

COMPARISON OF COGNITIVE STYLE SCORES BY AGE AND
SEX AMONG COMMUNITY COLLEGE STUDENTS AS
DETERMINED BY COGNITIVE STYLE MAPPING

A THESIS

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF MASTER OF SCIENCE

IN THE GRADUATE SCHOOL OF
TEXAS WOMAN'S UNIVERSITY

INSTITUTE OF HEALTH SCIENCES
SCHOOL OF HEALTH CARE SERVICES

BY

JOAN L. KANE, B.S.N.

DENTON, TEXAS

MAY, 1978

The Graduate School
Texas Woman's University

Denton, Texas

May 19 78

We hereby recommend that the thesis prepared under

our supervision by JOAN L. KANE

entitled COMPARISON OF COGNITIVE STYLE SCORES BY
AGE AND SEX AMONG COMMUNITY COLLEGE STUDENTS
AS DETERMINED BY COGNITIVE MAPPING

be accepted as fulfilling this part of the requirements for the Degree of
MASTER OF SCIENCE.

Committee:

Barbara J. Kramer

Chairman

Mildred M. Pittman

Anna M. L. Sanderson

Harriette B. Ehrhardt

Accepted:

Phyllis Bridge

Dean of The Graduate School

ACKNOWLEDGEMENTS

This author wishes to express her appreciation to the administration of Mountain View College, Dallas, Texas, and to Dr. Charles McCain, Mr. James Corvey, and Dr. Harryette B. Ehrhardt also of that institution, for their cooperation and support in the collection of data for this study. This author wishes to express her sincere thanks to the members of her graduate committee, Dr. Barbara J. Cramer, Dr. Mildred M. Pittman, Dr. Anne M. Gudmundsen, and Dr. Harryette B. Ehrhardt (Ad hoc committee person), for their untiring assistance throughout the preparation of this study. Finally, appreciation is expressed to her daughter for support in many ways and especially to her husband for his unceasing encouragement, patience, and assistance during the completion of this study.

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS	iii
LIST OF TABLES	vii
 Chapter	
I. INTRODUCTION	1
Problem	4
Purpose	5
Hypotheses	5
Definitions	6
Limitations	8
Delimitations	9
Assumptions	9
II. REVIEW OF LITERATURE	10
The Community College	10
The Associate Degree Program of Nursing	12
The Community College Student	14
Age Factors	21
Sex Related Factors	25
The Adult Learner	31
Curriculum Development	41
Learning Theories	47
Teaching Strategies	49
Cognitive Style	53
Cognitive Style Mapping	56
Dimensions and Models	63
Educational Implications	66
Student-Teacher Match	74
Constancy of Cognitive Style	75

	Page
Nursing Related Factors	76
Sex Related Factors	78
Age Related Factors	87
Summary	91
III. PROCEDURES	93
Population	93
Description of the Instrument	94
Data Collection	96
Treatment of the Data	100
IV. FINDINGS	102
Level of Significance	102
Means and Standard Deviations	103
Findings Within the Twenty-eight Items	107
Theoretical Symbols	107
Qualitative Symbols	110
Cultural Determinants	120
Modalities of Inference	123
V. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS	131
Summary	131
Conclusions	132
Patterns of the Means: Sex Groups	135
Patterns of the Means: Age Groups	136
Recommendations	143
APPENDICES	
A. COGNITIVE STYLE MAPPING SYMBOLS AND THEIR MEANING	147

	Page
B. COGNITIVE STYLE MAP	151
BIBLIOGRAPHY	152

LIST OF TABLES

Table	Page
1. Distribution of Student Population by Age and Sex . .	98
2. Numerical Size of Groups Sampled	100
3. Distribution of Means and Standard Deviations of Cognitive Style Scores, by Age and Sex Groups	106
4. Comparison of the Mean and Standard Deviation for Each Theoretical Symbol Item, by Age and Sex Groups	108
5. Comparison of the Mean and Standard Deviation for each Qualitative Symbol Item, by Age and Sex Groups	111
6. Comparison of the Mean and Standard Deviation for Each Cultural Determinant Item, by Age and Sex Groups	121
7. Comparison of the Mean and Standard Deviation for Each Modalities of Inference Item, by Age and Sex Groups	124

CHAPTER I

INTRODUCTION

For many years educators have sought more effective methods and means of assisting the student to learn. Instructional systems have been devised and innovative curricula developed. Each of these has its own unique possibilities, advantages, and disadvantages. New learning theories have been developed, and advances have been made in knowledge of the individual's social, cultural, psychological, and personality factors. Yet, it is clear that, with all of the technologies and innovations, no one instructional strategy or curriculum development is effective for all students.

The development of community colleges appealed to a type of person who had previously not attended institutions of higher learning. These persons have different characteristics and problems from the traditional student in higher education. The social and academic capabilities of the students range from very high to very low. The average age of the student is increasing. Many are employed full or part time. There are very few residential community colleges, and most of the students are commuters. Many

are married and have families. Typically, the students come from families of blue collar workers. Males have generally outnumbered females two to one. In specialized programs such as nursing there is a higher percentage of women than men.

Associate degree nursing programs are usually affiliated with community colleges. Hence, the student population in this nursing program retains many of the characteristics of the typical community college student population, with the exception of the male to female ratio. Also, most of the associate degree programs are more selective in their choice of applicants and do not practice a strictly open-door admission policy. Associate degree programs of nursing have been innovative in the development of technologies and curriculum and in the application of theories of learning. Still, some students are unsuccessful in learning those facts and skills that enable them to pass the State Board Test Pool Examinations. Providing efficient, effective, and economically responsible education for this "new student" is a challenge to the associate degree program of nursing and to the community college in general.

Increasing attention has been focused on the theory of cognitive styles of learning as a means of providing the missing elements between the student, the educator, the instructional strategies, and

learning theories. Each individual, students and faculty alike, has preferences for ways of learning and of relating to the learning environment. Cognitive style is one concept that has been devised to determine individual preferences for learning. Through the use of the cognitive style concept, a graphic representation or "map" of preferred learning style is determined. This "map" is prescriptive to facilitate educational strategies to meet individual needs. Faculty members are finding that by considering the preferred styles of learning of students and the teaching style of the faculty members, they can establish the most appropriate student-teacher match and teacher-learning strategies.

The older student may require instructional strategies that vary from those used with the traditional younger student. A review of the literature indicates that the average age of the community college student is increasing. Increasing numbers of older students are seeking a community college education, and they have had different environmental influences and experiences from those of the younger students. Curriculum and teaching-learning strategies of higher education have been developed for and practiced on populations of younger students.

Students are influenced in their orientations to life by their sex and occupational role expectations. Sex and occupational role expectations are changing. As a result, community colleges are finding that enrollment in courses which heretofore have been limited or dictated by sex role expectations are indicating a trend toward a sexual balance.

There has been increasing research and information on cognitive styles as they relate to personality type, instructional strategy-pupil match, teacher-pupil match, and vocational and career choice. There is less information available relating learning preferences to other factors, such as age and sex. Differences in cognitive styles of the different age groups and between the sexes could have implications for planning curriculum and teaching-learning strategies in a community college and an associate degree nursing program.

Problem

The problem is that there may exist differences in cognitive styles between males and females and the three age groups of community college students as determined by a Modified Hill Model Cognitive Style Map. Differences would have implications for instructional management.

Purpose

The purpose of this study was to investigate the differences in cognitive style scores between male and female students and between various age groups of community college students and to investigate the interaction in the cognitive style scores between age and sex of community college students. This was determined by a Modified Hill Model Cognitive Style Map.

Hypotheses

The hypotheses for this study were as follows:

1. There will be no significant difference in the cognitive style scores between male and female community college students as determined by a Modified Hill Model Cognitive Style Map.
2. There will be no significant difference in the cognitive style scores between three age groups of community college students as determined by a Modified Hill Model Cognitive Style Map.
3. There will be no significant interaction in the cognitive style scores between age and sex of community college students as determined by a Modified Hill Model Cognitive Style Map.

Definitions

For the purpose of this study the terms listed below have been defined as follows:

Cognitive style: the way in which an individual seeks and acquires meaning, reasons, and becomes informed in relation to how and where the learning takes place.

Cognitive Style Map (C. S. M.): a profile of the individual's preferred learning styles as determined through a Modified Hill Model which provides a picture of the diverse ways in which the individual prefers to acquire meaning.

Cognitive Style Mapping Instrument: a diagnostic tool used in determining learning style preferences through responses to a set of twenty-eight items (elements).

Modified Hill Model: a system for determining cognitive style based on Dr. Joseph Hill's Model.

Items or elements: twenty-eight symbols, each reflecting traits describing the manner in which an individual seeks meaning.

Sets (or groups): a system by which the twenty-eight items or elements are placed in categories consisting of: (1) Theoretical Symbols, (2) Qualitative Symbols, (3) Cultural Determinants, and (4) Modalities of Inference.

Cognitive style score: a numerical representation acquired as a result of responses to a set of eight questions or statements for each of the twenty-eight items (elements) in the Modified Hill Model Cognitive Style Inventory and recorded on the Cognitive Style Map.

"Major" score: a C.S.M. score falling between twenty-seven and forty.

"Minor" score: a C.S.M. score falling between sixteen and twenty-six.

"Negligible" score: a C.S.M. score falling between eight and fifteen.

Theoretical Symbols: represents an individual's process for working with words (linguistics) and numbers (quantitative) either by visual or auditory means.

Qualitative Symbols: reflect the process of getting meaning through the senses, codes, and certain programmatic effects which assist in interpreting the Theoretical Symbols.

Cultural Determinants: represents an indication of influences of culture and prior experience which the individual brings to bear in deriving meaning from symbols.

Modalities of Inference: represents an indication of the manner in which the individual reasons or infers.¹

Limitations

The limitations of this research were as follows:

1. The only Modified Hill Model Cognitive Style Map scores to be used in this study were those obtained through the Modified Hill Model Inventory utilized at the selected community college and available to the institution's computer system.
2. Scores were available for only those students who voluntarily participated in Modified Hill Model Cognitive Style Mapping and not for the entire student population in the community college.
3. The Modified Hill Model Cognitive Style Inventory has not undergone extensive investigation to establish reliability and validity.

¹ Definitions are based on a summary of definitions as presented in: (1) Arlen V. Schroeder, Cognitive Style: The Key to Student Placement? (Detroit: Oakland Community College Press, 1971); (2) Mountain View College, Mountain View College Workshop on "Cognitive Utilization of Cognitive Style Mapping," Dallas, Texas, October 22, 1977, Workbook, p. 1; (3) Crystal M. Lange, "Media and Learning Styles," Nursing Outlook 24 (November 1976): 672; and (4) Crystal M. Lange, "Determining Cognitive Styles," Nursing Outlook 24 (December 1976): 734.

Delimitations

The delimitations of this research were as follows:

1. Modified Hill Model Cognitive Style Map scores of those students seventeen years of age and older were utilized.
2. Students must have identified themselves either as male or female and by age.

Assumptions

The assumptions made for the purpose of this research study were as follows:

1. Students had correctly filled out information forms indicating their age and sex.
2. Students had all received the same Modified Hill Model Inventory, and the results have been computed using the same criteria.

CHAPTER II

REVIEW OF LITERATURE

This research study considers the student enrolled in the community college system. It describes the community college, the community college student, and the associate degree nursing program as it relates to the community college system. The study further reviews the literature in regard to such factors as curriculum developments, learning theories, teaching-learning strategies, and the age and sex of students; it then considers their possible implications for the education of community college students. Finally, this study explores research and recent literature concerning cognitive styles and Modified Hill Model Cognitive Style Mapping as they relate to educational management.

The Community College

Abundant literature is available concerning the community college. Monroe combines his insights into community college education with extensive research. He states that the community/junior college movement began in the early 1900's but that the first big growth came during the Depression. Following World War II,

with the return of veterans, a second period of large growth was seen. By the 1970's, new community colleges were being erected throughout the United States at a record pace because of the large numbers of high school graduates desiring a college education.¹

The community college differs from the traditional four-year college in that it provides opportunities for learning and personal development for persons with diverse interests, backgrounds, and needs and for whom college was previously inaccessible. It provides education for the masses. According to Monroe and Sims, it offers a wide range of varied learning experiences and services so that the personal needs and activities of all students who attend a community college are fully served. It usually maintains an open-door admission policy, low tuition fees, and a location within the community which makes education affordable and accessible to everyone. It offers the opportunity for educational, developmental, cultural, and recreational services. It is student centered, community based, innovative, offers a comprehensive curriculum, and has its emphasis on instruction. Programs include those of the vocational, terminal, general, and transfer nature. It is often characterized as

¹Charles R. Monroe, Profile of the Community College: A Handbook (San Francisco: Jossey-Bass, Inc., Publishers, 1972), pp. 1-20.

being more progressive and innovative than are the traditional four-year institutions. It has more freedom to break with traditional methods of teaching and to experiment with new ones.¹

Because it is a part of the community and responsive to it, it is necessary for it to adapt quickly to the student and community needs. In addition to the traditional post-secondary student, the community college serves the adult learner through its programs of part-time and evening college.²

The Associate Degree Program of Nursing

The associate degree nursing program is a two-year program and is usually based in a community college. It provides both a liberal and a technical education. It is an integral part of the parent institution. According to Michelmores, the program is organized for completion within the two-year period. Students must meet the requirements of the institution and the nursing program for admission, continuation of study, and graduation.³ The product of this program

¹Dr. David Sims, Class notes, EDFD 5413-30, Texas Woman's University, Denton, Texas, Fall, 1977.

²Ibid.

³Ellen Michelmores, "Distinguishing Between AD and BS Education," Nursing Outlook 25 (August 1977): 506-510.

is an Associate Degree Nurse (ADN) who is eligible to take the State Board of Nursing examination and become a registered nurse.

Schweer states that:

The associate degree program aims to prepare graduates who can function under supervision as beginning staff nurses to give direct nursing care to patients and to collaborate with other nursing and health team members in providing individualized nursing care. The focus of learning is on knowledgeable and skillful application of scientific principles to the performance of prescribed nursing techniques: identifying simple nursing problems and providing nursing measures to relieve problems.¹

Cross states that "The two most frequently cited purposes of education are to prepare the student for a vocation and to add to the general enrichment of life."² The community college philosophy incorporates these concepts. As a part of the community college, the associate degree nursing program also incorporates these concepts in its philosophy and curriculum development. Associate degree nursing programs have been innovative in development of curriculum and in the use of various teaching strategies.

¹Jean E. Schweer and Kristine Gebbie, Creative Teaching in Clinical Nursing, 3d ed. (St. Louis: The C. V. Mosby Co., 1976), p. 19.

²Kathryn Patricia Cross, Beyond the Open Door (San Francisco: Jossey-Bass, Inc., Publishers, 1974), p. 109.

The Community College Student

With the development of the community college came a new type of student. These students are seeking a college education because they believe that it will be the key to future success in life. The student population of the typical community college does not vary widely in its interests and abilities from the general population. Their capabilities range from very high to very low both socially and academically. Authors Sims, Monroe, Glass and Hodgin, and Cross agree that the majority of community college students tend to come from families of the lower middle class and blue collar workers. Therefore, they are from the lower socio-economic community. These authors also agree that the students tend to have low academic skills and have been unsuccessful in high school. The students often are married. They are commuters, and they may be employed full- or part-time in addition to their school activities.¹

Rodgers states that a questionnaire concerning work habits given to Mountain View College students in the spring of 1977 revealed the following information: of those responding, 78 per cent

¹ Sims; Monroe, pp. 181-206; J. Conrad Glass, Jr. and Hubert H. Hodgin, "Commuting Students and Cocurricular Activities," Personnel and Guidance Journal 34 (January 1977): 253-256; Cross, Beyond the Open Door, pp. 4-17, 32-55, 60-69, 79-85.

were working, 20 per cent worked fewer than thirty-one hours per week, 50 per cent worked between thirty-one and forty hours per week, and 30 per cent worked more than forty hours per week.

Therefore, of the 78 per cent who stated that they worked, 80 per cent worked more than thirty-one hours per week in addition to going to school. Results of a study during the fall semester, 1977, are not yet available.¹

Glass and Hodgin state that the students appear to be more conventional in their attitudes, less independent, and more authoritarian than do four-year students. The authors relate that important reasons for attending a community college include limited financial resources, parental influence, and institutional proximity. The students desire to remain in the community and may have a job which they need to continue. The college is seen as a means to an end and as an opportunity to select those courses that will enhance the achievement of their goals.² These reasons for attending a community college are supported by Cross and Monroe, who also state that a prime motivating factor is the inability to meet entrance

¹Dr. Sam Rodgers, Director of Institutional Research, Mountain View College, Dallas, Texas, Telephone conversation, March 8, 1978.

²Glass and Hodgin, pp. 253-256.

requirements of the four-year institutions, rather than a lack of finances.¹

The community college attracts students seeking vocational training, as well as those seeking transfer credits and those seeking enrichment through community service courses. The open door admission policy permits persons with low achievement scores to enroll. Cross states that although opening the door to education is a significant accomplishment, it is not enough for students may encounter more of the same kind of education that failed to serve them in the past. She discusses the task of developing an education which will serve the needs of "new students" to higher education. She relates that philosophies of who should go to college are changing and that the educational experiences in the American school system have differed for the "new student" and the traditional student. Her research description of the "new student" describes their interests, aspirations, attitudes, values, and personality characteristics as differing from those of more traditional students. She categorizes the "new students" as those scoring in the lowest third

¹Kathryn Patricia Cross, Accent on Learning (San Francisco: Jossey-Bass, Inc., Publishers, 1976), pp. 3-20; Monroe, p. 185.

among national samples of young people taking traditional tests of academic ability. Most of the "new students" are Caucasians whose fathers work at blue collar jobs. Most of the parents have never attended college, and the expectation of a college education is new to the family. These students enter because they recognize higher education as a way to a better job and a better life, not because of a love of learning or a desire to become well educated. Two other groups of people (ethnic minorities and women) are new to higher education. However, they do not necessarily fall into the category used for research descriptions of the previously described "new student." These two groups may present new and unique needs as students and are also considered by Cross to be "new students."¹

Cross states:

. . . there is a New Student to higher education and that institutions of higher education are not prepared to educate him. Traditional education has failed him in the past; and unless substantial changes are made, it will fail him in the future.²

Cross discusses many factors that are important in the education of "new students." Most of the "new students" are becoming students

¹ Cross, Beyond the Open Door, pp. 5-17.

² Ibid., p. xii.

of methods of failure. The psychology of failure is threatening and reinforcing. The fear-of-failure syndrome is influential in determining aspirations in school. The student may decide that if total success cannot be achieved, then total failure is the next best choice. The students have found that success is assured as long as they persist with something they know, and they are threatened when they try new things. Another area in which "new students" may have difficulty is in critical thinking. This has implications in occupations requiring this type of mental activity.¹ Nursing is one of those occupations.

