DOCUMENT RESUME

ED 118 907 CE 006 467

AUTHOR Skeen, Elois M.
TITLE Niagara Falls HEW 309 Project 1974-1975: Evaluation Report.
INSTITUTION Niagara Falls Board of Education, N.Y.
SPONS AGENCY Office of Education (DHEW), Washington, D.C.
BUREAU NO V0093-VA
PUB DATE 19 Dec 75
GRANT OEG-0-74-1763
NOTE 67p.; Not available in hard copy, due to marginal reproducibility; For related documents, see CE 006 466 and CE 006 468

EDRS PRICE MF-$0.83 Plus Postage. HC Not Available from EDRS.
DESCRIPTORS *Adult Basic Education; Adult Reading Programs; *Cognitive Measurement; Cognitive Processes; Diagnostic Teaching; Educational Testing; Individual Characteristics; Individual Differences; Individualized Instruction; *Individualized Programs; Individualized Reading; Individual Needs; *Measurement Instruments; *Program Evaluation; Reading Materials; Resource Guides; Test Construction
IDENTIFIERS *Cognitive Style Mapping; New York (Niagara Falls); Provus Discrepancy Model

ABSTRACT

The document reports an outside evaluation of a Niagara Falls Adult Basic Education Program special project entitled "Identification of Preferred Cognitive Styles and Matching Adult Reading Program Alternatives for the 0-4 Grade Levels." It was concerned with (1) research, training in cognitive style mapping, and development of a survey and process which would assess the adult student's preferred cognitive style, for prescribing individualized instruction; and (2) development of a taxonomy of alternative reading programs, methods, and materials presently available at the Niagara Falls center, as a resource file for matching materials with individual students' developmental levels and cognitive styles. The report's five sections are: (1) a description of the evaluation procedure, the Provus Discrepancy Model; (2) a list of 11 project objectives and accomplishments; (3) breakdowns by race, sex, and educational level of students, in the areas of symbolic orientation, cultural determinants, and modes of inference; (4) an evaluation of the cognitive style-mapping instrument; and (5) an evaluation of the total project, including recommendations. The staff accomplished most of their objectives, became skilled in the theory and application of cognitive style mapping, trained other personnel, and developed an effective instrument for assessing learning style preferences. A map-analysis form is appended. (Author/AJ)

EVALUATION REPORT
HEW 309 (PROJECT 1974-75
NIAGARA FALLS N.Y.

Elvin M. Skoon Ph.D.

State University of New York at Buffalo

DEPARTMENT OF ELEMENTARY AND REMEDIAL EDUCATION
Programs in Elementary Education, Reading, Remedial Education and Early Childhood

FACULTY OF EDUCATIONAL STUDIES

December 19, 1975

Dear Mr. Franciosa,

Enclosed you will find the completed evaluation of your HEW 309 project on Congitive Style Mapping. As discussed before, the procedure used was the Provus Discrepancy Model which essentially provides a reality testing of what was stated in the proposal and what was actually accomplished.

Additionally, I have provided a description of the demographic information of the participants, suggestions by Program Directors who were involved in the project, and a description of those students in Niagara Falls cognitive styles.

It was a pleasure working with you and your staff and, I hope you will find the suggestions I made helpful as you continue the implementation of your program.

Sincerely,

Elois M. Skeen

Elois M. Skeen
Assistant Professor

TER HALL BUFFALO, NEW YORK 14214 TEL.(716)831-2421

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ILLUSTRATIONS

INTRODUCTION

This report is divided in five major sections. The first section describes the Provus Discrepancy Model which is the evaluation procedure used in this report. The second section lists all of the objectives included in the funded proposal and describes the extent to which each was accomplished. The third section provides a breakdown by race, sex and educational level of those students with major orientations in the areas of Symbolic Orientation, Cultural Determinants, and Modes of Inference. The fourth section is an evaluation of the Cognitive Style Mapping Instrument and the fifth and last section is an evaluation of the total project including recommendations.

EVALUATION PROCEDURE

The Provus Discrepancy Model consists of a five stage evaluation process to assess the "discrepancy" of initially stated program goals and objectives to the implementation of these goals and objectives in the installation of the program in the field and finally to the end products achieved by the program. Additionally, this process can assist in characterizing the varying developmental aspects and process of programs. Ideally, this model works best when an evaluator is included initially in the development of a new program so that s/he might provide input in each stage to the program staff in order to facilitate the congruence of initially stated goals and objectives to terminal output.