Cross points out that a nursing student is much more likely to associate college study with specific job skills than is a student pursuing a general/liberal arts curriculum. Those females pursuing nursing careers score especially high on the Vocational Motivation Scales of the Comparative Guidance and Placement Programs (CGP). Those students scoring high on the CGP appear quite positively attracted to their field of study and present an especially strong picture of career motivation. Those students are much more likely than the average community college student to know what line of work

¹Ibid., pp. 18-31.

they want to enter and to spend time thinking about their future careers. As a group, students enrolled in the health curricula are noteworthy for their satisfaction with their choice.¹ Reilly states that nursing has become a means of upward mobility for many individuals as nursing education opportunities are made available to persons previously unable to participate. Nursing provides the opportunity for career employment. Motivations for entering nursing are varied and complex.²

Continuing the discussion of "new students," Cross describes an analysis of the ways in which these students perceive their educational experience. From this has been drawn some rather broad and speculative conclusions: New students are more uncomfortable in the traditional academic setting than are the traditional students; they are more likely to feel that the academic pace is too fast for them; they are more likely than the traditional students to feel nervous or shy in the competitive classroom; they are more eager for college assistance with problems related to academic

¹ Dorothy E. Reilly, Behavioral Objectives in Nursing: Evaluation of Learning Attainment (New York: Appleton-Century-Crofts, a publishing division of Prentice-Hall, Inc., 1975), p. 19.

² Cross, Beyond the Open Door, p. 83.

achievement; and they are more interested in counseling help with personal problems.¹

Scott and Holt state that a mature woman who becomes a student again may find that campus activities are geared to the needs of eighteen year olds. It may be difficult to get the kinds of courses needed. The mature woman also may need information, advice, financial aid, and assistance in budgeting time in relation to both family and campus responsibilities. A program was instituted which helped guide mature women back to the classroom. Faculty, along with an advisory committee, met to discuss academic, social, and personal needs of women who planned to return to school. Discussion groups were provided along with orientation and counseling which would omit material directed at eighteen year olds and emphasize re-entry problems. A lecture series by faculty members from different disciplines was planned and implemented. Students responded enthusiastically to the "returnee" program, and there were plans to continue the program. It was felt that groups should

¹Ibid., p. 83.

be instituted on other campuses, each tailored to the local needs and resources.¹

Age Factors

The community college student may typically fall into one of two broad categories: the full-time student who tends to be younger in age, and the part-time student who tends to be older. Sims indicates that the evening students at Mountain View College comprise 50 per cent of the student body. The average age of the student body is twenty-seven years.² Rodgers states that the median age of the student body during the fall of 1977 was 24.3 years.³ Data from the Statistical Abstract of the United States based on the population survey indicate the following: in 1975, 46.9 per cent of the population in the eighteen to nineteen year age group was enrolled in school; in the twenty to twenty-four year age group, 22.4 per cent; and in the twenty-five to thirty-four year age group, 8.5 per cent. In all three groups more males than females

¹ Ruth Scott and Lillabelle Holt, "The New Wage: A College Responds to Women Returnees," Phi Delta Kappan 58 (December 1976): 338-339.

² Sims.

³ Rodgers.

were enrolled. This data, based on enrollment in all educational institutions, also reveal that the percentage of students enrolled in school was increasing in the twenty to twenty-four year and the twenty-five to thirty-four year age groups in the years between 1970 and 1975.¹

Tibbles, in discussing a philosophy for continuing education in nursing, states that at about the age of forty, after the children are grown, females seek employment. Developmental levels are related as concerns in relation to continued learning in nursing. The concept of "andragogy," based upon four assumptions about adults as learners, is related. There are differences in the assumptions for adults as opposed to children. These four assumptions are related to self-concept, reservoir of experiences, developmental tasks of social roles, and change in time perspective.² Pruitt relates that in two community college schools of nursing the age ranges were:

¹U. S. Bureau of the Census, Statistical Abstract of the United States, School Enrollment by Sex and Age: 1970 to 1975 (Washington, D. C.: U.S. Government Printing Office, U.S. Department of Commerce, 1976), p. 120.

²Lillian Tibbles, "Theories of Adult Education: Implications for Developing a Philosophy for Continuing Education in Nursing," The Journal of Continuing Education 8 (July-August 1977): 25-28.

twenty to twenty-nine years, 50.8 per cent; thirty to thirty-nine years, 35.3 per cent; and forty to forty-nine years, 13.9 per cent.¹

Wren reports that the associate degree nursing students had an average of 24.4 years, which was significantly different from the diploma nursing students with an average of nineteen years and the baccalaureate nursing students with an average age of 19.9 years. Older students seemed to be attracted to an associate degree program. Other characteristics which are typical of the community college student were also characteristic of the student in the associate degree nursing program.²

Reilly states that age is a critical variable as the numbers of adult learners participate in nursing programs, continuing education programs, and in community groups involving the teaching-learning situations. Diverse motivations are present. It may be an opportunity for a new career choice or a career change. However, "all nursing programs feel the impact of these adult learners

¹Susan Pruitt, "Selected Criteria of Graduates from Two Associate Degree Nursing Programs" (Master's thesis, Texas Woman's University, Denton, Texas, 1977), p. 30.

²George R. Wren, "Some Characteristics of Freshman Students in Baccalaureate, Diploma, and Associate Degree Nursing Programs," Nursing Research 20 (March-April 1971): 167-172.

as the concept of life-long learning becomes accepted in practice."¹

A Dallas Morning News article includes the following data:

At least one of every three students entering college in the fall of 1978 will be an adult over twenty-five years of age; Census Bureau estimates are that adults over twenty-five years of age constitute 34 per cent of the total college enrollment for 1975; 12 per cent higher than in 1971; their studies project that the percentage could rise as high as 40 per cent by 1980; the average age of students at Empire State College in New York is thirty-seven years. The article draws the conclusion that establishing hundreds of after-hours and weekend courses and convenient locations has helped to boost enrollments of adults at large public universities. It also observes that as the percentage of eighteen to twenty-four year olds in the population drops, the corresponding rise in the population above that age offers a large potential market for higher education.²

¹ Reilly, p. 20.

² "College Campus Welcomes Growing Number of Adults," The Dallas Morning News, January 8, 1978, Sec. I, p. 20.

The preceding data seem to substantiate the theory that the average age of the community college student is increasing. This trend also holds true for the associate degree programs of nursing. The average age of the community college student is above that of those in other institutions of higher education.

Sex Related Factors

In the typical community college, males have outnumbered females two to one. Among black students, females tend to outnumber males. In specialized programs, such as nursing, there is a higher ratio of women.

Cross discusses women as new students and relates research indicating differences between males and females. These differences can be of significance in the educational setting. She states that as education becomes important to females and that as increased attention is given to equal opportunity, the traditional ratio of males to females will change. Results of various research in relation to males and females when verbal and quantitative measures are combined indicated that males have slightly better total test scores than do females. Traditional tests of academic aptitude usually show a slight female superiority in verbal abilities, whereas males outscore

females on quantitative measures. There seems to be the probability that these tendencies are acquired from their cultural surroundings. Females, however, have higher grade point averages in high school than do males. Females attach more importance to grades than do males.¹

Females scored higher on fondness for working with ideas and abstractions in a variety of areas such as literature, art, and philosophy. Males scored higher on interest in theoretical problems and use of the scientific method in thinking. There is no difference between the sexes in flexibility and tolerance for ambiguities and uncertainties. Females tend to rely somewhat more heavily on financial support from their parents, whereas males tend to draw more on earnings from past jobs or from summer or part-time jobs during college. Just over half of females will be content with two years of college or less, whereas slightly over half of the males aspire to four years of college or more.²

Females tend to have a diminished self concept. Classroom anxiety is more prominent among female students than among males.

¹ Cross, Beyond the Open Door, pp. 133-153.

² Ibid.

Females do not enjoy competition as much as do males. School is a competitive situation. Interests of males are directed toward attaining status in a competitive world, whereas the interests of college females conform to the expected passive role.¹

Larger percentages of females than of males express interest in helping people in difficulty, raising a family, creating art, developing a philosophy of life, and influencing social values. Males express more competitive drive by valuing achievements such as becoming authorities in their fields, obtaining recognition from peers, becoming administratively responsible, and attaining financial and business success. College females in the past have been protected from competition within traditionally women's fields. Females are increasingly entering the labor market. Sex roles are changing. Career aspirations of females are rising.²

Wren studied characteristics of freshman students in baccalaureate, diploma, and associate degree nursing programs (ADN). In relation to the students in the diploma and baccalaureate programs, the ADN students had a higher average age, had a

¹Ibid.

²Ibid.

significantly higher proportion of married or have-been-married students, traveled a shorter distance from their homes to the school of their choice, were more apt to support themselves by doing part-time work while students in the nursing program, were more apt to have fathers and mothers who had less than a high school diploma, had a larger proportion who finished in the last quartile of their high school graduating class, had significantly lower Scholastic Aptitude Test (SAT) scores, had a larger proportion who were licensed practical nurses (LPN) or had attended an LPN school, and had more previous experience in the health care field before entering nursing school. The ADN student chose the present school because it was close to home and because of the low cost. They chose nursing as a career in order to help people and because they always had wanted to be a nurse.¹ This study seemed to be limited to females, for no males were mentioned in the report of the study. These characteristics are consistent with the characteristics of the general community college student.

Reilly indicates that there is now more heterogeneity in nursing education which includes students with limited educational

¹Wren, "Some Characteristics of Freshman Students in Baccalaureate, Diploma, and Associate Degree Nursing Programs," pp. 167-172.

preparation as well as students with all degrees of experience and previous education. "We further note the demise or lessening of the importance of nurses' residence as more students become commuters who may be working part-time or have family responsibilities."¹

A study by Johnson indicated a significant change in the proportion of males recruited into the registered nurse (RN) and the licensed practical nurse (LPN) programs. From 1969 to the 1971 admissions the percentage of males admitted into the RN program increased from 3.5 per cent to 6 per cent. The number of males admitted into the LPN program increased from 4.4 per cent to 5.3 per cent. The percentage of males admitted into the associate degree nursing program (ADN) was 7.2 per cent. Overall there was an average of 5.7 per cent males in the RN and LPN programs.² This indicates that the percentage of males in the associate degree nursing programs is higher than the percentage of males in all nursing programs.

¹Reilly, p. 20.

²Walter L. Johnson, "Admissions of Men and Ethnic Minorities to Schools of Nursing," Nursing Outlook 22 (January 1974): 45-49.

Reilly states that there has been a small, but insignificant, increase in the number of males in nursing practice. Men experienced in the medical corps are entering health careers such as nursing. Male participation in nursing will probably increase with the expanded role of nursing, the greater variety of opportunities for practice, and the wider acceptance of men in our society in this role.¹

Garvin states that males constitute less than 2 per cent of all licensed registered nurses. Those males who do enter nursing tend to be older and married when entering school. The average age of the male students was higher than that of the female students. The population was from a baccalaureate school of nursing, and the purpose of the study was to examine values of male nursing students.²

The research indicates that there are differences between males and females which may affect the educational environment. There is an indication that more male students are entering nursing programs. There is also conflicting statistical information as to the

¹Reilly, p. 20

²Bonnie J. Garvin, "Values of Male Nursing Students," Nursing Research 25 (September-October 1976): 352-357.

numbers of males in nursing programs. However, the overwhelming proportion of students in the nursing programs is still female. There are still more male than female students in the community college as a whole.

The Adult Learner

The community college is challenged not only by the new type of student with a lower-than-average academic ability but also by the older students enrolling in increasing numbers. Although much more research is needed, certain characteristics of the adult learner and learning are known. The adult students in the community college are very much a part of the community. The students may be married and have family responsibilities. A high percentage work full-time or part-time. They are also members of and have an established role in the community, within the church, neighborhood, civic organizations, clubs, recreational activities, and work related organizations. Hence, their interests are not primarily centered in the college. These responsibilities and interests make demands upon the emotions, time, and energy of the student.

Monroe states that we must adapt teaching methods and curriculum to the needs of the older generation of students who wish

to be treated as adults and who may require a great deal of understanding and patience from the instructor. This is especially true in matters such as long reading assignments and objective examinations. Older students require extra time to regain lost reading and study skills.¹

Havighurst states that activities of living and growing are learning tasks and that the individual learns his way through life. The young adult in simple societies has mastered most of the learning tasks of life, and learning is almost over. This is not true in the modern, changing society where the individual must continually learn to adapt to changed conditions. Havighurst states that the tasks the individual must learn are the developmental tasks of life which may be located at the ages of special sensitivity for learning them.² He defines a developmental task as

. . . a task which arises at or about a certain period in the life of the individual, successful achievement of which leads to his happiness and to success with later tasks,

¹ Monroe, p. 187.

² Robert J. Havighurst, Developmental Tasks and Education, 3d ed. (New York: David McKay Company, Inc., 1974), pp. 1-7.

while failure leads to unhappiness in the individual, disapproval by the society, and difficulty with later tasks.¹

Havighurst describes the developmental tasks of middle age. During these years, women may enter or return to the labor force. Men may make middle years job or career changes. These may necessitate provision for education, either as retraining or as training for a new career. Middle-aged adults may be seeking new leisure time activities which would be a source of interest and pleasure during the years to come. Important, as far as education is concerned, is the task of developing new interests and activities appropriate to biological and psychological capabilities.²

Tibbles discusses the adult female in relation to the theory of changing roles and developmental levels, which has previously been described. There are changing patterns of interest and significance. The social role changes and developmental levels establish a changing readiness to learn. This readiness facilitates learning. She states that learning for the adult should be self directive and problem and experience centered. She suggests that effective methods and techniques include self-directed inquiry, independent discoveries,

¹Ibid., p. 2.

²Ibid., pp. 95-106.

and relationships of concepts. Learning is facilitated when new content is recognized by the learner as being different from knowledge he now has. Provision of learning experiences with opportunity to examine differences, make comparisons, and study new relationships is indicated. Effective learning experiences for adults are small group discussion and task accomplishment in small groups.¹

There have been beliefs and assumptions in the past that decreased learning ability occurs with increased age. Okun reviews various laboratory experimental research studies. These studies included adults of all ages, with the older adult (approximately sixty years and older) considered to be the thrust of the study. The findings of the research on adult learning are discussed, and the results of the research in relation to instructional implications for the older adult are outlined. He states that laboratory researchers are only beginning to investigate variables which may be related to the instructional process. The research studies revealed differences in learning in the older adult in each of the following variables: rate of presentation of information, organization of information, mode of presentation of information, covert strategies, meaningfulness of

¹Tibbles, pp. 25-29.

material, degree of learning, introduction of new material, transfer effects, feedback effects, and climate. Research experimental tasks indicated that a group of adults made significantly fewer errors and took longer to respond than did a younger group. This may reinforce the contention that older adults are more careful and deliberate and perform better than do young adults on tasks which de-emphasize constraints of time and memory processes.¹ The ages of community college students extend on a continuum from late teens to late adulthood. Research studies which include variables related to this age span may have implications for instruction of adult students.

Tomaino discusses the implications of teaching styles, whether college students are taught in an adult climate or a child-focused milieu, and whether learning is being linked to reality or is an exercise unrelated to the student's world. The principal differences between adult and child learners is discussed in relation to differences in self-concept, amount of experience, readiness to learn, and time perspectives. Adults view themselves as more

¹ Morris A. Okun, "Implications of Geropsychological Research for the Instruction of Older Adults," Adult Education 27 (Spring 1977): 139-155.

self-directing and able to manage their own learning. Adult students can assist in their own planning. They enter educational activity with a greater reservoir of experience from which to draw ideas, and they are less dependent upon experts and textbooks. The teacher can place greater emphasis with adults on experimental learning techniques. The developmental level and tasks of the adult differ from that of the child. Adults are more likely to respond to learning as "new" actions with problem-solving features, whereas children accumulate information for further use.¹

Hechinger discusses the adult student and the trend toward continuing education or life-long learning. Educators have considered school and college in terms of established, fixed ages and stages. Part-time study, which has not been accepted in many institutions, limits attendance of great numbers of persons. Within the past few years, however, attitudes and assumptions have begun to change. Continuing education is now viewed favorably as an answer to the prospects of declining college enrollments. Economic pressures are persuasive. Increasing numbers of people who are

¹Louis Tomaino, "On Teaching College Students as Adults," Improving College and University Teaching 25 (Winter 1977): 13-15.

middle aged and older will seek new interests and skills. Women, in particular, are turning from homemaking to careers, either by retraining for previously held careers or by establishing new ones. Adults and part-time students are seen by some as a "new majority" with whom learning may be considered as a life-long activity. Part-time students ought to be the rule rather than the exception. Relatively few institutions have made any substantial commitment to the education of adults. Professions such as medicine, law, teaching, and sciences find a need for a continuing education to update knowledge of new developments. Some adults are seeking to explore new directions or fill in the gaps of previous education. The continuing education movement runs counter to the notion of degrees and credentials previously dominating higher education.¹ Hechinger describes inherent dangers in the continuing education movement which would affect the quality of education. One such danger is that adult students are regarded as filling temporary vacancies of younger students, and they are expected to adjust to the status quo rather than expecting new dimensions for learning to be developed and provided for them. He states that the capacity of colleges and universities to

¹Fred M. Hechinger, "Education's 'New Majority,'" Saturday Review 2 (September 20, 1975): 14-18.

grasp the needs of the older student consistently and to respond to them will require flexibility. Adults of all ages can make higher education once again a growth industry.¹

Bishop and Van Dyk examined institutional and individual determinants of adult participation in higher education. They consider adult students as those of twenty-five years and older. Age, sex, number of children, income, and occupation played roles in predicting adult attendance in degree-credit college enrollment. The likelihood of a male's attending college was tripled if he were a Vietnam veteran. Lowering tuition increased the college attendance rates of adults, as did the establishment of a new two-year college in an area previously without one. Enrollment growth due to cultural changes, such as the lifelong learning movement and the women's movements, may continue. However, the authors feel that the adult enrollment growth rates are not likely to continue. They feel that there is little public policy that can further stimulate the growth of adult enrollment, except for the lowering of tuition. This is despite

¹Ibid.

the fact that the adult student usually has an income that is relatively large in comparison to tuition.¹

DeMott indicates that adults can improve themselves by enrolling in a course or program in one of three ways: by adding a skill, preparing for a new career, or broadening and increasing interests. The newer clientele for educational services differ from the more traditional groups. They have their own ways of inhabiting the classroom, laboratories, and libraries. Inner changes which are undergone and relationships which are formed have meanings and consequences which differ in adults from those common among younger people. In planning to meet the needs of adult education, it is essential that there be a clear understanding about the nature of the relationship between intermittent study and human self-development. It is also essential that there is a workable theory of the place and purpose of continuing education in the whole life of the community. DeMott feels that references to the subjective worlds of students themselves, the human, personal consequences of such endeavor, are necessary to frame an intelligent philosophy of mature-life study. These

¹John Bishop and Jane Van Dyk, "Can Adults Be Hooked on College?" Journal of Higher Education 48 (January-February 1977): 39-58.

consequences can be grouped in two categories, one related to the self and the other to the community. He feels that lifelong learning cries out for a philosophy that is adequate to meet the elements of uniqueness and potential social force.¹

Gould states that the Commission on Non-Traditional Study has sought information concerning the number of students at different age levels and stages of educational development as well as from different social groups. One interest is a knowledge of preferences for non-traditional to traditional options. Even though the available information has increased, the answers to questions are not readily available. One finding is that adults tend to prefer traditional programs when they return to the academic world because they remember them from earlier experience and are more comfortable with them.²

Education is no longer considered a "once in a life time" event. Rather, it is an on-going process for a life time. Adults are responding in ever greater numbers. Colleges and universities

¹Benjamin DeMott, "'Adult Ed'--The Ultimate Goal," Saturday Review 2 (September 20, 1975): 27-29.

²Samuel Gould, Diversity by Design (San Francisco: Jossey-Bass, Inc., Publishers, 1973), p. 31.

have the responsibility to acknowledge and respond to the adult student in a manner appropriate to meet their needs.

Curriculum Development

Curriculum developments reflect the educational philosophy of the times. The curriculum is the means by which the objectives and functions of the institution are organized into learning experiences. Authors agree that learning does not all take place within the institution, nor does a college education constitute the entire body of knowledge, habits, attitudes, and values acquired by the individual.

Monroe says that there are three guiding principles that seem appropriate for building a good community college curriculum. He cites comprehensiveness, relevance, and teachability. A comprehensive curriculum offers a range of learning experiences that is wide enough and varied enough so that the personal need and abilities of all students who attend the community college may be fully served. Relevance pertains to the meaningfulness of the curriculum. Relevance for the student varies. Teachability means reasonableness or practicality, application of common sense and sound principles of

educational psychology to create subject material which the student can comprehend and learn to use.¹

Conley traces the development of curriculum trends from the past to the present. During the past two decades, with the rise of scientific psychology and realistic philosophy, the informational and practical aspects of education began. The psychology of individual differences and educational programs directed attention to individualized instruction. Vocational and practical aspects took a leading position along with the general development of character, discipline, and knowledge.²

Curriculum began to be shaped by the needs of society. It was felt that school experiences should be planned with reference not only to good learning activities for the individual student, but also to the social significance of the problems facing the students.³

In the second half of this century there have been a multitude of technological and scientific innovations. Although there are many points of view concerning changing purposes of education among

¹Monroe, pp. 47-50.

²Virginia C. Conley, Curriculum and Instruction in Nursing (Boston: Little, Brown, and Company, 1973), pp. 11-16.

³Ibid., p. 13.

educators, one fundamental purpose remains common to all: the education for the young of this country is concerned with the development of their capacities to enable them to live personally and socially satisfying lives. Recently, curriculum appears to be concerned with assisting students to acquire certain behaviors that will be useful to them in the modern world. Curriculum development is a process of selecting and offering learning opportunities likely to assist the student in acquiring those behaviors while in school.¹

Holtzman states that for generations the purposes of higher education, the content of college curricula, and the nature of good teaching have been debated. Every student is expected to keep essentially the same pace or drop out. Remediation has often been a slowing down of the pace rather than any real change from the traditional approaches. Traditions and instructional methods that have served well in the past are now being questioned. A less routine and more personalized education is needed. Education should not only impart knowledge from the past, but also provide for problem solving for the future. The number and variety of students to be served will be expanded with the increased universality of access to

¹Ibid., pp. 11-16.

some form of higher education. More students are going on to college in the belief that a college education will be the key to future success in life. Their progress, however, has been hampered by the lack of adjustment between traditional instruction and the variety of abilities, patterns, motivational dispositions, and cultural preferences they bring with them. A better match to students' needs and preferences is needed. A cultural revolution is still taking place. Some academic changes endorsed by students are better teaching, more relevant courses, abolition of grades and required courses, more personal contact with faculty, and more outlets for creative interests. The next ten years, with a slowing down in growth and a leveling of enrollments will provide opportunity for conditions favorable to reform.¹

Supporting the concept of matching students' needs and preferences in educational practice, Cross discusses several possible matching strategies. These are described as a "challenge match," "remedial match," "compensatory match," or "capitalization match. The type of match selected would depend on the situation,

¹ Wayne H. Holtzman, "Education for Creative Problem Solving," in Individuality in Learning, ed. Samuel Messick and Associates (San Francisco: Jossey-Bass, Inc., Publishers, 1976), pp. 23-33.

the purpose of the instruction, and the area of strength or need to be developed.¹

Cross states that the typical American college has three curricula: what we say we teach, what we do teach, and what students learn. This results in a catalogue curriculum, a teaching curriculum, and a learning curriculum. These may bear little resemblance to one another in actual practice. The catalogue curriculum is well known, but the teaching curriculum and learning curriculum are not. There is knowledge about what happens to students as they proceed through college. Little is known about the conditions of learning that are responsible for success or failure. A student-centered curriculum should make learning maximally effective for each student, not just for the average student. It provides for individual differences in learning. Cross identifies four major dimensions important to learning: rate of learning, life situation, learning styles, and goals. Students differ in relation to each one. These individual differences became obvious and a serious problem for colleges when the open admission policies began in the 1960's. Cross states that those who attend part-time now constitute the

¹ Cross, Accent on Learning, pp. 126-127.

majority of American college students, which means that the majority of students today have other responsibilities.¹

As is DeMott, Cross is concerned that with their eagerness to attract older students, institutions be responsible in offering education with a form and content that is maximally useful to students and to society. In relation to learning styles and goals, Cross indicates less progress has been made than in knowledge of the rate of learning and life situation of the student. She relates that we must face the reality that students do not grasp the significance of the catalogue statements of educational goals or incorporate them. One of the most important of all educational goals is the ability to make sound value judgments. The ability to solve academic problems bears little or no relationship to the ability to solve real-world problems. She suggests that students should practice thinking about real problems.²

An open door admission policy is not enough. Cross states: "There are signs, especially in community colleges, that the

¹K. Patricia Cross, "Learner-Centered Curricula," in Learner-Centered Curriculum: Current Issues in Higher Education, ed. Dyckman W. Vermilye (San Francisco: Jossey-Bass, Inc., Publishers, 1974), pp. 54-65.

²Ibid.

curriculum is being reshaped to fit the needs of the New Students."¹ Cross further states: "If history repeats itself, and it surely will, college curricula will slowly respond to the changing needs of the nation. There will be no revolution; it will look more like continuing evolution."²

Learning Theories

Bigge discusses learning theories reflected in school practice. Three major classifications are: (1) the mental discipline theories of the mind substance family, (2) the stimulus-response conditioning theories of the behavioristic family, and (3) the cognitive theory of the Gestalt-field family. Those in use today are primarily the stimulus-response and the Gestalt-field theories.³

Cross states: "Behaviorists stress the application of scientific principles to improve teaching-learning process, whereas humanists emphasize the need for personal attention and human

¹Cross, Accent on Learning, p. 20.

²Reilly, p. 21.

³Morris L. Bigge, Learning Theories for Teachers, 3d ed. (New York: Harper and Row, Publishers, 1976), pp. 3-12.

warmth."¹ At the present time the behaviorists are dominating the educational scene.

Reilly states that numerous theories of learning are based on various assumptions about man, the nature of knowledge, and the process by which one learns. Teaching activity would be purposeless and obscure unless a teacher operates within the framework of a theory of learning, whether or not it is verbalized. This theory is reflected in the approaches to teaching and the expectations of the learner and teacher. She states that various classifications of learning theorists exist, but they may be generally identified as associationists, conditionists, behaviorists, cognitive field theorists, and phenomenological theorists. The two most widely diverse concepts of man are the behavioristic and phenomenological, and these two form a basis for the two prominent theories currently favored in educational practice.²

Much literature and research is available on the concept of learning theories. Familiar learning theories are employing reinforcement, transfer, extinction, knowledge of results, praise and

¹Cross, Accent on Learning, p. 49.

²Reilly, p. 21.

reproof, and shaping. These concepts are utilized throughout the various teaching-learning strategies.

Some things are known about how people learn, and these things do have implications for teaching. There is disagreement about which particular theory of learning is best. Things are known about how behavior is affected by reinforcement, how people process and remember information, the relationship of question asking to learning, and how people learn through active involvement in small groups. Teaching strategies are available to implement these theories.¹

Teaching Strategies

Most people would agree that the goal of education is to produce educated persons. In the matter of which method, strategy, learning theory or system to use, there is less agreement. To meet the changing demands for education, new educational systems and strategies have been developed. Effective teaching employs various learning activities, instructional systems, and strategies based upon various learning theories. The teacher may want to choose a strategy that best fits the goals of the course or lesson.

¹James R. Davis, Teaching Strategies for the College Classroom (Boulder, Colorado: Westview Press, Inc., 1976), p. iv.

Mastery learning is a concept of significance to the community college student. Block states that "mastery learning approaches assume that virtually all students can master a great deal of what they are taught in school." Certain conditions are necessary to accomplish this, such as help for students when and where they have learning difficulties, sufficient time being given to achieve mastery, and establishment of a clear criterion of what constitutes mastery. Block further states that

. . . mastery approaches are designed for use in the typical classroom situation; they can be implemented in a group based, teacher-paced format; and they rely primarily on human beings, rather than on technological devices, for their success.¹

Davis supports this concept. He feels that the emphasis in mastery learning is on a very thorough and systematic approach to evaluation. Specific criteria are established and students are evaluated solely with reference to the criteria.²

There is no lack of literature and research in the area of instructional strategies and systems. Unfortunately, most of the studies indicate no significant differences, regardless of which method is

¹James H. Block, "Individualized Instruction: A Mastery Learning Perspective," Educational Leadership 34 (February 1977): 337.

²Davis, pp. 31-33.

used. It has been found, however, that certain methods and strategies are more effective for certain purposes than are others. Davis indicates that lecturing can be an effective means of communicating information, but other methods are more important in achieving higher cognitive and attitudinal objectives. Lecturing can be used effectively for its motivational value. Discussions prove helpful in achieving certain objectives but may vary in effectiveness according to the manner in which the discussion is conducted. Laboratory methods are helpful in developing problem-solving abilities, if that is the intention. Independent study seems to increase motivation but may be less effective in bringing about other desirable educational outcomes. Automated techniques vary in their effectiveness according to the quality of the materials used and the objectives pursued. Strategies are discussed with consideration given to the fact that different methods seem to be effective for different objectives.¹

Gould, in a discussion of technology, states that technology is a response to a perceived need. If technology has not been used to increase the options available to students, he feels the fault may

¹Davis, pp. 3-4, 25-37.

be with the educators' lack of wisdom rather than with the technology itself.¹

Generally, teaching strategies may be categorized into the following groupings: lecture, inquiry or discovery, group processes, and individualized instruction. Technologies and systems have been developed to facilitate their use. It is not so much a matter of availability as one of how and when to use them.

Curriculum has changed and is still in the process of changing to meet the needs of a new type of student. Theories have been proposed as to why and how individuals learn. Instructional systems and technology have been developed to provide a vehicle for implementing educational practices. These have all been available to teachers and students. Brooks, in discussing improvement of teaching and learning, states that "Although there is no shortage of learning theories or attempts to define good teaching and learning, important parts of the puzzle are still missing."² There still are students who do not learn.

¹Samuel B. Gould, pp. 98-99.

²Mindy Brooks, "Cognitive Styles Impact Education," NETCHE Newsletter 11 (November 1977): 1.

Cognitive Style

It is evident from research that the advent of the community college has had far reaching effects upon educational instruction and that it has introduced higher education of a different kind of student, one with a wide variety of abilities, interests, and backgrounds. Differences that distinguish one individual from another affect the basis of the student's receptivity to learning. Mental activity is not directly observable as overt behavior. Nevertheless, individuals are influenced by conscious, covert mental processes. Cognitive psychologists have just begun to study this area. Cross states that although research has been going on in this area for twenty-five years, there has been little application to the educational process. Innovative methods and strategies have been developed, but their effectiveness has been questioned. Which methods work for which students is not being explored.¹

For the past decade the value of individualized instruction has been emphasized. Numerous systems and a multitude of materials have been developed. However, it is evident that individualized instruction is not the answer to all of the challenges of educating students. Programmed instruction offered promise of reducing

¹Cross, Accent on Learning, p. 112.

student failure. Hardware was developed enabling students to use various sensory involvement in materials. Still some students were unsuccessful. Bloom's "mastery learning theory" was not the answer for all students either.

What, then, was the discrepancy between theory and practice? Perhaps the unanswered question was: HOW CAN WE DETERMINE WHICH OF THE STRATEGIES, TIME FRAMES AND TEACHING ENVIRONMENTS WILL BE EFFECTIVE FOR EACH STUDENT? Until the above question was answered, the object of American Education to provide every person an equal opportunity to receive an education of high quality could not be realized.¹

Davis states that data demonstrate that there is no measurable difference among truly distinctive teaching methods of college instruction when evaluated by student performance on final examinations.² Educators have long recognized that teaching is more effective when individual differences in students' prior knowledge and level of development are taken into account. But they are only beginning to recognize that differences in style of learning and thinking also require the attention of educators and researchers. Concern about differences in prior learning, achievement, and level of social and cognitive development is not enough. If an effective basis for

¹ Mountain View College, Workbook, p. 1.

² Davis, p. 3.

individualized education is to be found, there must be movement beyond providing for differences in content and level of learning to adapting to the differences in the process of cognitive and creative thinking. "The basic issues are whether and how to match educational treatments to individuals and who should decide among the alternatives."¹

Cross indicates that we do not know enough about individual learning styles to prescribe strategies maximizing learning for a given person. Community colleges, especially, have found that pluralistic routes such as lecture, discussion groups, learning laboratories, media presentations, peer tutoring, and project learning are necessary to deal effectively with the diversity of student learning styles. It is clear that we need to give more attention to offering pluralistic alternatives in materials and methods of instruction. Practical application of reinforcement theory is possible now in the form of self instructional modular units. Students can control the rate at which material can be assimilated through self-paced models. It now seems evident that we are not going to improve instruction by finding the method or methods that are good for all people. It has

¹Samuel Messick and Associates, Individuality in Learning (San Francisco: Jossey-Bass, Inc., Publishers, 1976), p. vii.

been found that for the "average" student it makes little difference how we teach.¹

Cognitive Style Mapping (CSM)

In the 1950's, D. Joseph Hill and his associates at Wayne State University placed education as an applied science within a framework of "The Educational Sciences." This attempted to provide a conceptual framework and scientific language for the applied field of education that would approach that precision found in other fields.²

A number of people have created applied models that purport to use the concept of learning styles. The "cognitive mapping" techniques devised by Dr. Joseph Hill, a community college president, is familiar to some practitioners.³

Cognitive Style Mapping (C.S.M.) is a part of "The Educational Sciences." The premise is accepted that no two students seek meaning in exactly the same manner. The Cognitive Style Map of each student provides a picture of the various ways in which the individual perceives his environment and total surroundings, how he seeks meaning, and how he becomes informed.

¹ Cross, Beyond the Open Door, pp. 54-65.

² Mountain View College, Workbook, p. 1.

³ Cross, Accent on Learning, p. 113.

Does the student learn theoretical matter by listening or reading, through visual or auditory material, by touching or even smelling the matter being studied? Does the learner work most effectively in a highly structured setting, in a peer group, or in an environment where he/she may work alone and establish an independent rate? Does the student reason and reach conclusions by dealing with rules, recognizing similarities, identifying differences, or combining all three approaches?¹

Cognitive Style may be described as an individual's unique mode of behavior as he searches for meaning. As a concept, C. S. M. does not deal with level of achievement or academic abilities of the student.² It is recognized that persons have characteristic "styles" for collecting and organizing information into useful knowledge and that people have characteristic ways of using their minds. Psychologists label these mental characteristics "cognitive styles," and their importance to education is fundamental and pervasive.³

Cross distinguishes between "cognitive styles," "learning styles," and "cognitive maps."

Usually the term cognitive style is reserved for those dimensions that have their roots in the study of cognitive functioning in experimental research. Most people using other schemes for arriving at dimensions of difference

¹ Mountain View College, Workbook, p. 3.

² Ibid.

³ Cross, Accent on Learning, p. 12.

refer to "learning styles," "cognitive maps," "learning modalities," and other variations on the theme.¹

Cognitive styles, as considered in this study, are the result of an applied, functional method for arriving at dimensions of difference in how and where learning takes place most effectively for each student. It is the way in which an individual reasons, seeks meaning, and becomes informed. A profile of the student's preferred learning style can be obtained by use of a Modified Hill Model Cognitive Style Inventory. The instructor and the student can then select the most effective materials and the setting for learning that is most appropriate for that student. It becomes more nearly possible to match teaching styles and instructional strategies with the preferred learning styles of the student. Patterns may also be established for student grouping to reflect the similarities of the students' preferred learning styles in order to determine which conceptual approach or teaching style is most appropriate for each group. The need for C.S.M. is most critical for those who have had previous unsatisfactory learning settings. Various appropriate methods exist for mapping students.²

¹Ibid., p. 113.

²Mountain View College, Workbook, p. 3.

A factor analysis was conducted to identify and delineate those factors present within the area of measurement of Hill's "Cognitive Style Inventory" by Clark and Sheriff. The conceptual framework of the Educational Sciences has potential practical application for the classroom teacher, but the data suggested inherent problems with the instrument designed to assess Educational Cognitive Style. "Theoretically, if the Cognitive Style Inventory were factorally 'pure,' it would measure 27 discrete attributes resulting in 27 factors."¹ Actually, however, the first factor contained 15 of the 27 attributes and accounted for 59.20 per cent of the common variance. The succeeding four factors shared the remaining 40.80 per cent of the common variance. Within this framework, several attributes loaded significantly on more than one factor. Because of the failure of the instrument to measure discrete attributes, the description and diagnostic features of the instrument are questionable. Until other empirical data are obtained that contradict the results of this study, it can be concluded that the Cognitive Style Inventory does not lend

¹Francis E. Clark and Dennis E. Sheriff, "Hill's Cognitive Style Inventory in Retrospect," Paper presented at Mountain View College, Conference on Cognitive Style, Dallas, Texas, 5-8 February 1978.

empirical evidence to support the theoretical structure of the instrument as proposed by Hill.¹

In a series of articles relating cognitive style to nursing, Lange discusses the theoretical symbols of the Cognitive Style Map and the potential uses in nursing education. In agreement with other authors, she feels that learning is made easier or more difficult for the student by certain styles of mediated instruction. The closeness of the match between the student's preferred learning style and the style of presentation of material will determine the ease of learning.²

Lange describes the theoretical symbols of the Cognitive Style Map and states that they provide a scientific language to describe what happens in the process of learning. Essentially the same symbols and associated meanings are used as those included in the appendix of this study. Four main methods of arriving at decisions are discussed with the symbol "D" representing difference, "R" representing relationship, "M" representing magnitude inference modality, and "L" representing appraisal. She points out the implications for use in nursing in learning the nursing process or

¹Ibid.