Following is a brief description of the five stages to be evaluated (Provus, 1971).

Design

During the design stage one develops and specifies the major goals of the program and the methods used to obtain these goals. An effective evaluation of this stage requires that both the structural and theoretical soundness of the proposed goals be evaluated. This process can be diagramed in the following manner.

INPUTS ---- > PROCESS ---- > OUTPUTS

1. Inputs are composed of three components: variables, preconditions, and criteria.

    a. Variables essentially refer to anything that is to be changed, for example, pupil performance. The variables listed may include those for the client as well as those for the staff.

b. Preconditions provide a description of the entering characteristics of the clients, the staff or both, i.e., what characteristics must people have to be eligible for this program?

c. Criteria describe how you will select your clients and/or your staff, that is, given certain entering characteristics what procedure will you then utilize to make selections of persons to be included?

2. Process is composed of two components: variables and criteria.

a. The variables in this stage give a description of what the clients, students, staff etc. will be doing. (activities)

b. Criteria describe how much time will be devoted on the activities described in the variable section above.

3. Outputs include the same elements as are present in the input stage. The major difference between the two stages is that the criteria to be evaluated in the output stage refers to the terminal goals attained at the end of the program.

Installation

This stage encompasses your first reality of fidelity testing to your standard, e.g., how does the program in the field compare to what is stated to be in the design? Ideally, this stage contributes to the development of congruence between reality and the standard by pointing up discrepancies and assisting the shift to a more congruent model.

Process

In this stage one essentially compares the interim products with those specified in the design. It is assumed that at this point the acquisition of the interim products are both necessary to the terminal output and will assure the achievement of the stated terminal goals.

Product

This stage is similar to stage three except that one looks at the congruence of the stated goals in the design to those obtained at the end of the project. In other words, have you accomplished what you said you would?

Cost

This stage is somewhat different than the other four stages previously discussed, in that, in the first four stages one looks within the program being evaluated. In this last stage, one compares the program being evaluated with other similar programs. This comparison attempts to assess the cost benefits of one program having the same stated terminal outcomes to another.

APPLICATION OF THE PROVUS MODEL TO THE NIAGARA FALLS PROJECT

This section provides an overview of the components of the project as they directly relate to the Provus Discrepancy evaluation procedure.

Design

Structurally, this proposal contained more objectives than could be reasonably accomplished for the length of the program. This could not have been anticipated initially, but, in January, modifications were submitted to HEW which reflected one of the extremely positive aspects of this program which has been a constant evaluation of their procedures and progress. In all cases, an effort was made to include the evaluator so that input relative to feasibility and theoretical soundness could be provided.

Regarding the theoretical aspects of the program, the staff has grown tremendously, from initially recognizing a need, searching for an objective way to meet that need, to a critical evaluation of the development and modification of an instrument. The theory that people learn in different ways was never an issue, objectively quantifying that information has been.

1. Inputs (areas in which change will occur)
   A. Variables
      (a) Students
      An increase in reading performance will occur as a result of instruction utilizing the Cognitive Style Mapping (CSM) procedure.

      (b) Staff (includes Niagara Falls staff and staff of other ABE centers in N.Y. State)
      Ability to diagnose preferred learning style using CSM questionnaire, ability to prescribe instruction program for each student based upon his diagnosis and the ability to implement

the prescribed program.

B. Preconditions

(a) Students

The priority entering characteristics of the students in the target population were: (1) 0-4 entering reading level, (2) minority (3) male (4) unemployed or underemployed.

(b) Staff

Limited or no knowledge of Cognitive Style Mapping.

C. Criteria

(a) Students

The students were selected after they voluntarily enrolled in ABE programs and were given achievement tests to determine reading level. The number of students selected were limited to the number of trained staff members.

2. Process

A. Variables

(a) Students

The students will be learning utilizing materials in which they can use his/her preferred learning mode.

(b) Staff

Teachers will prescribe these instructional materials and grouping procedures for each student based upon the results of the students CSM scores.

B. Criteria

(a) Students

The proposal was amended to read approximately

one hundred hours of instruction would be provided for each student.

3. Outputs (these are essentially the same as stated in the Input section).

Installation

In addition to Niagara Falls, this project included centers in Buffalo, Albany, Schenectady, and White Plains. Staff members from the Niagara Falls project and Oakland University provided the needed workshops and inservice programs. Additionally, the Niagara Falls staff administered the CSM questionnaire and wrote prescriptions for all of the other students tested in each of the centers named above.

Product

The Product is described in both the Objectives section of this report and the Product Evaluation section for both students and staff.

Cost

No attempt has been made to provide a cost benefit analysis. It is suggested that this stage is premature at this point.

EVALUATION OF ACCOMPLISHMENT OF STATED GOALS AND OBJECTIVES

This section describes each of the goals and/or objectives stated by the Niagara Falls Center in their initial proposal or as modified and approved by HEW, and evaluates the degree to which they have been accomplished.

Objective 1. To provide Niagara Falls ABE teachers with an orientation to Cognitive Style Mapping and to provide an intense orientation to Cognitive Style Mapping to ABE teachers in New York State.

(a) Initially, the teachers in the Niagara Falls daytime program received an in depth description of the project, its aims and their responsibilities to the program.

(b) The teachers and the staff that were to be directly involved with the implementation aspect of the project received an in depth three day training session from the Oakland Community College staff.

(c) After this training period, the Niagara Falls project staff then gave a five day training session to the total Niagara Falls ABE staff.

The second part of this objective was accomplished by providing:

(a) A 3½ day workshop, which was co-sponsored by the

New York State Education Department Staff Development section, was given to representatives of the centers which worked with the Niagara Falls group during the implementation aspect of this project, local ABE staff members, representatives from the 10 Regions, State Education Department and USOE staff members were also present. This workshop was primarily informational and served the purpose of a dissemination vehicle regarding the concept of CSM and its implication for the development of instructional programs for ABE students.

(b) Two follow-up workshops were conducted for Schenectady, White Plains, Albany, and Buffalo which provided the training needed to administer a CSM questionnaire, interpret the findings to a student, and to prescribe an instructional program to compliment the students individual styles.

(c) A final workshop was given for the participants to discuss the problems they experienced during implementation.

Objective 2. The development of an instrument to be used for mapping cognitive styles of ABE students.

The original instrument which the Niagara Falls Center obtained from Oakland University was developed for Junior College students. The Niagara Falls project staff rewrote the

questions so that they had a readability level of approximately fourth grade. Secondly, they put the questions on language master cards so that those students who had reading levels below grade four could also participate in the mapping process.

This caused two problems: (1) The initial rewriting of the questionnaire prevented the use of whatever reliability and validity information which was available on the instruments developed by Dr. Joseph Hill. And, (2) By chancing their own questionnaire to fit the physical constraints of the language master card, they had in essence developed two different instruments.

The instrument which they developed followed the format of the instrument developed by Dr. Hill in that the staff assumed there were 26 major ways in which individuals gain information, and these 26 ways comprise three areas which reflect the major-minor orientation of students. The three areas are: (1) Symbolic Orientation, (2) Cultural Determinants, and (3) Modalities of Inference. The area of Symbolic Orientation provides us with information on an individual's preference regarding attainment of meaning. Questions attempt to ascertain whether the individual prefers to read or listen when attempting to gain meaning. Additional items in this category provide clues regarding the individual's feelings, commitments, and values and are designed to extract information regarding: (1) how much the individual (a) depends on the sense of smell or touch in deriving meaning, (b) empathizes with others; (2) the

extent to which the individual obeys rules; and (3) the individual's ability to employ gestures in speaking, etc.

In the area of Cultural Determinants, items are designed to evaluate whether an individual relies on his own ability to analyze a given situation or seeks assistance from affiliate social groups (associate vs. family). This enables the staff to assess the person's individuality and his preference for grouping procedures.

Analysis of responses to the items in the area of Modalities of Inference provides the staff with data regarding how the individual processes new information. The items are designed to reflect whether an individual chooses to classify, differentiate, seek multiple relationships (i.e., to find unified meaning among a number of dimensions), or adhere to existing rules in determining a given course of action.

The instrument as presently developed is comprised of a set of cards, each containing one statement which the individual can either read or insert in the language master so that the card is read for him. There are eight statements for each cognitive area, making a total of 208 statements to which he must respond. Subjects are requested to respond to each item by placing each card in a pile categorized as either Most of the Time, Some of the Time or Hardly Ever. By having the students place the cards in piles rather than use some form of answer sheet, a great deal of confusion has been

eliminated which can result when students are learning how to mark responses on answer sheets.