²Crystal M. Lange, "Media and Learning Styles," p. 672.

problem solving in clinical situations. . Nursing process requires appraisal approach, which is represented by the "L" symbol. She feels that those who use non-appraisal approaches to decision making may have difficulties. Three means of determining cognitive style are indicated: cognitive style map, observational rating scale, and a card sort approach wherein the individual rates himself or herself on a variety of items.¹

A third article by Lange discusses practical application of knowledge of the cognitive style of the individual in the selection and/or production of mediated instructional materials. She states:

In planning activities for a specified learning task, the teacher must take into account not only individual learning styles, but also the nature of the learning task, the potential effect of a particular medium for achieving each objective, availability of specific materials, and cost effectiveness.²

She discusses how a specific learning objective can be carried out in relation to cognitive style knowledge.³

¹Crystal M. Lange, "Determining Cognitive Styles," p. 734.

²Crystal M. Lange, "Matching Media to Learning Styles," Nursing Outlook 25 (January 1977): 18.

³Ibid.

Dunn, Dunn, and Price state that public concern today has increased pressures for educational accountability. Law suits contend that educational institutions have the obligation to diagnose and treat learning problems so that the graduate is in fact able to meet the established criteria. Legislatures and courts, seeking to enforce accountability, are appraising and testing available diagnostic tools that are available. An important factor related to academic achievement is how a student learns. Complementary instructional methodology and/or teaching styles are needed to accommodate varied learning styles. Studies indicate that academic achievement and retention are increased when students can study in ways harmonious with the identified preferred learning styles. The Learning Style Inventory (LSI) was the diagnostic tool selected and utilized for the study. It was discovered that students preferred to learn through various modes. It is felt that prescriptions based on individual diagnosis would verify that teachers are assisting students. Such methods increase the probability that students will learn, decrease educational malpractice suits, and help insure that instructional needs are met by teachers rather than by attorneys.¹

¹Rita Dunn, Kenneth Dunn, and Gary E. Price, "Diagnosing Learning Styles: A Prescription for Avoiding Malpractice Suits," Phi Delta Kappan 58 (January 1977): 418-420.

Dimensions and Models

Messick, in discussing characteristic modes of mental functioning, states:

Each individual has preferred ways of organizing all that he sees and remembers and thinks about. Consistent individual differences in these ways of organizing and processing information and experience have come to be called cognitive styles. These styles represent consistencies in the manner or form of cognition, as distinct from the content cognition or the level of skill displayed in the cognitive performance. They are conceptualized as stable attitudes, preferences or habitual strategies determining a person's typical modes of perceiving, remembering, thinking, and problem solving. As such, their influence extends to almost all human activities that implicate cognition, including social and interpersonal functioning.

An example might help clarify the nature of these stylistic dimensions and their pervasive involvement in learning, thinking, and social interaction. One of the most widely studied of these styles, field independence versus field dependence, refers to a consistent mode of approaching the environment in analytical, as opposed to global terms. Field independent (or analytical) individuals have more facility with tasks requiring differentiation and analysis, whether in identifying more easily the presence of logical errors, or in understanding more quickly the point of a joke, and this analytical penchant leads as well to a high degree of differentiation of the self from its context. Field dependent (or global) individuals, on the other hand, tend to identify with a group, exhibiting a social orientation in which they are more perceptive and sensitive to social characteristics such as names and faces than are field independent persons:

but they are also more susceptible to external influence and more markedly affected by isolation from other people.¹

Nelson describes cognitive style models that address different aspects of information processing. The models share assumptions about the differences between cognitive style and abilities. Abilities are measured as maximum levels of performance, imply a value, and are unipolar in distribution. Cognitive style is value free and bipolar in distribution. The middle of an ability distribution is "normal" or "average" whereas the center of a cognitive style distribution is neutral. Abilities have to do with quantitative differentiation of performance, whereas cognitive styles are more concerned with qualitative differences.²

Messick describes some twenty cognitive style dimensions, of which field independence versus field dependence is one.³ The Field Independence-Dependence model, or dimension, developed by Herman Witkin and previously described, has taken minimal steps

¹Messick, pp. 4-5.

²Karen H. Nelson, "Contemporary Models of Cognitive Style: An Introduction," Paper presented at the Convention of the American College Personnel Association, 3 March 1975, pp. 3-4.

³Messick, pp. 14-22.

toward implementation in educational settings. It offers a theoretical distinction between field independence and field dependence, and analytical as opposed to global perception. Several instruments are available which differentiate style, and others which measure performance on these tasks; the results are highly correlated. There are generalizations based on the use of these instruments relating to sex, personality, careers, courses, and test performance.¹

A second model of cognitive style which has been explored in educational settings is the Reflection-Impulsivity mode developed by Jerome Kagan. The aspect of information-processing addressed is conceptual tempo. Nelson states:

Conceptual tempo is defined only by those situations in which one must consider several alternatives simultaneously while under time pressure. The reflective individual looks at the sample, examines each of the alternatives, and selects the perfect match. The impulsive individual more often glances at the sample, scans the alternatives, and selects an almost-right answer. He fails to consider each of the alternatives before making a decision.²

A third cognitive style model was developed by James McKenney. The McKenney Model adds still newer perspectives on

¹Nelson, "Contemporary Models of Cognitive Style," pp. 4-5.

²Ibid., p. 6.

differentiation and methodology. There are three methods of measurement: timed tests, behavioral checklists, and problem solving.¹ In discussing the McKenney Model, Nelson states:

The basic premise of the McKenney Model is that in response to the huge quantities of data imposed on people, each individual selects and uses only part of that information. This cognitive style model employs 2 dimensions: information gathering and information evaluation--to describe the information-processing styles of individuals. The model depicts the dimensions and the labels at each pole.

Individuals are described by their preferred mode on each dimension. Four categories emerge:

Intuitive Preceptive	Systematic Preceptive
Intuitive Receptive	Systematic Receptive

No individual has only preceptive skills with no receptive skills or is purely intuitive with no systematic abilities. At least no one has so far been located. Most people can be described in terms of a cognitive operating space.²

Educational Implications

Nelson states that teaching and learning are affected by cognitive style in three ways: (1) There may be communication

¹Ibid., p. 8.

²Karen H. Nelson, "Introduction of an Information-Processing Model of Cognitive Style," Paper by Karen H. Nelson, 1974, a handout, Mountain View College, Conference on Cognitive Style, Dallas, Texas, 5-8 February 1978, p. 1.

problems involving an instructor and one or more students having incompatible styles; (2) A teacher sensitive to cognitive style may use aids and options to meet different style needs of the students; and (3) Cognitive style may have an effect on career selection.¹

A number of studies contribute to an understanding of cognitive styles and the implications which these hold for education. These have come largely, in the past, from psychological research of cognitive styles, rather than from research of student's preferred learning styles and Cognitive Style Mapping.

Early work on field dependence-independence focused particularly on perceptual and intellectual functioning. Following this, research extended to the "personality" domain. Patterns of relations identified in this research seemed best accounted for by the concept of psychological differentiation. Witkin and Goodenough reviewed and identified the specific ways in which more differentiated and less differentiated functioning are likely to manifest themselves in interpersonal behavior. The research literature suggests that "these manifestations are linked to the use of a field-independent or field-dependent cognitive style in ways predicted by the theory of

¹ Ibid., pp. 5-6.

psychological differentiation."¹ A summarized statement of their findings states:

People with field-dependent or field-independent cognitive styles are different in their interpersonal behavior in ways predicted by the theory of psychological differentiation. Field-dependent people make greater use of external social referents, but only when the situation is ambiguous and these referents provide information that helps to remove the ambiguity; field-independent people function with greater autonomy under such conditions. Field-dependent people are more attentive to social cues than are field-independent people. Field-dependent people have an interpersonal orientation: They show strong interest in others, prefer to be physically close to people, are emotionally open, and gravitate toward social situations. Field-independent people have an impersonal orientation: They are not very interested in others, show both physical and psychological distancing from people, and prefer nonsocial situations. Finally, field-dependent and field-independent people are different in an array of characteristics that make it likely that field-dependent people will get along better with others. Altogether, field-dependent people have a set of social skills that are less evident in field-independent people. On the other hand, field-independent people have greater skill in cognitive analysis and structuring. This pattern suggests that, with regard to level, the field-dependence-independence dimension is bipolar; each of the contrasting cognitive styles has components that are adaptive to particular situations, making the dimension value neutral.²

¹Herman A. Witkin and Donald R. Goodenough, "Field Dependence and Interpersonal Behavior," Psychological Bulletin 84 (July 1977): 681.

²Ibid., p. 661.

Cross provides some illustrations of how the carefully researched concept of cognitive style might be applied to the design of educational programs. She has selected for illustration the field independence versus field dependence dimension.¹

The concept of cognitive style introduces the notion that the subject to be learned and the manner in which it is presented interact with abilities to influence learning. Research documentation for the social interest and sensitivity of field dependence is substantial and varied.²

In a comparison of field dependents and the "new student," some similarities were found. Cross hypothesizes that traditional education favors the field independent student. The classroom and system are more geared to the reward of independence, but not often balanced by equal rewards for interpersonal relationships. In spite of the fact that social situations are often highly effective learning experiences, the traditional classroom is not a very social place.³

Research supports the evidence that students with a high desire for close, friendly, interpersonal relationships develop

¹Cross, Accent on Learning, p. 116.

²Ibid., p. 119.

³Ibid., pp. 122-126.

problem solving skills better when they are assigned to work on the problems in pairs, whereas those with low desire for such relationships achieve better alone. Weak students, with the desire for close interrelationships, are likely to profit from peer tutoring.¹

According to Nelson, implications for education derived as a result of studies indicate field dependents prefer people-oriented options such as peer tutors, discussion groups, and consultation with the professor. Before exploration of options, there tended to be no preference expressed by students by differing styles. It is suggested that the means whereby field dependents learn best may be devalued in most educational settings and are seen as expressions of need for help and contrary to independent scholarship. It is also suggested that when options are available and seen as valid, field dependents simply use different learning options.²

Nelson further states that in a study of workshop participants, field independent participants rated independent work higher as a means of learning than did field dependents. Field dependents gave

¹Ibid.

²Karen H. Nelson, "Cognitive Styles and Sex Roles in Teaching-Learning Processes," Expanded version of a paper presented at the Convention of the American Psychological Association, San Francisco, California, 26 August 1977.

higher ratings to individual conference time and social time. Systematic participants prefer small lecture, whereas intuitives prefer small discussion and question and answer periods. Little is known about neutrality on style dimensions, and participants were found to be more often confused or undecided than the systematic or intuitive dimensions. Neutrality may be an advantage or a disadvantage. In field dependence-independence, neutral students may need more structure by which to judge the most adaptable style or strategy in a given situation.¹

Nelson then discusses aspects of providing students with cognitive style information. Generally, it is felt that the information helps the student understand past learning experiences, past successes and failures, and assists the student in making a more intelligent selection of courses. There are educators who feel that providing the information may narrow options available to the student. Students feel that it has been helpful in understanding past problems and directing new efforts.²

¹Ibid., pp. 10-11.

²Ibid., pp. 11-12.

Brooks states that in influences on the decision-making process itself, role models are an important factor in helping people make choices and are probably critical to people with field dependence, intuitive, impulsive, and neutral styles. Since there is no operational definition of the field dependent learning process, students with the four styles listed above have probably already found a model effective for them in the traditional educational system. It has been hypothesized that field dependents learn better from people and are less sure of how to make and use choices. These field dependent students should be supported in decision-making processes. Further study is needed to establish an operational definition. Some modest research has been done in the area of career correlates of styles using the Strong Vocational Interest Blank and Value Added Project Questionnaire. The consequences for the students exploring their own styles may be positive or negative or both. The purpose of implementation is to assist the students to know themselves better and make more knowledgeable choices about their learning and working environments. More compatible teaching approaches to the individual style are possible with increased knowledge about how students learn. Reports of studies indicate that choice of major and

choice of educational/vocational specialty is influenced by cognitive style.¹

Witkin states that although relatively little research has been done, it is nevertheless evident that cognitive style is a potent variable in a number of areas, including academic choices, vocational preferences, and continuing academic development. There has been a persistent finding of sex difference in field dependence. Socialization factors are undoubtedly of some importance in the development of individual differences in field dependence versus field independence. Genetic factors may be implicated to a lesser degree. There is evidence that relatively field dependent and field independent students differ in their conceptualization of occupation and in the ease with which they make educational and vocational choices. Regardless of age, relatively field dependent students have more difficulty in defining their career choices.²

¹Mindy Brooks, "Cognitive Style and Career Choice," NETCHE Newsletter 11 (December 1977/January 1978): 4-6.

²Herman A. Witkin, "Cognitive Style in Academic Performance and in Teacher-Student Relations," in Individuality in Learning, ed. Samuel Messick and Associates (San Francisco: Jossey-Bass, Inc., Publishers, 1976), pp. 38-57.

Student-Teacher Match

Cognitive styles and the interaction of students and teachers have been studied. Witkin feels that a teacher's cognitive style may influence his way of teaching. A student's cognitive style may influence his way of learning. A match or mismatch in cognitive style between teacher and student may have important consequences for the learning process. Other social interactions, such as patient-therapist and interviewer-interviewee, are similar to the teacher-student interaction.¹ It has been demonstrated that relatively field dependent teachers prefer a discussion method of teaching. The relatively field independent teacher may prefer lecturing or discovery methods.²

Studies have revealed that teachers and students matched for cognitive style described each other in highly positive terms. Teachers and students who were mismatched showed a strong tendency to describe each other negatively. Similar findings have been made in the patient-therapist relationship.³ A study done by Lange of the

¹Ibid., pp. 57-72.

²Ibid., pp. 63-72.

³Ibid.

effects on learning of matching the cognitive styles of students and instructors in nursing education revealed that matched students do, to a significant degree, perceive their instructor more positively than do the non-matched students.¹

There is evidence suggesting that similar modes of communications are used by persons of the cognitive style which facilitates understanding. Another modality of communication, hand gestures accompanying speech, is found to be different in field independent and field dependent persons.²

Constancy of Cognitive Style

The assumption of constancy of student learning is troublesome, and there is some evidence that cognitive styles remain rather stubbornly with people throughout life. A consistent match of teaching strategy to student cognitive style could leave the graduate unprepared to cope with non-preferred strategies. An achievement that is hoped for in education is flexibility.³

¹Crystal M. Lange, "A Study of the Effects on Learning of Matching the Cognitive Styles of Students and Instructors in Nursing Education," unpublished doctoral dissertation, Michigan State University, 1972, as abstracted in Dissertation Abstracts International. A. The Humanities and Social Sciences 33 (March 1973): 4742A-3A.

²Witkin, p. 68.

³Cross, Accent on Learning, pp. 127-128.

Nelson states that the possibility of changing one's cognitive style has been studied empirically. Results suggest that an impulsive child placed in a classroom with a reflective teacher often becomes more reflective with time. It suggests that a student may decrease his response time if he has an impulsive teacher.¹

Nursing Related Factors

Ritchie conducted a study to determine the Jungian personality types of selected groups of student and registered nurses, to identify their preferred learning styles, to ascertain the relationship between personality type and preferred learning style, and to identify the most productive learning styles for given personality types. Personality types were measured by Myers-Briggs Type Indicator (MBTI). Preferred learning styles were measured by Media Effectiveness Chart. The study indicated that individuals and groups, according to their personality types, prefer to learn in specific ways. Disliked methods of learning are also evident. Results of the study indicated: (1) there are personality type differences between selected student nurses; (2) the method of instruction did have an effect on student's learning; and (3) the

¹Nelson, "Contemporary Models of Cognitive Style," p. 7.

personality type of the students did affect the method of teaching.

There were personality type differences between selected successful registered nurses; the method of teaching did have an effect on their learning; and the personality type did affect the method of teaching.

In both the student nurse and the registered nurse groups, of the personality types where teaching method did matter, certain teaching methods are more productive for each personality type. There are differences between the personality types of students and those of registered nurses. In the MBTI four pairs of preferences are indicated, resulting in sixteen different combinations of personality types. These are: (1) Extroverted (E)--Introverted (I); (2) Sensing (S)--Intuitive (N); (3) Thinking (T)--Feeling (F); and (4) Judging (J)--Perceptive (P). Student nurses had a preference for Extroversion, Sensing, Feeling, and Judging. Registered nurses indicated equal preference for Introversion, Sensing, Thinking, and Judging and for Extroversion, Intuition, Feeling, and Perception. The student nurse with the same Jungian personality type as that of the registered nurse preferred to learn by a different style. In general, students ranked lecture as their most desired instructional method and least desired to learn by methods involving only audio recordings. Registered nurses also least preferred audio

as a method of learning, but readings placed first as the preferred method of learning. The study recommended that educational programs should be structured in such a way as to accommodate varying personality and learning styles.¹

Lange cites implications in relation to cognitive style and learning. Cognitive style matching was perceived by 70 per cent of the faculty to be a helpful tool in the teaching-learning process. Contrary to other studies, this revealed that students' cognitive style maps do change, based on findings for students who had two testings.²

Sex Related Factors

Research in relation to sex and age has been relatively more limited, and this has primarily been with reference to the field dependence versus field independence dimension. Messick, in discussing sex differences in creative performance, indicates that

¹Harriette B. Ritchie, "Learning Styles Relevant to Identified Personality Types of Selected Nursing Students and Selected Successful Registered Nurses," unpublished doctoral dissertation, Nova University, 1975 (ERIC Document Reproduction Service, Computer Microfilm International Corporation, ED 139 485).

²Lange, "Study of the Effects on Learning."

cognitive styles may be important as contributors to the creative process and as precursors of creative performance. But they are only a part of the total picture. Other factors influencing sex differences are environment and motivation.¹ The sexes apparently do not differ in sizable and systematic ways in their cognitive functioning or ability levels, at least not enough to make any practical difference educationally.² Cross states that although females in Western culture show small, but persistent, differences in the direction of greater field dependence than do males, these differences are not universal in non-Western data. This finding supports the general conclusion that although there may be a genetic component to cognitive style, cognitive styles are largely determined through socialization.³

Witkin states that sex differences are exhibited in field dependence and field independence in the following ways: males tend to exhibit interest in areas requiring technical and mechanical activities (analytic skills). Twice as many males major in these

¹Messick, p. 13.

²Ibid., p. 92.

³Cross, Accent on Learning, p. 118.

areas. Females tend to prefer activities involving people.¹ In summarizing sex differences, Witkin states that an awareness of sex differences that exist will be of assistance if the forces responsible for their development are understood. Sex is likely to be an important variable influencing cognitive style and performance in the educational setting.²

Nelson states that behaviors consistent with one pole of a style dimension have been valued by educators, with a resultant devaluation of the alternative style. Those cognitive styles that predominate among males are generally favored by educators and researchers. Sex differences in cognitive styles having educational implications are in the area of broad versus narrow categorizing: ". . . the broad categorizer prefers a small number of categories each containing a large number of items, whereas the narrow categorizer prefers a large number of categories with a small number of items each."³ Children, in late childhood, and adult males use greater breadth of categorization than do females. Teachers prefer

¹Witkin, pp. 38-42.

²Ibid., p. 54.

³Nelson, "Cognitive Styles and Sex Roles," p. 2.

narrow categorizing females, and females who are broad categorizers are seen as disruptive. Studies indicate that broad categorizing females tend to be lower in judgmental confidence and more conservative on most decision-making indices. Nelson indicates: In this case, then, sex differences are reinforced and perpetuated by teachers and when females adopt the 'male' style, negative attributions are one consequence."¹ Another model of cognitive style, reflection-impulsivity, does not reveal differences in frequency of each style. However, there are value judgments. Depending upon the sex, the same action may receive differing connotations and value judgments. Operational definitions of reflection and impulsivity pertaining to both sexes need to be defined.²

Nelson further states that in the dimension of cognitive simplicity-complexity, there are no sex differences in frequency of each style, but rather in the generality of this style. Generality of complexity was found for males, virtually none for females, "implying that women may be complex some of the time but they will be simple in style more frequently than their complex male counter

¹Ibid.

²Ibid., pp. 3-4.

parts."¹ There are educational implications. The cognitive simple approach may be advantageous in undertaking new concepts, and the efficient use of strategies may be demonstrated by using a cognitive simple approach in more familiar ones. Accordingly, less generality of simplicity-complexity among females may indicate flexibility along this style dimension.²

In the dimension of field dependence-independence, Nelson describes the field independent individual as one who separates the self from a setting and easily identifies separate features. The field dependent individual responds to the interrelatedness of self and surroundings. Research has shown that there are some small sex differences in Western cultures. As previously indicated, careers consistent with traditional sex-role stereotypes are chosen by field independents and field dependents.³

In the cognitive style model, information-processing, Nelson states that studies show there are no sex differences in scores across all four tasks. However, women are more often intuitive and tend to

¹Ibid., p. 4.

²Ibid., p. 5.

³Ibid., p. 6.

be more receptive as freshmen but more intuitive and preceptive as seniors. As seniors, men are more systematic and receptive. Studies did show differences in styles by the major selected. There were no sex differences in frequency of major of study selected. "Sex and major thus relate to style but not to each other."¹ These findings are important in that students can choose any college major and develop any style. According to Nelson,

. . . it is important to note that sex differences have diminished substantially over the last ten or fifteen years. As women and men have become more flexible in their educational choices, cognitive styles have become less sex-role stereotyped. Despite the decline of sex differences in research data, value judgments relating to style persist. Being field dependent or intuitive is bad--even if you're male.²

She states that the emphasis should now shift from sex and career differences to the following three process areas: learning differences, style sensitive educational programs, and strategies for increasing cognitive flexibility.³

Nelson, in discussing differentiation of reflective and impulsive behavior in terms of tasks and academic fields, states:

¹Ibid., p. 7.

²Ibid., p. 8.

³Ibid.

. . . girls who have rejected sex-typed activities tend to be more reflective than those who have not. This is related, in part, to the fact that students in math and science tend to be more reflective, whereas those in humanities or social sciences tend to be more impulsive. Girls who do well in math and science are rejecting sex-typed activities already. Thus there is a distinction between the kind of coursework that pays off for each style.¹

Brooks, in discussing cognitive style and career choice, states that sex stereotypes exert a strong influence on career choice. Therefore, in working with cognitive style theory it is necessary to give attention to sex differences. Although relatively little research has been done in the relationship between a person's cognitive style and later vocation, studies indicate a correlation. According to cognitive style theory, individuals who are strongly field dependent or field independent will have preferences for different majors in college and, ultimately, different careers. In general, field dependents prefer majors dealing with interpersonal skills, which involve writing, discussion, and have a social orientation. Field independents prefer nonsocial content, such as math and science. When choice of educational-vocational specialty is compatible with cognitive style, students are more likely to remain with

¹Nelson, "Contemporary Models of Cognitive Style," p. 7.

those majors through their educational experience. When the cognitive style is not compatible, students are apt to change majors. Broad-gauged disciplines, such as social science, may be favored by field dependents but can also accommodate the field independents. The narrow-gauge disciplines, such as mathematics, do not offer such possibilities of accommodation. Nursing is a broad gauge discipline. Student nurses, rated as doing well in psychiatry, were relatively field dependent. Student nurses rated as doing well in surgery were relatively field independent.¹

Cognitive styles must be understood as patterns of response developing in relation to constraints of environmental demands and the individual's internal organizational requirements and abilities. Ridgeway states that cognitive styles are generally determined by multiple factors. A study was undertaken to examine the pattern of perceived relationships between the self and the environment which underlie cognitive simplicity-complexity and field independence in males and females. No initial sex differences on the cognitive style variables were found. There were directional tendencies for males to score higher on the hidden figures test and

¹Brooks, "Cognitive Style and Career Choice," pp. 4-6.

for females to score higher on the flexible simple-decision style. The only significant differences in non-cognitive variables were those that might be predicted from traditional sex-role expectations. Results supported the expectation that different configurations of self-environment variables would underlie similar measured cognitive styles for males and females.¹

Kogan indicates that the empirical outcomes for creativity viewed as a special kind of thinking process indicate only a modest advantage for females over males in what might be called creativity potential. He also asserts that the within-sex differences are considerably greater than the between-sex differences. He feels that the broad-gauged abstract concepts or principles of masculinity and femininity may well have outlived their usefulness in psychology.² Utilized as a basis for formation of concepts are rational conceptualizing, analytic-descriptive conceptualizing, or the categorical-inferential conceptualizing. These three formal bases for

¹Cecilia L. Ridgeway, "Patterns of Environmental Adjustments Underlying Measured Cognitive Complexity and Field Independence in Men and Women," Perceptual and Motor Skills 44 (February 1977): 99-112.

²Nathan Kogan, "Sex Differences in Creativity and Cognitive Styles," in Individuality in Learning, ed. Samuel Messick and Associates (San Francisco: Jossey-Bass, Inc., Publishers, 1976), pp. 93-119.

conceptualizing appear to be developmentally ordered, with relational being more characteristic of young children and analytic-descriptive being more characteristic of older persons.¹ These would be represented in the Modelities of Inference elements of the C. S. M.

Age Related Factors

Modality preferences refer to individual consistencies in relative reliance upon the different sensory modalities available for experiencing the world. Three major sensory modes for interacting with the environment and organizing information are kinesthetic, visual, and auditory. These three sensory modes act as the mind's hand, the mind's eye, and the mind's ear. Two important developmental shifts occur with respect to these sensory modes. The first involves a progression from a preference for the kinesthetic modality in the early years to a later preference for the visual modality and ultimately for the auditory or verbal modality. The second is that of a progressive increase in the capability to coordinate and integrate information obtained through one sensory modality with information obtained through others. In adults all three modalities can function

¹Messick, p. 15.

in parallel. Information from one modality clarifies and supplements information from the other two. But individuals differ markedly in their preferred reliance upon one or another of these three sensory modes of representation. This results in characteristic differences in learning and thinking styles. These would be represented under the Qualitative Symbols in the Cognitive Style Map.¹

According to Gruenfeld and MacEachron, socio-economic variables confound the relationship between age and field dependence. This should be observed and accounted for before concluding that age explains differing levels of field independence. Younger persons are likely to be of higher socio-economic status than are their older peers because of recent history of rising levels of education, higher incomes, and health services. Studies have shown that neighborhood college students were less field independent than those who attend out-of-town colleges. Older persons tend to be somewhat more field dependent. In the study, age correlated significantly with the education of the individual and of his/her father. Cultural variables referenced by social-class membership may account for differences

¹Ibid., p. 22.

associated with field independent cognitive styles observed in the study.¹

Cawley, Miller, and Milligan state that if differences exist in cognitive styles of adults, it would be of importance to educators. Up until now conceptual tools in understanding the adult learner have been limited largely to Havighurst, Maslow, and Houle. It was suggested that if differences in individual learners are known, this could assist in counseling, program planning, learning environments, and administrative strategies. Information based on previous studies and knowledge of cognitive styles of pre-adult individuals was utilized as a basis for the study.²

Three hypotheses were formulated. A Cognitive Style Inventory and the Witkin Embedded Figures Test were utilized. The population consisted of graduate students. The abstract stated:

This research investigated relational and analytic cognitive styles among adult learners. It was hypothesized that in any selected population of adults,

¹ Leopold W. Gruenfeld and Ann E. MacEachron, "Relationship Between Age, Socioeconomic Status, and Field Independents," Perceptual and Motor Skills 41 (October 1975): 449-450.

² Richard W. V. Cawley, Sheila A. Miller, and James Milligan, "Cognitive Styles and the Adult Learner," Adult Education 26 (Winter 1976): 101-116.

both polar analytic and polar relational, as well as mixed and conflicted, cognitive styles will be found; that relational cognitors will prefer a more informal learning environment and analytic cognitors will not; and that cognitive style will be related to life style preference. The instrument used was found to be an effective gauge of cognitive style, and data on styles were in fact collected. Predictions about learning environment preference were given reasonable support. Life style preference was not conclusively demonstrated, but enough evidence was collected to suggest the usefulness of further investigation.¹

Cawley, Miller, and Milligan suggest that it seems likely that life-situation changes affect cognitive style and that further study should examine whether cognitive style remains stable over time in adult populations. Another consideration is that adults returning to full-time study, thereby making life-style changes, may experience stress.²

In other cultures as well as American culture, there is movement toward field independence up to early adolescence. This is followed by a plateau, and then some move toward field dependence around the age of fifty. These patterns seem to hold regardless of culture. Individuals show remarkable stability

¹Ibid., p. 101.

²Ibid., p. 115.

throughout life with respect to their relative position on the continuum.¹

Research on managers disclosed that there are differences in the cognitive styles between those managers who solve their problems systematically and those who solve their problems by intuition.² Knowledge of cognitive styles is not limited to education. Industry, vocational rehabilitation, and other fields may apply the principles as well.

Summary

Research of the literature reveals that with the conception and development of the community college, educational philosophy and practice have been modified. A new type of student is generally older and comes with differing socio-economic and educational background than the student who attended the traditional four-year institutions. The community college and the associate degree nursing programs have been leaders in utilizing learning theories and in developing and utilizing innovative instructional systems and technologies. With all

¹ Cross, Accent on Learning, p. 118.

² James L. McKenney and Peter G.W. Keen, "How Managers' Minds Work," Harvard Business Review 52 (May-June 1974): 79-90.

of the innovations there still remains a problem of matching students, teachers, and strategies. Determining preferences for learning styles through Cognitive Style Mapping is one available method to assist in accomplishing this.

Most of the research available in relation to cognitive styles comes from psychological research. However, the field dependent versus field independent research is related to the interpersonal competencies which are conceptualized in the Cognitive Style Mapping Instrument. Other dimensions also contribute additional information. The research does indicate relevance of cognitive styles to education. There are significant differences in cognitive styles which could have implications for education. To date there is very little research evident which establishes the reliability and validity of the Cognitive Style Mapping Instrument. Results from psychological research reveal that there are some differences in learning styles between the sexes and some differences in learning styles between the ages. Research of the adult learner indicates differences in the ways in which younger and older adults learn. These, too, have implications for education of the adult student. However, no studies were found which specifically explored sex and age factors and their possible relationship to Cognitive Style Mapping scores.

CHAPTER III

PROCEDURES

Population

The institution selected for this study was a community college in an urban setting. The institution was chosen because it administered the Modified Hill Model Cognitive Style Mapping Instrument for those students who desired to participate on a voluntary basis. The total enrollment of the institution on the first day of the fall semester, 1977, was 4,924 students, of which 2,947 were males and 1,977 were females. The student population was diverse and heterogeneous, containing various socioeconomic, racial, and ethnic characteristics. The average age of the student population was twenty-seven; the average female student age was twenty-six, and the average male student age was twenty-seven. The age range was from seventeen to sixty and over.¹ The median age was 24.3 years.² Approximately one-half of the students attended evening classes. The student population contained students with high academic ability,

¹ Dr. David Sims, Class handouts, EDFD 5413-30, Fall, 1977.

² Dr. Sam Rodgers.

but there was a disproportionate number with decreased or low academic skills, especially in reading, writing, and mathematical competencies.¹ Of the total enrollment in the fall semester, 1977, an estimated eight hundred students chose voluntarily to participate in the Modified Hill Model Cognitive Style Mapping program. Any student could request to participate in this program at any time in his or her academic career. Cognitive Style Mapping had been administered in this institution since 1973, with approximately eight thousand students having been mapped.²

Description of the Instrument

The Modified Hill Model Cognitive Style Map is derived from a single self-assessment inventory completed by the student. The results are computed and then reviewed by the student. The Modified Hill Model Cognitive Style Map is based upon the conceptual framework of the Educational Sciences and was developed largely through the efforts of Dr. Joseph Hill.

¹ Sims, Class notes.

² Mountain View College, Dallas, Texas, telephone conversation with Resource Consultant, January, 1978.

The inventory takes approximately forty-five minutes to complete and is written at the fifth/sixth grade level. It can also be administered verbally or by the computer. There are twenty-eight items. Each item has a coded symbol and represents a particular cognitive style component. The twenty-eight items are organized into four major groups: Theoretical Symbols, containing four items; Qualitative Symbols, containing sixteen items; Cultural Determinants, containing three items; and Modalities of Inference, containing five items. The scores of each of these twenty-eight items represent responses from eight individual questions or statements in the inventory. The compilation of responses is then placed in three categories to reflect the preferences in cognitive styles. A numerical score of twenty-seven to forty indicates a "Major" score. A numerical score of sixteen to twenty-six indicates a "Minor" score. A score of eight to fifteen indicates a "Negligible" score. Thus, each of the twenty-eight items representing responses to eight questions or statements will be recorded as a "Major," "Minor," or "Negligible" and will reflect the degree of preference for that particular item. The "Major" preference is ordinarily the accepted norm for determining the cognitive style preference. The results are then reviewed with the student and can be utilized in the selection

of courses and classes in accordance with his or her preferred cognitive style. The Cognitive Style Maps can be stored in the computer and be available for use. A simulation of the Cognitive Style Map is located in Appendix B.

Extensive research has not been done to establish the reliability and validity of this inventory. However, a Mountain View College evaluation of the program was conducted in the fall of 1976 through a questionnaire completed by 250 students and ten faculty members, with the replies indicating that the program was helpful in giving useful information concerning how the students learned.¹ As related earlier, a study by Clark and Sheriff concluded that the Cognitive Style Inventory does not lend empirical evidence to support the theoretical structure of the instrument as proposed by Dr. Joseph Hill.²

Data Collection

A computerized listing of students attending Mountain View College during the fall semester, 1977, was obtained. The list contained demographic information including: (1) the social security

¹ Mountain View College, Workbook, p. 1.

² Clark and Sheriff.

numbers, (2) the birthdate, and (3) the sex of the student. The list was arranged chronologically from the earliest birthdate to the most recent. The oldest student was seventy-six years old; the youngest was sixteen years old. Three age groups were arbitrarily chosen: seventeen to twenty-five years, twenty-six to thirty-five years, and thirty-six and above years. To obtain the selected groupings, the list was divided into three groups as follows: (1) the thirty-six year and above age group included all birthdates from the beginning of the list, February 14, 1901, through December 31, 1941; (2) the twenty-six to thirty-five year age group included all those birthdates listed from January 1, 1942, through December 31, 1951; and (3) the seventeen to twenty-five year age group included all those birthdates listed from January 1, 1952, through December 31, 1960.

There were 5,645 social security numbers listed. Of these, seven were not included in the study; six were not included because there was no indication of sex or birthdates, and one student was excluded because he was only sixteen years old. The total population used as a basis for this study was 5,638. Each of the sex and age groups was labeled for the purpose of facilitating the computer data collection. The labels were as follows: Female older group (FOGP), thirty-six years and older; female middle age group (FMGP),

twenty-six to thirty-five years; female younger group (FYGP), seventeen to twenty-five years; male older group (MOGP), thirty-six years and older; male middle age group (MMGP), twenty-six to thirty-five years; and male younger group (MYGP), seventeen to twenty-five years. The numbers of students contained within each age grouping of each sex are listed with their labels in Table 1.

TABLE I
DISTRIBUTION OF STUDENT POPULATION BY
AGE AND SEX

Age Group	Number of Males	Group label	Number of Females	Group label
36 years, older	315	MOGP	441	FOGP
26-35 years	1,154	MMGP	716	FMGP
17-25 years	<u>1,668</u>	FYGP	<u>1,344</u>	FYGP
Total sex group	3,137		2,501	
Total population	5,638			

A stratified sample of fifty Cognitive Style Maps was selected for each male and female age group, for a total of six groups and three hundred Cognitive Style Maps. Since the listing contained

no indication of which students had participated in Cognitive Style Mapping (CSM), it was then necessary to determine which students had participated in CSM. In order to obtain the desired fifty maps from each of the male and female age groups, two hundred social security numbers were selected by a systematic probability sample from each group. The individual social security numbers were entered into the computer terminal. A computer response indicated whether or not a Cognitive Style Map was on file for that particular social security number. A record was kept of those numbers having Cognitive Style Maps on file. A smaller proportion of students in the two older age groups were mapped than was anticipated; therefore, the systematic probability sample was enlarged. The actual numbers sampled from each of the six groups in order to obtain the desired fifty maps sampled are indicated in Table 2. The systematic probability sample criterion selected for each group was maintained until the desired number was obtained.

These stratified and randomly selected social security numbers were then entered into the computer system. Two types of printed data were then generated for each of the six age/sex groups. First, for each age/sex group, a profile of the "Major," "Minor," and "Negligible" scores was obtained. This profile also

included the mean and standard deviations for each item, each of which was carried to five places beyond the decimal point. The other set of data consisted of the names, social security numbers, and the individual scores for each of the twenty-eight elements or items. The names were obliterated from the records by a black permanent ink marker. Confidentiality and anonymity of the records were maintained throughout.

TABLE 2
NUMERICAL SIZE OF GROUPS SAMPLED

Age Group	Females	Males
36 years, older	315 FOGP	251 MOGP
26-35 years	280 FMGP	220 MMGP
17-25 years	<u>200</u> FYGP	<u>200</u> FYGP
Sex group totals	795	671

Treatment of the Data

Following collection of the data, summary statistics of the means (\bar{X}) and standard deviations (SD) of the CSM scores for each male and female age group of each of the twenty-eight items were

determined. The means and standard deviations of each age and sex group could then be compared in relation to each item. F statistics of each of the twenty-eight items of each of the age/sex groups were obtained by an analysis of variance with two-way factorial arrangement of treatments (age and sex combinations) at the 0.05 level of significance. These statistics provided for an examination of the CSM scores between the male and female groups, within the various age groups of each sex, as well as for an interaction in the CSM scores between age and sex of community college students.