From these data, the staff, in conjunction with each individual, establishes a program of instruction based on the individual's major orientations in the three areas previously described. (A further description of this instrument is described in the sections Profile of Students and Instrument Evaluation).

Objective 3. The selection and field testing of standardized instruments to be used with the sample population.

All of the students who enter Adult Education Programs go through an intake process. This process in New York State requires the administration of the California Achievement Test. This test provides both a reading and math score. The staff also has available other diagnostic tools as well as other standardized tests which might be used to test the areas of "theoretical knowledge in...verbal analogies, verbal listening, reading comprehension, grammar...mathematics computation, and auditory discrimination as related to mathematics" - however, these instruments were not field tested for "validity."

Objective 4. The enabling of staff members to place new students in the modes of instruction consonant with his/her cognitive style.

The accomplishment of this objective paralleled the accomplishment of Objective 1. Objective 1 described the

staff development program of the project. The accomplishment of this objective facilitated Objective 4, in that after the Niagara Falls staff had received the in depth training required to administer, interpret and prescribe educational programs based upon the students responses on the CSM questionnaire, they were then able to place students in programs that were assumed to facilitate success by the students.

Objective 5. The assessment of existing materials in the 0-4 grade level available in the Niagara Falls Center.

Perhaps one of the most valuable aspects of this program was the assessment of the Instructional Materials available in the Niagara Falls Center for the type of cognitive mode that is required for their proper utilization. During this process each piece of material was handled by several members of the staff. The material was classified into hardware and software. For those materials that required the students to listen and observe, such as video tapes, each piece was viewed. The staff then answered the questions or did the activities that were required and then classified the task into what skills were required. In this way, not only was each piece of material classified, but it was also evaluated and teachers were able to become familiar with its contents and the best procedures for its utilization. All too often, good

materials are not used because teachers have not had the needed in-service programs which help them to know both how to use available materials but also which ones are the best to select for a particular purpose. The accomplishment of this objective was an extremely important aspect of this project.

Objective 6. The identification and investigation of alternative programs used in other areas.

There was, of course, an awareness developed of other existing programs, particularly in New York State and in the Region. However, the focus of this project has not been to study these programs in depth. It is probably more accurate to say that other Regions have become more aware of the alternative program which is in development in Niagara Falls. The major reason for this was that the complexity of the development of the instrument, mapping and prescribing instructional program for students and, the major task of classifying and identifying the materials available in Niagara Falls according to the cognitive modes they require for successful use was a monumental task.

The State Education Department, however, was particularly helpful in identifying other available programs for Niagara Falls and constant communication between Niagara Falls, the State Education Department, and other interested parties did facilitate the accomplishment of this objective.

Objective 7. The development of a list of materials which would be used in each of the modes.

This objective was accomplished in the following way. For each of the modes, the Niagara Falls staff suggested materials that could be of use with that student. For example, if the student had a major TAQ, materials which could include the tape recorder, cassettes, records, language master would be suggested. In addition, recommendations would also be made regarding whether the student would profit more from working in groups, (including small groups) or whether the student would profit more working individually.

Objective 8. Conducting pre-service and in-service programs for the purposes of becoming familiar with alternative programs and materials.

To date, the pre-service and in-service programs have been primarily for the introduction and implementation of CSM procedure. An inherent part of this procedure, however, is the prescription that is written for each student based upon his preferred style. As was mentioned in the discussion of Objective 7, the staff prepared a list of recommended materials for each mode as well as suggestions for instructional procedures. Most, if not all, of the materials on this list can be found in ABE centers or are easily available to them.

Objective 9. Utilization of Croft materials as the

basis of in-service and pre-service workshops to assist in understanding reading skills and activities.

The Croft materials were not an integral part of this program.

Objective 10. Recruitment of more target people.

This aspect of the program was not directly observed; however, the accomplishment of this objective is reflected in the sample population.

Sample

One of the objectives in the program was to reach students who fit the categories identified in the 309 grant, as:

1. Young males
2. Minorities
3. Those with a fourth grade or less ability in reading, writing, computational and communication skills
4. Welfare recipients
5. Rural or urban adults
6. The most severely impoverished
7. The most severely undereducated
8. The unemployed
9. The underemployed

Tables 1-3 provide a description of the demographic characteristics of race, sex, educational level, pre-reading and pre-math scores of the students involved in the project. As can be seen from the tables, the sample consisted of 103 males and 54 females. Of this group, 82 were Black, 73 were white and 3 were Spanish surname. Thirty-nine of these students were in the 0-6 educational level (educational level refers to the highest grade completed) and 114 students were in the 7-12 educational level.

Table 1 DESCRIPTION OF SAMPLE POPULATION
BY RACE, SEX AND LOCATION

Location	Sex		Race		
	M	F	Black	White	Spanish
Niagara Falls	79	43	57	65	1
Albany	6	4	6	4	0
Schenectady	10	2	10	2	0
White Plains	8	5	9	2	2
Total	103	54	82	73	3

Table 2 DESCRIPTION OF SAMPLE POPULATION
BY EDUCATIONAL LEVEL

Location	EDUCATIONAL LEVEL	
	0-6	7-12
Niagara Falls	N=14	N=104
Albany	N= 9	N= 1
Schenectady	N= 3	N= 9
White Plains	N=13	N= 0

Table 3 PRE-READING AND PRE-MATH SCORES OF NIAGARA FALLS STUDENTS

Pre-Reading Score	Sample Size	Pre-Math Score	Sample Size
0	N= 6	0	N= 4
2.0-2.9	N= 9	1.0-1.9	N= 1
3.0-3.9	N=22	2.0-2.9	N= 2
4.0-4.9	N=29	3.0-3.9	N= 1
5.0-5.9	N=17	4.0-4.9	N=14
6.0-6.9	N=26	5.0-5.9	N=20
7.0-7.9	N=13	6.0-6.9	N=17
8.0-8.9	N= 1	7.0-7.9	N=17
		8.0-8.9	N=14
		9.0-9.9	N= 8
		10.0-10.9	N= 4

In Niagara Falls, the pre-reading scores ranged from 0-8.9 years. Pre-reading and pre-math refer to the scores obtained by the students during the intake process on the California Achievement Test [CAT.] It should be noted that of the 123 students in Niagara Falls, 109 had a reading level between 0-6.9. It is interesting to compare these scores with the pre-math scores which are somewhat higher and range from 0-10.9 years. In this category, of the 102 students for whom this information was available, 59 students has computational skills in the 0-6.9 level. These data are descriptive only and indicate that it is possible to recruit students in the category as specified in the target population. They should not, however, be used as comparative data between centers (see evaluation section).

PROFILE OF STUDENTS

There are three major areas in which students are mapped; Symbolic Orientation, Cultural Determinants, and Modalities of Inference. The first area, Symbolic Orientation, refers primarily to how an individual processes information. That is to say, does he appear to obtain information better through auditory, or through visual means. (Other areas are also included on the CSM questionnaire, however, the data breakdown were included only for auditory or visual means only). The question of how one obtains information best is asked for quantitative areas as well as linguistic areas. The second area, Cultural Determinants, refers to how an individual mediates the information he receives; does he prefer to work things out on his own or does he instead work things out based on discussions with his family or friends. The third area, Modalities of Inference, refers to how the individual incorporates this information into his cognitive structure so that he is able to make decisions and act utilizing the information he has gained.

Figures 1-11 provide a breakdown of those students in Niagara Falls who had a major orientation in each of the described modes by race,* educational level and sex. A major orientation is defined as those students who received a score greater than 24 for any of the defined categories. (The highest possible score is 40 and the lowest possible score is 8). It is probably debatable

*The data were not analyzed for those respondents who were categorized as Spanish surname or Other because the sample was too small. In all cases the combined N was no larger than 3.

whether a score of 24 actually reflects a major orientation, but it certainly does reflect a mode which the student describes he uses more frequently than not.

Symbolic Orientation

The first mode depicted in the Symbolic Orientation area is Theoretical Auditory Linguistics, T(AL). This mode refers to the "Ability to acquire meaning through hearing spoken words." (This definition as well as the other which will be used are taken from the Niagara Falls Cognitive Style Mapping Analysis Sheet. See Appendix 1). A total of 72 students received a score of 25 or more on the responses which tap this particular mode. This represents 58.5% of the total sample. A further breakdown shows that 34 or 27.6% of the total Black sample had a major T(AL). This represents 22 males and 12 females. Thirty-five of the total sample were white. This represented 24 males and 11 females and reflected 28.5% of the total group.