CHAPTER IV

FINDINGS

The following chapter describes the results of the study.

The hypotheses tested in this study were as follows:

1. There will be no significant difference in the cognitive style scores between male and female community college students as determined by the Modified Hill Model Cognitive Style Map.
2. There will be no significant difference in the cognitive style scores between three age groups of community college students as determined by the Modified Hill Model Cognitive Style Map.
3. There will be no significant interaction in the cognitive style scores between age and sex of community college students as determined by the Modified Hill Model Cognitive Style Map.

Level of Significance

To be considered significant, an F statistic must have been at least 3.92 to declare the difference between the sexes to be statistically significant at the 0.05 level. For age and interaction variables, it must have been at least 3.07. All observed F statistics were less than 1.0. The F statistic was determined by the analysis of variance with two-way factorial arrangement of treatments (age

and sex combinations) at the 0.05 level of significance. Analysis of the data revealed that there was no significant effect of the sex variable upon the cognitive style scores. Therefore, the first hypothesis was accepted. There was no significant effect of the age variable on cognitive style scores. The second hypothesis was accepted. There was also no significant interaction between age and sex and cognitive style scores. The third hypothesis was accepted.

Means and Standard Deviations

The means (\bar{X}) and standard deviations (SD) of the cognitive style scores (CS scores) for each of the twenty-eight items of the Modified Hill Model Cognitive Style Map (CSM) were compared for differences between males and females of each age group as well as between the three age groups within each sex group. Means and standard deviations of the cognitive style scores were discussed in relation to patterns of the means existing within or between the groups. Although there were no significant F statistic results, differences of patterns of the means of either of the variables were included. Those items which suggested differences in the patterns of the means in either the sex or age variables were listed.

A grand mean of all scores was determined. The mean of the cognitive style scores within each of the twenty-eight items was computed to obtain a mean for each item. A mean of each item was then computed for each sex group within the item, giving a female group mean and a male group mean for each item. All means were calculated within each age group to obtain age group means. The mean and standard deviation of each of the twenty-eight items were then compared according to each age and sex group. The twenty-eight items were clustered according to the four major categories: Theoretical Symbols, Qualitative Symbols, Cultural Determinants, and Modalities of Inference. Finally, the means within each item were examined and patterns of the means were listed. A cognitive style score of twenty-seven to forty was considered a "Major" or a preferred score. A cognitive style score of sixteen to twenty-six was considered a "Minor" score, and a less preferred cognitive style, according to the Modified Hill Model Cognitive Style Map. The means represented the scores.

The six sex/age groups were referred to with the same labels as were utilized in the computer groups: (1) female older group (FOGP), thirty-six years and older; (2) female middle group (FMGP), twenty-six to thirty-five years; (3) female young group (FYGP),

seventeen to twenty-five years; (4) male older group (MOGP), thirty-six years and older; (5) male middle group (MMGP), twenty-six to thirty-five years; and (6) male younger group (MYGP), seventeen to twenty-five years.

Although no significant differences were found, demographic data were compared for differences and patterns of the means. The mean of all scores of all groups was 27.83. Totals of all means by sex were: for the females, a mean of 27.50; for the males, a mean of 28.17. Totals of the means for both sex groups and for each sex group individually according to age are identified in Table 3, as well as the means and standard deviations of each of the age and sex groups. The data revealed a higher mean for males than for females. The older group obtained the highest mean of the three age groups, and the group means of each sex were almost identical. The lowest mean in the female group occurred in the middle age group. Both sex groups indicated an increase overall in means from younger to older. The difference in means and the standard deviations within the female group was greater than within the male group.

TABLE 3

DISTRIBUTION OF MEANS AND STANDARD DEVIATIONS
OF COGNITIVE STYLE SCORES BY AGE AND SEX
GROUP

Age Group	Total Both Groups		Female Group		Male Group	
	\bar{X}	S. D.	\bar{X}	S. D.	\bar{X}	S. D.
17-25 years	27.71	5.26	27.30	5.19	28.13	5.33
26-35 years	27.55	5.62	26.96	5.94	28.14	5.29
36 years, older	<u>28.24</u>	5.63	<u>28.23</u>	5.64	<u>28.24</u>	5.62
Means--All Ages	27.83		27.50		28.17	

Each of the means and standard deviations of the twenty-eight items was compared according to each age and sex group. The items in the model were clustered according to the major categories with which they were generally associated. The scores of each of the items were compared as to differences between the sex groups, differences within the age groups, and any observed patterns of the means. Although not significant, F statistics which were greater for one variable than another were noted.

Findings Within the Twenty-eight Items

Theoretical Symbols

1. Theoretical Auditory Linguistics [T(AL)]. The sex group means were: female, 26.76; male, 28.03. The item mean was 27.39. The means were higher in all three male age groups as compared with the female groups. The means in the male group decreased from younger to older. The lowest mean in the female group was in the FMGP, with the FYGP and FOGP being essentially the same. The standard deviations among the females demonstrated a progressive increase from younger to older, with a more marked increase in the FOGP than in the MOGP. Except for the FMGP, all mean scores fell within the "Major" category.

Table 4 contains demographic data comparing the means and standard deviations for each of the Theoretical Symbol items by age and sex groups. Totals for each age and sex group are given.

2. Theoretical Auditory Quantitative [T(AQ)]. As indicated in Table 4, the sex group means were: female, 20.99; male, 22.05. The item mean was 21.52. The male means were larger than were the female means in all three age groups, especially among the younger males. The means of both groups indicated a progressive

TABLE 4
COMPARISON OF THE MEAN AND STANDARD DEVIATIONS FOR EACH THEORETICAL
SYMBOL ITEM, BY AGE, AND SEX GROUPS

Item	17-25 yr Female		26-35 yr Female		36 yr, older Female		Sex Group Total	17-25 yr Male		26-35 yr Male		36 yr, older Male		Sex Group Total	Item Mean
	\bar{X}	S. D.	\bar{X}	S. D.	\bar{X}	S. D.		\bar{X}	S. D.	\bar{X}	S. D.	\bar{X}	S. D.		
T(AL)	27.20	5.21	26.08	5.90	27.00	6.17	26.76	28.64	5.47	27.88	5.23	27.56	5.68	28.03	27.39
T(AQ)	21.92	5.44	20.96	5.33	20.08	5.53	20.99	23.32	5.37	22.52	5.98	20.32	6.62	22.05	21.52
T(VL)	29.36	5.55	29.68	6.47	30.56	5.80	29.87	28.64	5.68	30.48	4.93	31.13	5.16	30.08	29.97
T(VQ)	<u>31.80</u>	4.72	<u>31.36</u>	6.08	<u>32.00</u>	5.58	<u>31.72</u>	<u>31.48</u>	4.74	<u>30.48</u>	4.72	<u>32.68</u>	5.37	<u>31.55</u>	<u>31.63</u>
Mean Score	27.57		27.02		27.41		27.34	28.02		27.84		27.92		27.93	27.63

\bar{X} = Mean.

S. D. = Standard Deviation.

decrease from the younger to the older groups, with the males demonstrating a more marked difference. The female standard deviations were varied, with a slight increase from younger to older, whereas the male standard deviations progressively decreased and demonstrated a more marked difference. These scores all fall within the "Minor" category, and the item mean was the lowest mean of all the twenty-eight item means.

3. Theoretical Visual Linguistics [T(VL)]. As indicated in Table 4, the sex group means were: female, 29.87; male, 30.08. The item mean was 29.97. Although the FYGP indicated a higher mean than the male group, male means surpassed the female means in both the MMGP and MOGP. Both male and female groups indicated a progressive increase in means from younger to older, with the male group demonstrating a greater difference than the female group. The standard deviations of both groups were varied. There was a greater difference among the male groups than the difference between the male and female groups. All scores fell within the "Major" category. They were larger than the T(AL) scores in all groups except the MYGP, which in this group were identical. The group mean was above the grand mean of all items.

4. Theoretical Visual Quantitative [T(VQ)]. As indicated in Table 4, the sex group means were: female, 31.72; male, 31.55. The item mean was 31.63. Means of the FYGP and FMGP were larger than the male groups, whereas the MOGP was larger than the FOGP. Both groups tended to be higher in the younger and older groups than in the middle groups. The standard deviation in the FMGP indicated a wide dispersion. The group mean of this item fell within the "Major" category and was the highest mean of the four theoretical items.

In these four items the highest mean was the T(VQ), and the lowest was the T(AQ). The means for the sex groups for the Theoretical Symbols category were: females, 27.34; males, 27.93. There was a slight decrease in the means of both sex groups from youngest to oldest. The item mean for the Theoretical Symbols was 27.63.

Qualitative Symbols

5. Qualitative Auditory [Q(A)]. As indicated in Table 5, the sex group means were: female, 29.69; male 30.83. The group mean for the item was 30.26. A decrease in both male and female groups was noted in the middle age range. The male group means

TABLE 5

COMPARISON OF THE MEAN AND STANDARD DEVIATIONS FOR EACH QUALITATIVE
SYMBOL ITEM, BY AGE AND SEX GROUPS

Item	17-25 yr Female		26-35 yr Female		36 yr, older Female		Sex Group Total	17-25 yr Male		26-35 yr Male		36 yr, older Male		Sex Group Total	Item Mean
	\bar{X}	S. D.	\bar{X}	S. D.	\bar{X}	S. D.	\bar{X}	\bar{X}	S. D.	\bar{X}	S. D.	\bar{X}	S. D.	\bar{X}	\bar{X}
Q(A)	30.08	4.66	28.48	5.17	30.52	5.12	29.69	32.16	4.23	29.60	4.45	30.72	5.56	30.83	30.26
Q(O)	27.64	4.62	28.88	6.85	30.20	5.35	28.90	27.72	5.08	27.40	5.98	27.64	5.14	27.59	28.24
Q(S)	29.84	5.77	28.28	5.21	30.36	4.13	29.49	29.16	4.77	29.80	4.92	29.12	4.92	29.36	29.43
Q(T)	35.44	4.76	34.56	5.67	36.44	3.78	35.48	34.04	3.60	34.76	4.66	34.56	4.64	34.45	34.97
Q(V)	30.08	4.48	29.16	4.08	30.52	4.76	29.92	30.84	3.90	30.68	5.15	30.68	5.20	30.73	30.33
Q(P)	27.24	5.42	25.56	5.83	26.56	7.09	26.45	30.40	4.80	28.32	5.34	28.76	5.16	29.16	27.81
Q(CEM)	30.72	4.79	30.84	5.50	32.68	4.55	31.41	30.48	4.96	29.20	5.27	30.56	4.48	30.08	30.75
Q(CES)	30.40	5.73	32.08	5.92	33.52	5.20	32.00	30.20	5.67	30.64	4.99	31.44	5.28	30.76	31.38
Q(CET)	32.16	5.12	33.24	4.85	34.32	3.55	33.24	30.60	4.77	32.56	5.39	33.48	5.82	32.21	32.73
Q(CH)	22.84	5.22	20.92	5.54	23.12	6.34	22.29	25.24	5.52	23.76	6.02	22.56	5.38	23.85	23.07
Q(CK)	24.00	5.10	23.84	7.08	27.84	5.55	25.23	24.24	5.58	23.44	6.77	24.68	5.82	24.12	24.67
Q(CKH)	25.64	5.33	25.80	6.05	25.44	7.55	25.63	28.96	5.60	29.20	4.41	28.68	6.08	28.95	27.29
Q(CP)	32.28	6.10	32.32	6.17	32.64	5.38	32.41	31.72	5.27	31.80	5.87	32.28	5.87	31.93	32.17
Q(GS)	33.24	4.14	32.08	5.64	33.36	4.96	32.89	32.24	4.64	31.48	5.06	32.56	5.83	32.09	32.49
Q(CT)	26.84	6.20	24.80	6.02	26.44	6.20	26.03	26.92	5.38	27.16	6.40	27.32	7.22	27.13	26.58
Q(CTM)	30.84	6.16	31.60	6.07	33.60	4.50	32.01	29.88	5.02	31.48	4.60	32.64	5.35	31.33	31.67
Mean Score	29.33		28.90		30.47		29.57	29.67		29.46		29.85		29.67	29.62

\bar{X} = Mean.

S. D. = Standard Deviation.

decreased from the MYGP to the MOGP. There were greater differences within the male age groups than within the female age groups. The differences within the male group means were greater than the difference between the male and female group means. This was not true for the female group. All scores fell within the "Major" category. When compared with the item means of T(AL), 27.39, and T(AQ), 21.52, a difference was noted in the range of means, the Q(A) being much higher.

Table 5 contains demographic data comparing the means and standard deviations for each of the Qualitative Symbol items by age and sex groups. Totals for each age and sex group are given.

6. Qualitative Olfactory [Q(O)]. As indicated by Table 5, the sex group means were: female, 28.90, male, 27.59. The item mean was 28.24. The female mean was higher than the male mean. The FMGP included a high standard deviation as compared with the FYGP and the MMGP was also increased. Females showed progressive increase in means from younger to older, whereas males remained essentially the same. There was a greater difference within the female group than between the female and male groups. All scores fell within the "Major" category, although the male group scores were low on the scale.

7. Qualitative Savory [Q(S)]. As indicated in Table 5, the sex group means were: female, 29.49; male, 29.36. The item mean was 29.43. There was little difference between the means of the sexes in this item. The female means showed a decrease in the FMGP, with the FOGP having a higher mean than the FYGP. There were more differences among the female group means than there were differences between the means of the male and female groups. All means fell within the "Major" category.

8. Qualitative Tactile [Q(T)]. As indicated in Table 5, the sex group means were: female, 35.48; male 34.45. The item mean was 34.97. This was the highest mean of all items. Female means were higher than male means. The highest mean for the males occurred in the MMGP, and for the females the highest mean occurred in the FOGP. The youngest groups both indicated the lower means. The female means showed a more marked difference than the means between the male and female groups. All means fell high in the "Major" category.

9. Qualitative Visual [Q(V)]. As indicated by Table 5, the sex group means were: female, 29.92; male, 30.73. The item mean was 30.33. The males had a higher mean than the females. The mean was decreased in the FMGP. No pattern of means was

noted. The highest mean in the female group occurred in the FOGP. There were more differences in means of the female group than there were between the male and female groups. The standard deviation within the male group showed variation and contained both the lowest and highest deviations of both groups. All scores fell within the "Major" category. The item mean of Q(V), 30.33, compared with the item means of T(VL), 29.97, and T(VQ), 31.63, fell within the same range of means.

10. Qualitative Code Proprioceptive [Q(P)]. As indicated in Table 5, the sex group means were: female, 26.45; male, 29.16. The item mean was 27.81. Definite differences were noted in the male and female group means, with the male means being higher. Both sex groups indicated the highest means in the younger groups, and the lowest in the middle groups. The standard deviation in the FOGP was 7.09. The differences between the means of the male and female groups were larger than the differences within either sex group. The F statistic, although not statistically significant, was larger for the sex variable than for the age variable. The means of the FMGP and FOGP fell within the "Minor" category. All other scores fell within the "Major" category, although the FYGP was a mean low in this category.

11. Qualitative Code Empathetic [Q(CEM)]. As indicated in Table 5, the sex group means were: female, 31.41; male, 30.08. The item mean was 30.75. The females indicated a higher mean than the males. The female group indicated a progressive increase in means from younger to older, whereas the male group means decreased in the MMGP and indicated very little increase from the MYGP to the MOGP. The within group differences among the females were somewhat greater than those among the male groups. The F statistic, although not statistically significant, was larger for the sex variable than for the age variable. All means fell within the "Major" category.

12. Qualitative Code Esthetic [Q(CES)]. As indicated in Table 5, the sex group means were: female, 32.00; male, 30.76. The item mean was 31.38. Females had a higher mean than males. Both sex groups showed a progressive increase in means from younger to older. However, the difference within the female group means was larger than the difference within the male group means. There was a greater difference within the female group means than the difference between the means of male and female groups. All scores fell within the "Major" category.

13. Qualitative Code Ethic [Q(CET)]. As indicated in Table 5, the sex group means were: females, 33.24; males, 32.21. The item mean was 32.73. Female means were higher than the male means. Both indicated progressive increase in means from younger to older. There was a more marked difference of means within the male group than within the female group. The within group differences were greater than the differences between the sex groups. The F statistic, although not statistically significant, was larger for the age variable than for the sex variable. All scores fell within the "Major" category.

14. Qualitative Code Histrionic [Q(CH)]. As indicated in Table 5, the sex group means were: females, 22.29; males, 23.85. The item mean was 23.07. The female group had its lowest mean in the FMGP. The highest mean and standard deviation in the female group occurred within the FOGP. The highest mean in the male group occurred within the MYGP and decreased so that the lowest mean was in the FOGP. The F statistic, although not statistically significant, was larger for the sex variable than for the age variable. All means fell within the "Minor" category.

15. Qualitative Code Kinesics [Q(CK)]. As indicated by Table 5, the sex group means were: females, 25.23; males, 24.12.

The item mean was 24.67. Females had a higher group mean than males. The item mean was below the grand mean of 27.83. The lowest mean among the female group was in the FMGP. The highest mean among the females was in the FOGP, and the difference between the FMGP and the FOGP was marked. The highest standard deviation in both groups occurred in the middle groups. Although there was a marked difference between means of male and female older groups, the difference within the female group from the FMGP to the FOGP is greater. The F statistic, although not statistically significant, was larger for the age variable than for the sex variable in this item. The FOGP mean fell within the "Major" category. All other means fell within the "Minor" category.

16. Qualitative Code Kinesthetic [Q(CKH)]. As indicated in Table 5, the sex group means were: female, 25.63; male, 28.95. The item mean was 27.29. The male group mean was larger than the female group mean. Both male and female groups indicated an increase of means in the middle age groups, with the means of the older groups less than the younger groups. The highest standard deviations occurred in the older groups. There was a more marked difference between the sex groups than within the sex groups. The F statistic, although not statistically significant, was

larger for the sex variable than for the age variable. All of the female means fell within the "Minor" category, whereas all of the male means fell within the "Major" category.

17. Qualitative Code Proxemics [Q(CP)]. As indicated by Table 5, the sex group means were: female, 32.41; male, 31.93. The item mean was 32.17. There was a progressive increase in means in both sex groups with age. The male differences were greater than the female differences, but these differences were slight. All scores fell within the "Major" category.

18. Qualitative Code Synnoetics [Q(CS)]. As indicated in Table 5, the sex group means were: female, 32.89; male, 32.09. The item mean was 32.49. Both sex groups had the lowest mean in the middle age groups, with a slight increase in means from the younger to the older groups. There were more differences within the groups than between the groups. All scores fell within the "Major" category at a fairly high level.