This is a particularly interesting mode because one would assume that most people who were in ABE programs would have to rely on this particular mode to a great extent because of their lack of reading skills, and yet when we analyze the data we find only 8 people out of a total of 14 in the 0-6 grade level who describe themselves as using this mode frequently. This may be attributed to the fact that people responded to a mode they would prefer to

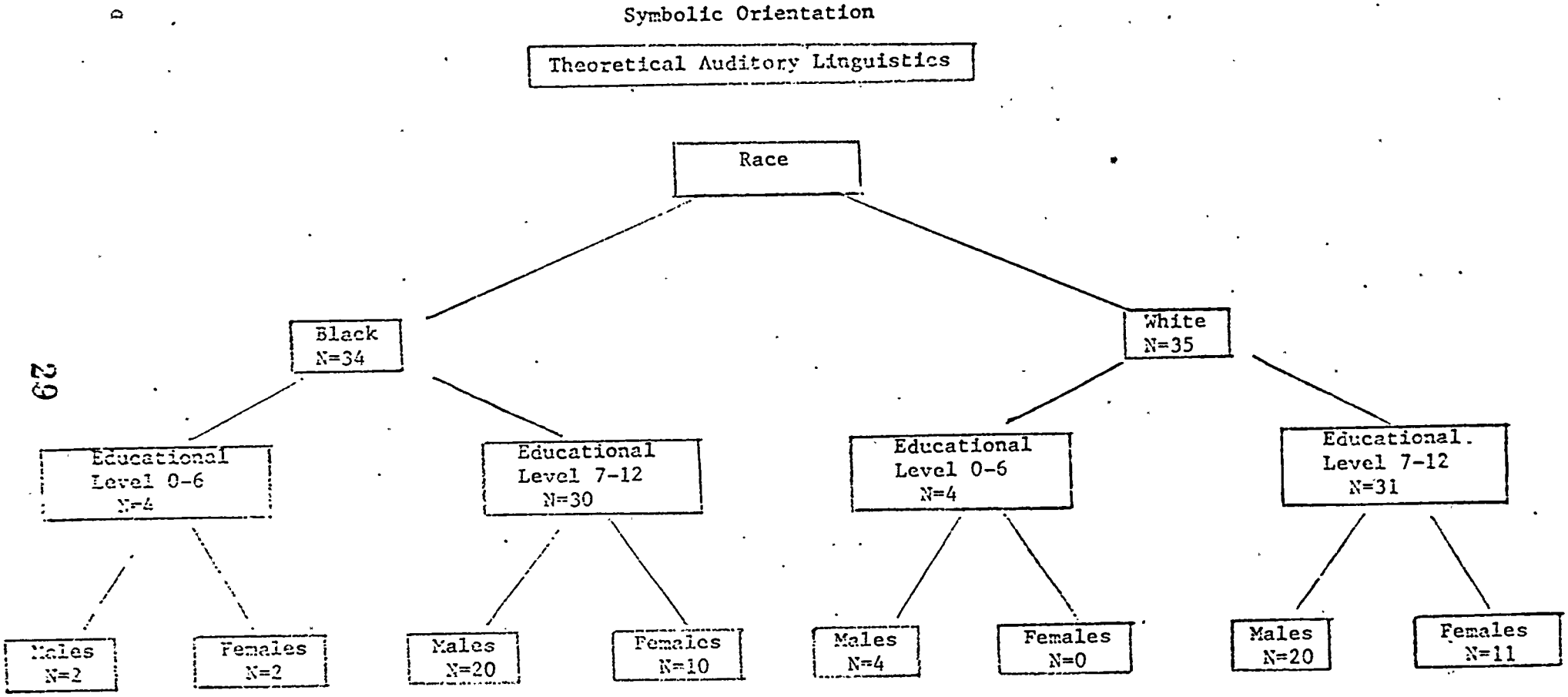

Figure 1
Breakdown of subjects with a major TAL orientation by race, educational level and sex.

use rather than one they actually utilized.

The second mode in the Symbolic Orientation area is the Theoretical Auditory Quantitative, T(AQ) and is displayed in figure 2. This mode reflects the "Ability to acquire meaning from numerical symbols, relationship and measurements that are spoken." People who use this particular mode would more frequently understand math problems when they were explained orally as opposed to visual or written explanations.