19. Qualitative Code Transactional [Q(CT)]. As indicated by Table 5, the sex group means were: female, 26.03; male, 27.13. The item mean was 26.58. The lowest mean in the female group was within the FMGP. The FOGP was slightly less than the FYGP. The male means increased progressively from the younger to the older

age group. The difference within the female group was greater than the difference between the sex groups. This was not true of the male group differences. All female means fell within the "Minor" category. In the male group, the MYGP fell within the "Minor" category, although the MMGP and the MOGP fell within the "Major" category.

20. Qualitative Code Temporal [Q(CTM)]. As indicated in Table 5, the sex group means were: female, 32.01; male, 31.33. The item mean was 31.67. Both sex groups indicated a progressive increase in means from younger to older age groups. The degree of variation within each group was identical and was greater than the difference between the sex groups. The F statistic, although not statistically significant, was larger for the age variable than for the sex variable. All scores fell within the "Major" category.

In these sixteen items the highest item mean was the Q(T) item. The lowest item mean was the Q(CH) item. The means for the sex groups were: females, 29.57; males, 29.67. The mean for the Qualitative Symbol items was 29.62. Three items, Q(CH), Q(CK), and Q(CT) fell within the "Minor" category. The rest fell within the "Major" category of cognitive styles.

Cultural Determinants

21. Associate (A). As indicated in Table 6, the sex group means were: female, 22.96; male, 24.20. The item mean was 23.59. The male group mean was higher than the female mean. Both sex groups indicated a progressive decrease in the means from younger to older and to a fairly marked degree. The differences in means within the sex groups were almost the same. The differences within each of the sex groups were more pronounced than the differences between the sex groups. The F statistic, although not statistically significant, was larger for the age variable than for the sex variable. All means fell within the "Minor" category.

Table 6 contains demographic data comparing the means and standard deviations for each of the Cultural Determinant items by age and sex groups. Totals for each of the groups are given.

22. Family (F). As indicated in Table 6, the sex group means were: female, 23.71; male, 24.87. The item mean was 24.29. The female group showed a progressive increase in means from younger to older, with a more marked difference between the FMGP and FOGP. The highest male mean occurred in the MMGP. There was a marked difference in this mean from the means in the

TABLE 6
COMPARISON OF THE MEAN AND STANDARD DEVIATION FOR EACH CULTURAL
DETERMINANT ITEM, BY AGE AND SEX GROUPS

Item	17-25 yr Female		26-35 yr Female		36 yr, older Female		Sex Group Total	17-25 yr Male		26-35 yr Male		36 yr, older Male		Sex Group Total	Item Mean
	\bar{X}	S. D.	\bar{X}	S. D.	\bar{X}	S. D.		\bar{X}	S. D.	\bar{X}	S. D.	\bar{X}	S. D.	\bar{X}	
							\bar{X}								\bar{X}
A	25.16	5.27	22.12	5.88	21.68	5.89	22.96	26.00	5.92	24.16	5.19	22.44	5.60	24.20	23.59
F	22.24	5.58	22.28	7.22	26.60	6.13	23.71	23.76	6.37	26.12	6.05	24.72	6.37	24.87	24.29
I	<u>27.08</u>	4.32	<u>28.32</u>	6.01	<u>30.16</u>	5.16	<u>28.52</u>	<u>29.80</u>	5.16	<u>27.80</u>	5.67	<u>29.36</u>	5.02	<u>28.99</u>	<u>28.75</u>
Mean Score	24.83		24.24		26.15		25.06	26.53		26.03		25.51		26.02	25.54

\bar{X} = Mean.

S. D. = Standard Deviation.

MYGP and MOGP groups. The differences within the female group were greater than those within the male group. The differences within the sex groups were greater than the differences between the sex groups. All means fell within the "Minor" category. The F statistic, although not statistically significant, was larger for the age and sex interaction variable than for either the age or sex variable.

23. Independence (I). As indicated in Table 6, the sex group means were: female, 28.52; male, 28.99. The item mean was 28.75. There was very little difference between the male and female means. Females indicated a progressive increase in means from younger to older. Males indicated the highest mean in the MYGP, the lowest mean in the MMGP, and the mean in the MOGP was only slightly less than in the MYGP. The differences within the female sex group were higher than those in the male sex group. Both of these were higher than the difference between the sex groups. All means fell within the "Major" category.

For the three Cultural Determinant items, the sex group means were: female, 25.06; male, 26.02. The mean of the three items was 25.54. The highest means were located in the Independence (I) item. This was the only item mean which fell

within the "Major" category. There were more differences between the age groups than between the sex groups. There was a decrease in the means for the Associate (A) item with increased age in both sex groups. The female sex groups indicated progressive increase of means in both the Family (F) and Independence (I) items with age. The male group indicated a mean difference in the middle age groups in both the Family (F) and Independence (I) items. In the Family (F) item the mean score in the MMGP was the highest of the three age levels, and in the Independence (I) item, the mean score in the MMGP was the lowest of the three age levels.

Modalities of Inference

24. Magnitude (M). As indicated in Table 7, the sex group means were: female, 30.80; male, 30.77. The item mean was 30.79. Both sex groups were almost identical in the group means. Both sex groups indicated a progressive increase in means from younger to older. The differences within the female group were greater than the differences within the male group. Both of these differences were greater than the differences between the sex groups. The F statistic, although not significant, was larger for the

TABLE 7

COMPARISON OF THE MEAN AND STANDARD DEVIATION FOR EACH MODALITIES
OF INFERENCE ITEM, BY AGE AND SEX GROUPS

Item	17-25 yr Female		26-35 yr Female		36 yr, older Female		Sex Group Total	17-25 yr Male		26-35 yr Male		36 yr, older Male		Sex Group Total	Item Mean
	\bar{X}	S. D.	\bar{X}	S. D.	\bar{X}	S. D.		\bar{X}	S. D.	\bar{X}	S. D.	\bar{X}	S. D.		
M	29.24	5.34	30.92	5.89	32.24	4.84	30.80	29.24	6.13	31.40	5.15	31.68	6.48	30.77	30.79
D	26.72	5.23	26.64	5.76	27.52	6.23	26.96	28.44	4.43	28.60	4.03	28.44	5.47	28.49	27.73
R	26.12	5.62	26.76	5.66	29.00	5.79	27.29	26.92	6.24	28.80	4.83	29.76	5.62	28.49	27.89
L	27.36	4.58	26.80	5.50	28.00	6.40	27.39	28.52	4.78	28.04	5.31	27.88	4.82	28.15	27.77
(K)	<u>27.84</u>	5.37	<u>27.24</u>	5.67	<u>27.76</u>	5.67	<u>27.61</u>	<u>28.40</u>	5.19	<u>29.24</u>	5.52	<u>30.68</u>	5.82	<u>29.44</u>	<u>28.53</u>
Mean Score	27.46		27.67		28.90		28.01	28.30		29.22		29.69		29.07	28.54

\bar{X} = Mean.

S. D. = Standard Deviation.

age variable than for the sex variable in this item. All scores fell within the "Major" category.

Table 7 contains demographic data comparing the means and standard deviations for each of the Modalities of Inference items by age and sex groups. Totals for each of the groups are given.

25. Difference (D). As indicated in Table 7, the sex group means were: female, 26.96; male, 28.49. The item mean was 27.73. The male means were higher than the female means. The lowest mean in the female group was within the FMGP whereas the highest mean was in the FOGP. In the male group, the highest mean occurred in the MMGP and the MYGP and the MOGP were identical. The differences in the three were minimal. The highest standard deviations occurred in the older groups. There was a greater difference between the sex groups than within the sex groups themselves. The F statistic, although not significant, was larger for the sex variable than for the age variable. In the FYGP and FMGP groups, the means fell within the "Minor" category, but the mean of the FOGP as well as all the means of all the male groups fell within the "Major" category.

26. Relationship (R). As indicated in Table 7, the sex group means were: female, 27.29; male, 28.49. The item mean

was 27.89. Both sex groups indicated progressive increases in means from the younger to the older groups. There was a greater difference within the means of the sex groups than there was between the sex groups. The F statistic, although not statistically significant, was larger for the age variable than for the sex variable. The FYGP, FMGP, and the MYGP groups fell within the "Minor" category. The FOGP, MMGP, and MOGP groups fell within the "Major" category.

27. Appraisal (L). As indicated in Table 7, the sex group means were: female, 27.39; male, 28.15. The item mean was 27.77. In the female group the lowest mean was within the FMGP, the highest in the FOGP, and the difference between the FYGP and the FOGP was not great. The male means indicated a progressive decrease from younger to older. There was more of a variation within the female group than the male group. There was little difference between the within group sex variations and the between sex group variations. The FMGP group mean fell within the "Minor" category. All the rest fell within the "Major" category.

28. Deductive [(K)]. As indicated in Table 7, the sex group means were: female, 27.61; male, 29.44. The item mean

was 28.53. The male means were higher than the female means. The means and standard deviations both increased in the male group from younger to older. The means within the female groups indicated little change. There was a greater difference within the male group means than between the sex group means. The F statistic, although not statistically significant, was larger for the sex variable than for the age variable. All mean scores fell within the "Major" category.

For the Modality of Inference items, the sex group means were: female, 28.01; male, 29.07. The mean of the five items was 28.54. All of the sex group means fell within the "Major" category except for the difference (D) item in the female group. The highest mean of the five item means was the Magnitude (M) item. Difference (D), Relationship (R), and Appraisal (L) all contained means of approximately the same magnitude. Individual age/sex groups, however, did fall within the "Minor" category. These were the FYGP and FMGP of the Difference (D) items; the FYGP, FMGP, and MYGP groups of the Relationship (R) item, and the FMGP of the Appraisal (L) item.

In summary, although there were no significant differences for any of the three hypotheses, some differences in means and in the

patterns of the means were noted. The results indicated that there were some differences in means which were greater between the sex groups, some differences in the means which were greater among the age levels, and some differences which had no apparent patterns.

Those items in which greater differences were noted between the sex groups than within the age groups included: (1) Qualitative Code Proprioceptive [Q(P)], (2) Qualitative Code Empathetic [Q(CEM)], (3) Qualitative Code Histrionic [Q(CH)], (4) Qualitative Code Kinesthetic [Q(CKH)], and (5) Difference (D).

Those items in which greater differences were noted between the age groups than within the sex groups included: (1) Qualitative Code Ethic [Q(CET)], (2) Qualitative Code Kinesics [Q(CK)], (3) Qualitative Code Temporal [Q(CTM)], (4) Associates (A), (5) Magnitude (M), (6) Relationship (R), and Deductive [(K)].

One item, although not statistically significant, indicated a larger F statistic for the age and sex interaction than for the age or sex variables. This was the Family (F) item.

Other patterns of means that were noted included tendencies in the means to increase, decrease, or remain relatively stable in relation to the age variable. Tendency for the mean to decrease from younger to the older group included: (1) Theoretical Auditory

Linguistics [T(AL)], in the male group; (2) Theoretical Auditory Quantitative [T(AQ)], both sexes; (3) Qualitative Code Histrionic [Q(CH)], males; and (4) Associate (A), both sexes.

Tendency for the mean to increase from the younger to the older groups included: (1) Theoretical Visual Linguistics [T(VL)], both sexes; (2) Qualitative Olfactory [Q(O)], females; (3) Qualitative Code Empathetic [Q(CEM)], females; (4) Qualitative Code Esthetic [Q(CES)], both sexes; (5) Qualitative Code Ethic [Q(CET)], both sexes; (6) Qualitative Code Proxemics [Q(CP)], both sexes; and (7) Qualitative Code Transactional [Q(CT)], males.

Tendency for the mean to increase in the middle age group included: (1) Qualitative Savory [Q(S)], males; (2) Qualitative Tactile [Q(T)], males; (3) Qualitative Code Kinesthetic [Q(CKH)], males; and (4) Family (F), males.

Tendency for the mean to be lower in the middle age groups included: (1) Theoretical Auditory Linguistics [T(AL)], females; (2) Theoretical Visual Quantitative [T(VQ)], both sexes; (3) Qualitative Auditory [Q(A)], both sexes; (4) Qualitative Savory [Q(S)], females; (5) Qualitative Tactile [Q(T)], females; (6) Qualitative Visual [Q(V)], females; (7) Qualitative Code Proprioceptive [Q(P)],

females; (8) Qualitative Code Empathetic [Q(CEM)], males; (9) Qualitative Code Histrionic [Q(CH)], females; (10) Qualitative Code Kinesics [Q(CK)], both sexes; (11) Qualitative Code Synnoetics [Q(CS)], both sexes; (12) Qualitative Code Transactional [Q(CT)], females; and (13) Independence (I), males.

CHAPTER V

SUMMARY, CONCLUSION, AND RECOMMENDATIONS

Summary

The purpose of this study was to investigate the differences in cognitive style scores between male and female students and between three age groups; in addition, there was an investigation of the interaction in the cognitive style scores between age and sex of community college students. These differences were determined by use of the Modified Hill Model Cognitive Style Map as utilized by Mountain View College, Dallas, Texas.

The research questions of this study were as follows:

1. Is there a significant difference in the cognitive style scores between male and female community college students as determined by a Modified Hill Model Cognitive Style Map?
2. Is there a significant difference in the cognitive style scores between three age groups of community college students as determined by a Modified Hill Model Cognitive Style Map?
3. Is there a significant interaction in the cognitive style scores between the age and sex of community college students as determined by a Modified Hill Model Cognitive Style Map?

Three age groups were chosen arbitrarily: seventeen to twenty-five years, twenty-six to thirty-five years, and thirty-six years and older. Each age group was separated according to the male or female sex, resulting in six age/sex groups. Utilized was a list of the students enrolled at the selected institution for the fall semester, 1977, with the social security number, birthdate, and sex of each one. The list was divided into the three age categories according to birthdate and sex.

A random sample of fifty cognitive style maps was obtained by a systematic probability sample within each of the six age/sex groups. A random stratified sample was thus obtained. The data were analyzed for differences among the groups with respect to each of the twenty-eight variables by an analysis of variance with two-way factorial arrangement of treatments (age and sex combinations) at the 0.05 level of significance.

Conclusions

From the hypotheses tested, the following conclusions were drawn:

1. The F statistics revealed that there were no significant differences in the cognitive style scores between the three age groups

of community college students as determined by a Modified Hill Model Cognitive Style Map. The hypothesis was accepted.

2. The F statistics revealed that there were no significant differences in the cognitive style scores between the three age groups of community college students as determined by a Modified Hill Model Cognitive Style Map. The hypothesis was accepted.

3. The F statistics revealed that there was no significant interaction in the cognitive style scores between age and sex of community college students as determined by a Modified Hill Model Cognitive Style Map. This hypothesis was accepted.

Although there were no significant differences or interactions, there were certain patterns of mean differences noted. Factors which were uncontrolled in this study may have had influences upon the results obtained. These included such factors as the Modified Hill Model Cognitive Style Map itself, the personal roles as established by family and sex, educational, social, cultural, and economic factors.

There were variations in mean scores among the twenty-eight items. In general, there was greater variability of the means among the female group than among the male group. The highest item mean was recorded in the Q(T) item, indicating that the most

cognitive style was perceiving meaning through touch, temperature, and pain. Other items with high mean scores in the "Major" preference category were: [T(VQ)], finding meaning in numerical symbols, relationships, and measurements that are seen; [Q(CES)], enjoying the beauty of an object or an idea; [Q(CET)], commitment to a set of values, a group of principles, obligations, or duties, [Q(CP)], judging the physical or social distance permitted by another person; [Q(CS)], personal knowledge of oneself; and [Q(CTM)], awareness of time and time expectations. The lowest item mean was the [T(AQ)] item, finding meaning in spoken or non-word symbols. Other items which fell in the lower region of the "Minor" category included: [Q(CH)], playing a role or knowing how to fulfill role expectations; [Q(CK)], understanding and communicating by facial expressions and body motions; [Q(CT)], ability to effectively put across an idea or sell a product; (A), the degree of influence by friends or persons other than the immediate family; and (F), influences that might include the immediate family, or church or authority figures.

Patterns of the Means: Sex Groups

There were differences between the means of the male and female groups that were greater than the differences of the means among the age groups, although they were not of a level of significance. [Q(P)], synthesizing a number of associated symbols into a performance of a task was a more preferred style among males than among females. Females indicated more preferences than did males for [Q(CEM)], sensitivity to other's feelings, or seeing another person's point of view. [Q(CH)], playing a role to influence others was a low scoring item for both groups but was less preferred in the female group than in the male group. [Q(CKH)], performing motor skills according to an acceptable form contained a relatively wide variability of scores in both sexes, but the variation was greater in the male group. The remaining sex mean score difference was the item having to do with reasoning by looking at differences, (D). Higher means were obtained by the male group. There were five cognitive style items in which there were greater mean differences between the sex groups than among the age groups. The findings of no significant differences between the sexes supported the findings revealed in the literature. That certain differences in means, though insignificant, did exist cannot be attributed to sex as

a causative factor. The items within the inventory could possibly have tended to encourage a more positive or negative response according to the sex because of difficulty in obtaining non-sexed or non-culturally oriented statements or questions for the inventory.

Patterns of the Means: Age Groups

There were differences between the means of the age groups which were greater than the differences between the sex groups, although not of a significant level. Certain patterns of the means were noted.

Those items in which the mean score differences in the age groups were larger than the mean score differences between the sex groups were those items having to do with: (1) [Q(CET)], a commitment to principles, obligations, duties, or values; (2) [Q(CK)], an understanding and communicating by body motions, gestures, hand and facial expressions; (3) [Q(CTM)], an awareness of time; (4) (A), the degree of influence of persons other than family; (5) (R), reasoning by looking for similarities in concepts; (6) (M), a form of categorical reasoning utilizing norms or categorical classifications; and (7) [(K)], reasoning by deduction and logic.

Progressive tendency for the means of the items to be the less preferred cognitive style with increasing age included:

- (1) [T(AL)], a preference for hearing words, among males;
- (2) [T(AQ)], a preference for hearing non-word symbols, both sexes;
- (3) [Q(CH)], playing a role and fulfilling role expectations, among males; and
- (4) (A), a preference for the degree of influence by friends or persons other than the family, both groups.

Progressive tendency for the mean of the cognitive style item to be more preferred with increasing age included: (1) [T(VL)], a preference to read and find meaning through words which are seen, both sexes; (2) [Q(O)], perceiving meaning through the sense of smell, female group; (3) [Q(CEM)], having a sensitivity to the feelings of others, female group; (4) [Q(CES)], enjoying the beauty of an object or an idea, both sexes; (5) [Q(CET)], a commitment to a set of values and principles, both sexes; (6) [Q(CP)], judging physical and social distance, both sexes; and (7) [Q(CT)], ability to sell a product or an idea, male group. There were more items indicating a pattern of the means to increase with age than to decrease with age.

In certain items, the tendency was noted for the means within the sex group to be lower in the middle age group than in

either the younger or older groups. Among the female groups only, these items included: [T(AL)], a preference for hearing words; (2) [Q(S)], perceiving meaning through the sense of taste; (3) [Q(T)], perceiving meaning through the sense of touch; (4) [Q(V)], perceiving meaning through sight; (5) [Q(P)], synthesizing associated symbols into a performance of a task; (6) [Q(CH)], playing a role and fulfilling role expectations; and (7) [Q(CT)], ability to sell a product or an idea. Among the male group only these items included: (1) [Q(CEM)], sensitivity to the feelings of others; and (2) (I), independence in decision making. The mean was lower in the middle age in both sexes in the following: (1) [T(VQ)], preference for seeing non-word symbols; (2) [Q(A)], perceiving meaning through a sense of hearing; (3) [Q(CK)], understanding and communicating by facial expressions and body motions; and (4) [Q(CS)], personal knowledge of oneself.

In other items, a tendency was noted for the mean to be higher in the middle age group than in either the younger or older groups. All of these were in the male group. These included: (1) [Q(S)], perceiving meaning by sense of taste; (2) [Q(T)], perceiving meaning through sense of touch; (3) [Q(CKH)], performing motor skills according to a recommended or acceptable

form; and (4) (F), the influence of immediate family, church, or authority figures. In general there were more items indicating a pattern of the means to be lower in the middle age group than to be higher.

In the male group, the pattern of mean scores indicated that the mean score was highest in the younger group in perceiving meaning through the sense of hearing, [Q(A)]. Certain other items in which the mean was highest and more marked in the older group, but did not indicate a pattern with increasing age included: (1) [Q(CH)], playing a role and fulfilling role expectations; and (2) [Q(CK)], understanding and communicating through facial expressions and motions of the body, in the female group; and (3) [T(VQ)], a preference for seeing non-word symbols in the male group. In this study, the Relationship (R) item increased with age in both sexes. The Appraisal (L) item mean was the lowest of the five Modalities of Inference items and decreased in the older group of males. These results of the cognitive styles did not correlate with the inferences suggested by the literature.

Very little mean differences were noted with age in the cognitive style item related to performing motor skills according to a recommended or acceptable form [Q(CKH)], but in the item having to

do with synthesizing a number of associated symbols into a performance of a task [Q(CP)], the means increased with age. [Q(V)], perceiving meaning through sight remained essentially the same in the male group and reflected little difference in the female group, exhibiting the least preference within the older female group. [Q(A)], perceiving meaning through the sense of hearing indicated a decrease in preference among males with increased age and indicated a lesser preference in the middle age group of the females. Among the theoretical symbols, there was a decrease with age among both sex groups in both a preference for hearing words [T(AL)], and preference for hearing non-word symbols [T(AQ)]. This was contrary to that indicated in the literature. However, this did agree with the findings among student and registered nurses which stated that the least preferred method of learning was a method involving only audio-recordings. There was an increase in the mean score with age in both sex groups both in the preference to read and the preference for seeing non-word symbols. There was a marked mean score difference between the visual [T(VQ)] and [T(VL)], and auditory [T(AQ)] and [T(AL)] items. Implications in structuring educational strategies are that, with a marked preference for visual theoretical

material, especially with increased age, a lecture class should include reading assignments, class handouts, charts, and graphs.

Among the Cultural Determinant item means, as obtained by the Modified Hill Model Cognitive Style Instrument, (I), independence in decision making was the only "Major" preference item. The female groups indicated preference for this mode with increased age. However, the males indicated a decreased mean score in this area in the middle age group and remained fairly constant in the younger and older groups. As the Independence (I) decreased in the middle group, the Family (F) influences were increased to the highest mean level.

In general, as measured by the Modified Hill Model Cognitive Style Map, there seemed to be certain differences and patterns of mean scores. These differences could be interpreted only in terms in which the Modified Hill Model Cognitive Style Map was utilized within Mountain View College. Instructional management could include these general preferences and least-liked elements in the considerations of program planning and student learning activities.

Based upon the evidence discovered during this study, the associate degree program of nursing, with largely a female student population and with an increase in proportion of older students, might

find that group discussions and group project type of learning modes may not be as preferred as the more independent learning laboratory or the more structured method such as lecture. Since community college students live away from the campus and have other responsibilities in addition to attending school, this method of cognitive style preference may best fit their life style.

Nursing education requires the student to develop multi-sensory skills, such as visual perception, discrimination of sounds, sense of smell, and sense of touch. With slight exceptions, these cognitive style preferences generally remained fairly stable within both sexes and were higher among the preferred cognitive styles.

Nursing education also requires use of communication and interpersonal skills. Social interactions, such as those of the student-teacher, patient-therapist, and interviewee-interviewer, may be influenced by the cognitive styles of the individual involved. In this study, those qualities having to do with ethics, esthetics, and empathy also remained stable or increased with age and were also high in the cognitive style preferences.

Nursing also involves the problem solving process and relating theoretical knowledge to the clinical setting. Knowledge of the student's preferences among the Modalities of Inference items

would enable the teaching-learning processes to be structured in such a way as to be most beneficial for the student. Whether or not the students in an associate degree nursing program would indicate the same degree of preferences in the same items cannot be determined by this study. An indication of how the student prefers to learn, along with an assessment of areas of natural strengths or areas needing assistance, are considerations that may be helpful to the student as well as helpful in structuring instructional strategies.

Recommendations

This study suggests that more research should be conducted in relation to cognitive styles as determined by the Modified Hill Model Cognitive Style instrument. Recommendations for further study include:

1. The study should be continued and expanded to include students enrolled in other time frames, such as other semesters or years.
2. A replication of the study with students of a differing population, such as another community college, should be done and the results compared.

3. Another research study using a different instrument or combinations of instruments to assess cognitive styles and student learning mode preferences should be done. The results should then be compared with the Modified Hill Model Cognitive Style instrument.

4. A study should be done to obtain other demographic information concerning cognitive styles as they relate to various aspects in education, such as career choice, and to specialized vocational programs, such as nursing.

APPENDICES

APPENDIX A

COGNITIVE STYLE MAPPING SYMBOLS AND
THEIR MEANINGS

APPENDIX A

COGNITIVE STYLE MAPPING SYMBOLS AND THEIR MEANINGS

1. T(AL) Theoretical Auditory Linguistics. Finding meaning through words you hear.
2. T(AQ) Theoretical Auditory Quantitative. Finding meaning in spoken numbers or non-word symbols.
3. T(VL) Theoretical Visual Linguistics. Finding meaning from words you see or read.
4. T(VQ) Theoretical Visual Quantitative. Finding meaning in seeing numerical or non-word symbols.
5. Q(A) Qualitative Auditory. Perceiving meaning through the sense of hearing. Distinguishing between sounds, music tones, etc.
6. Q(O) Qualitative Olfactory. Perceiving meaning through the sense of smell. Odors may reinforce or interfere with learning process.
7. Q(S) Qualitative Savory. Perceiving meaning through the sense of taste. Concentration may be aided by tasting, chewing gum, smoking, etc.
8. Q(T) Qualitative Tactile. Perceiving meaning through touch, temperature, and pain.
9. Q(V) Qualitative Visual. Perceiving meaning through sight.
10. Q(P) Qualitative Code Proprioceptive. Synthesizing a number of associated symbols into a performance of a task. Sometimes called the "Sixth Sense."

11. Q(CEM) Qualitative Code Empathetic. Sensitivity to other's feelings. Putting yourself into another person's place.
12. Q(CES) Qualitative Code Esthetic. Enjoying the beauty of an object, scene, or idea.
13. Q(CET) Qualitative Code Ethic. Commitment to a set of values, principles, obligations, and/or duties. (Does not imply morality.)
14. Q(CH) Qualitative Code Histrionic. Exhibiting a deliberate behavior or "playing a role" to influence others.
15. Q(CK) Qualitative Code Kinesics. Understanding and communicating by body motions, gestures, smiles, facial expressions, and hands.
16. Q(CKH) Qualitative Code Kinesthetic. Performing motor skills according to a recommended, or acceptable, form.
17. Q(CP) Qualitative Code Proxemics. Judging the physical and social distance that another person would permit.
18. Q(CS) Qualitative Code Synnoetics. Personal knowledge of one's self.
19. Q(CT) Qualitative Code Transactional. Influencing another's behavior, effectively putting across an idea, or selling a product.
20. Q(CTM) Qualitative Code Temporal. Awareness of time and time expectations.
21. A Degree of influence by associates--persons other than family.
22. F Degree of influence by family, church, authority figures.

- 23. I Independence in decision making.
- 24. M Magnitude. "Categorical reasoning" utilizing classification or rules as the basis for accepting or rejecting an advanced hypothesis.
- 25. D Difference. Reasoning by looking for differences in concepts, such as in art, writing, and music.
- 26. R Relationship. Reasoning by looking for similarities in concepts.
- 27. L Appraisal. Reasoning by using the three previous modalities (M, D, and R), giving equal weight to each.
- 28. (K) Deductive. Deductive reasoning, logic as used in geometry or syllogistic reasoning.¹

¹"Summary of CSM Symbols and Their Meanings," in Student Guide, Cognitive Style (Dallas: Mountain View Community College, Fall, 1977).

APPENDIX B

COGNITIVE STYLE MAP

APPENDIX B

COGNITIVE STYLE MAP

NAME: ROE MARY

DATE 09/21/77

SSN. 000000000

GROUPS	ITEMS	MAJOR	MINOR	NEGLIGIBLE
--------	-------	-------	-------	------------

THEORETICAL

1	T(AL)			24
2	T(AQ)			18
3	T(VL)	36		
4	T(VQ)	36		

QUALITATIVE

5	Q(A)	32		
6	Q(O)	32		
7	Q(S)	32		
8	Q(T)	40		
9	Q(V)	36		
10	Q(P)		20	
11	Q(CEM)	32		
12	Q(CES)	32		
13	Q(CET)	40		
14	Q(CH)		20	
15	Q(CK)	36		
16	Q(CKH)		20	
17	Q(CP)	36		
18	Q(CS)	36		
19	Q(CT)		26	
20	Q(CTM)	38		

CULTURAL DETERMINANTS

21	A	28		
22	F		22	
23	I	30		

MODALITIES OF INFERENCE

24	M	34		
25	D	28		
26	R	36		
27	L	32		
28	(K)	34		

BIBLIOGRAPHY

- Bigge, Morris L. Learning Theories for Teachers. 3d ed.
New York: Harper and Row, Publishers, 1976.
- Bishop, John, and Van Dyk, Jane. "Can Adults Be Hooked on College?" Journal of Higher Education 48 (January-February 1977): 39-58.
- Block, James H. "Individualized Instruction: A Mastery Learning Perspective." Educational Leadership 34 (February 1977): 337-341.
- Brooks, Mindy. "Cognitive Style and Career Choice." NETCHE Newsletter 11 (December 1977-January 1978): 4-6.
- _____. "Cognitive Styles Impact Education." NETCHE Newsletter 11 (November 1977): 1-3.
- Cawley, Richard W. V.; Miller, Sheila A.; and Milligan, James N. "Cognitive Styles and the Adult Learner." Adult Education 26 (Winter 1976): 101-116.
- Clark, Francis E., and Sheriff, Dennis E. "Hill's Cognitive Style Inventory in Retrospect." Paper presented at Mountain View College, Conference on Cognitive Style, Dallas, Texas, 5-8 February 1978.
- Cohen, Arthur M. Dateline '79: Heretical Concepts for the Community College. Beverly Hills, California: Glencoe Press, a Division of the Macmillan Company, 1969.
- "College Campuses Welcome Growing Number of Adults." The Dallas Morning News, 8 January 1978, sec. I, p. 20.
- Conley, Virginia C. Curriculum and Instruction in Nursing. Boston: Little, Brown and Company, 1973.

- Cross, K. Patricia. Accent on Learning. San Francisco: Jossey-Bass, Inc., Publishers, 1976.
- _____. Beyond the Open Door. San Francisco: Jossey-Bass, Inc., Publishers, 1974.
- _____. "Learner-Centered Curricula." in Learner-Centered Curriculum: Current Issues in Higher Education, pp. 54-65. Edited by Dyckman W. Vermilye. San Francisco: Jossey-Bass, Inc., Publishers, 1974.
- Davis, James R. Teaching Strategies for the College Classroom. Boulder, Colorado: Westview Press, Inc., 1976.
- DeMott, Benjamin. "'Adult Ed'--The Ultimate Goal." Saturday Review 2 (September 20, 1975): 27-29.
- Dunn, Rita; Dunn, Kenneth; and Price, Gary E. "Diagnosing Learning Styles: A Prescription for Avoiding Malpractice Suits." Phi Delta Kappan 58 (January 1977): 418-420.
- Garvin, Bonnie. "Values of Male Nursing Students." Nursing Research 25 (September-October 1976): 352-357.
- Glass, J. Conrad, Jr., and Hodgins, Hubert H. "Commuting Students and Cocurricular Activities." Personnel and Guidance Journal 34 (January 1977): 253-256.
- Gould, Samuel B. Diversity by Design. San Francisco: Jossey-Bass, Inc., Publishers, 1973.
- Gruenfeld, Leopold W., and MacEachron, Ann E. "Relationships Between Age, Socioeconomic Status, and Field Independence." Perceptual and Motor Skills 41 (October 1975): 449-450.
- Havighurst, Robert J. Developmental Tasks and Education. 3d ed. New York: David McKay Company, Inc., 1974.
- Hechinger, Fred M. "Education's 'New Majority.'" Saturday Review 2 (September 20, 1975): 14-18.

- Holtzman, Wayne H. "Education for Creative Problem Solving." In Individuality in Learning, pp. 23-33. Edited by Samuel Messick and Associates. San Francisco: Jossey-Bass, Inc., Publishers, 1976.
- Johnson, Walter L. "Admissions of Men and Ethnic Minorities to Schools of Nursing." Nursing Outlook 22 (January 1974): 45-49.
- Kogan, Nathan. "Sex Differences in Creativity and Cognitive Styles." In Individuality in Learning, pp. 93-119. Edited by Samuel Messick and Associates. San Francisco: Jossey-Bass, Inc., Publishers, 1976.
- Lange, Crystal Marie. "A Study of the Effects on Learning of Matching the Cognitive Styles of Students and Instructors in Nursing Education." Unpublished doctoral dissertation, Michigan State University, 1972, as abstracted in Dissertation Abstracts International. A. The Humanities and Social Sciences 33 (March 1973): 4742A-4743A.
- _____. "Determining Cognitive Styles." Nursing Outlook 24 (December 1976): 734.
- _____. "Matching Media to Learning Styles." Nursing Outlook 25 (January 1977): 18.
- _____. "Media and Learning Styles." Nursing Outlook 24 (November 1976): 672.
- McKenney, James L., and Keen, Peter G. W. "How Managers' Minds Work." Harvard Business Review 52 (May-June 1974): 79-90.
- Messick, Samuel and Associates. Individuality in Learning. San Francisco: Jossey-Bass, Inc., Publishers, 1976.
- Michelmores, Ellen. "Distinguishing Between AD and BS Education." Nursing Outlook 25 (August 1977): 506-510.

- Monroe, Charles R. Profile of the Community College: A Handbook. San Francisco: Jossey-Bass, Inc., Publishers, 1972.
- Mountain View College, Dallas, Texas. Telephone conversation with Resource Consultant. January 1978.
- _____. Mountain View College Workshop on "Classroom Utilization of Cognitive Style Mapping." Dallas, Texas, October 22, 1977. (Workbook.)
- Nelson, Karen H. "Cognitive Styles and Sex Roles in Teaching-Learning Processes." Expanded version of a paper presented at the Convention of the American Psychological Association, San Francisco, California, 26 August 1977.
- _____. "Contemporary Models of Cognitive Style: An Introduction." Paper presented at the Convention of the American College Personnel Association, 3 March 1975.
- _____. "Introduction of an Information-Processing Model of Cognitive Style." Paper by Karen H. Nelson, Ph. D., 1974. A handout, Mountain View College, Conference on Cognitive Style. Dallas, Texas 5-8 February 1978.
- Okun, Morris A. "Implications of Geropsychological Research for the Instruction of Older Adults." Adult Education 27 (Spring 1977): 139-155.
- Pruitt, Susan. "Selected Criteria of Graduates from Two Associate Degree Nursing Programs." Master's Thesis, Texas Woman's University, Denton, Texas, 1977.
- Reilly, Dorothy E. Behavioral Objectives in Nursing: Evaluation of Learner Attainment. New York: Appleton-Century-Crofts, a publishing division of Prentice-Hall, Inc., 1975.
- Ridgeway, Cecilia L. "Patterns of Environmental Adjustments Underlying Measured Cognitive Complexity and Field Independence in Men and Women." Perceptual and Motor Skills 44 (February 1977): 99-112.

- Ritchie, Harriette B. "Learning Styles Relevant to Identified Personality Types of Selected Nursing Students and Selected Successful Registered Nurses." Unpublished doctoral dissertation, Nova University, 1975 (ERIC Document Reproduction Service, Computer Microfilm International Corporation, ED 139 485).
- Rodgers, Dr. Sam. Director of Instructional Research, Mountain View College, Dallas, Texas. Telephone conversation, March 8, 1978.
- Schroeder, Arlen V. Cognitive Style: The Key to Student Placement? Detroit: Oakland Community College Press, 1971.
- Schweer, Jean E., and Gebbie, Kristine M. Creative Teaching in Clinical Nursing. 3d ed. St. Louis: The C. V. Mosby Company, 1976.
- Scott, Ruth, and Holt, Lillabelle. "The New Wave: A College Responds to Women Returnees." Phi Delta Kappan 58 (December 1976): 338-339.
- Sims, Dr. David. Class handouts. EDFD 5413-30, Texas Woman's University, Denton, Texas, Fall, 1977.
- _____. Class notes. EDFD 5413-30, Texas Woman's University, Denton, Texas, Fall, 1977.
- "Summary of CSM Symbols and Their Meanings." In Student Guide, Cognitive Style. Dallas: Mountain View Community College, Fall, 1977.
- Tibbles, Lillian. "Theories of Adult Education: Implications for Developing a Philosophy for Continuing Education in Nursing." Journal of Continuing Education in Nursing 8 (July-August 1977): 25-28.
- Tomaino, Louis. "On Teaching College Students as Adults." Improving College and University Teaching 25 (Winter 1977): 13-15.

- U. S. Bureau of the Census. Statistical Abstract of the United States. School Enrollment, by Sex and Age: 1970 to 1975. Washington, D. C. : U. S. Government Printing Office, U. S. Department of Commerce, 1976.
- Witkin, Herman A. "Cognitive Style in Academic Performance and in Teacher-Student Relations." In Individuality in Learning, pp. 38-72. Edited by Samuel Messick and Associates. San Francisco: Jossey-Bass, Inc., Publishers, 1976.
- _____, and Goodenough, Donald R. "Field Dependence and Interpersonal Behavior." Psychological Bulletin 84 (July 1977): 661-689.
- Wren, George R. "Some Characteristics of Freshman Students in Baccalaureate, Diploma, and Associate Degree Nursing Programs." Nursing Research 20 (March-April 1971): 167-172.