Of the total sample, 75 people describe this as being true of them most of the time. This represented 61% of the total group. Of these 75 people, 36 were Black and 37 were white. It is interesting to note that the number of respondents in the 0-6 age group is again very small. More Blacks, in this educational group, however, depicted themselves as using this mode more frequently than did the white respondents. (Seven Blacks had a major T(AQ) while only two whites described themselves as having a major in this area).

The next mode, Theoretical Visual Linguistics, T(VL), appears in Figure 3. This mode refers to the "Ability to acquire meaning from words that are seen. Indicates some who reads with an above-average degree of comprehension." An obvious difficulty with this definition is the lack of specificity regarding what above-average comprehension means. If taken purely at face value, it may mean the ability to read at a tenth grade level

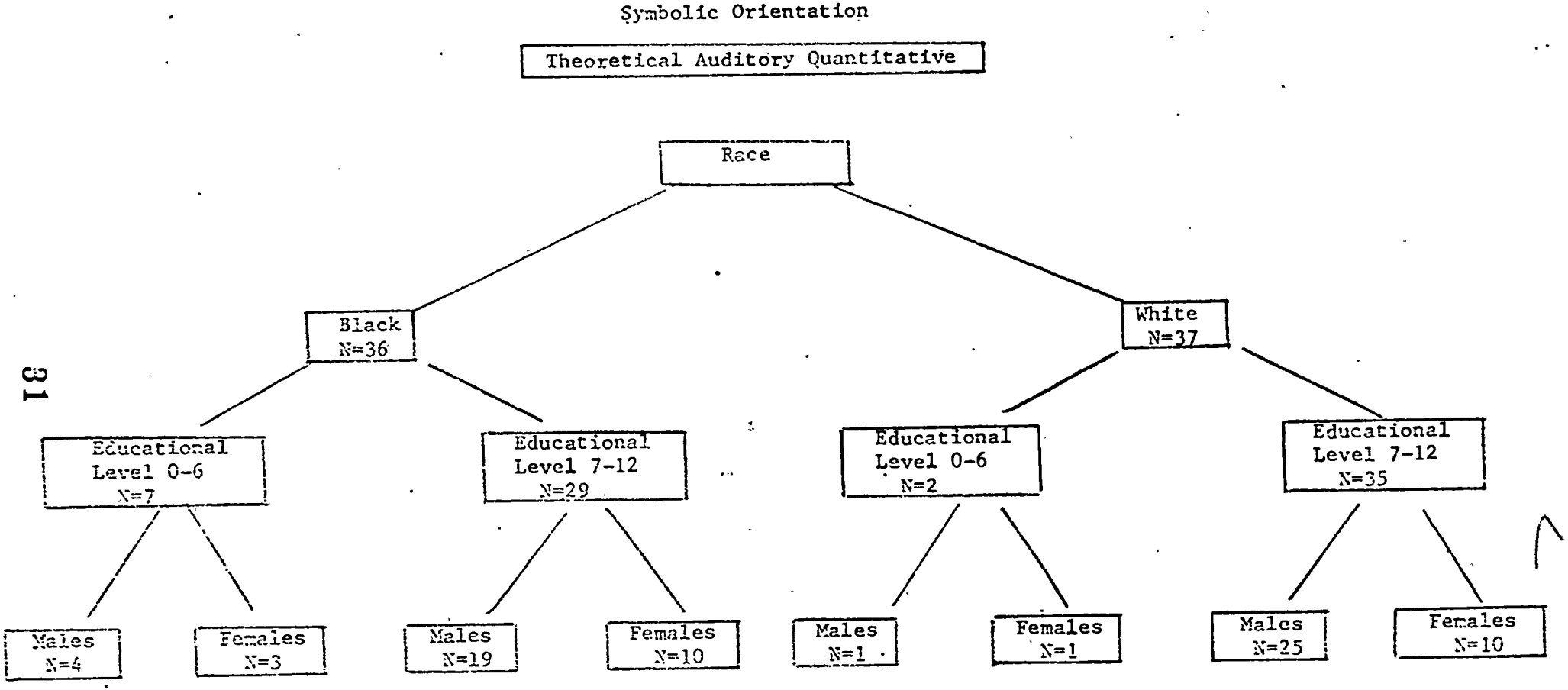

Figure 2
Breakdown of subjects with a major TAQ orientation by race, educational level and sex.

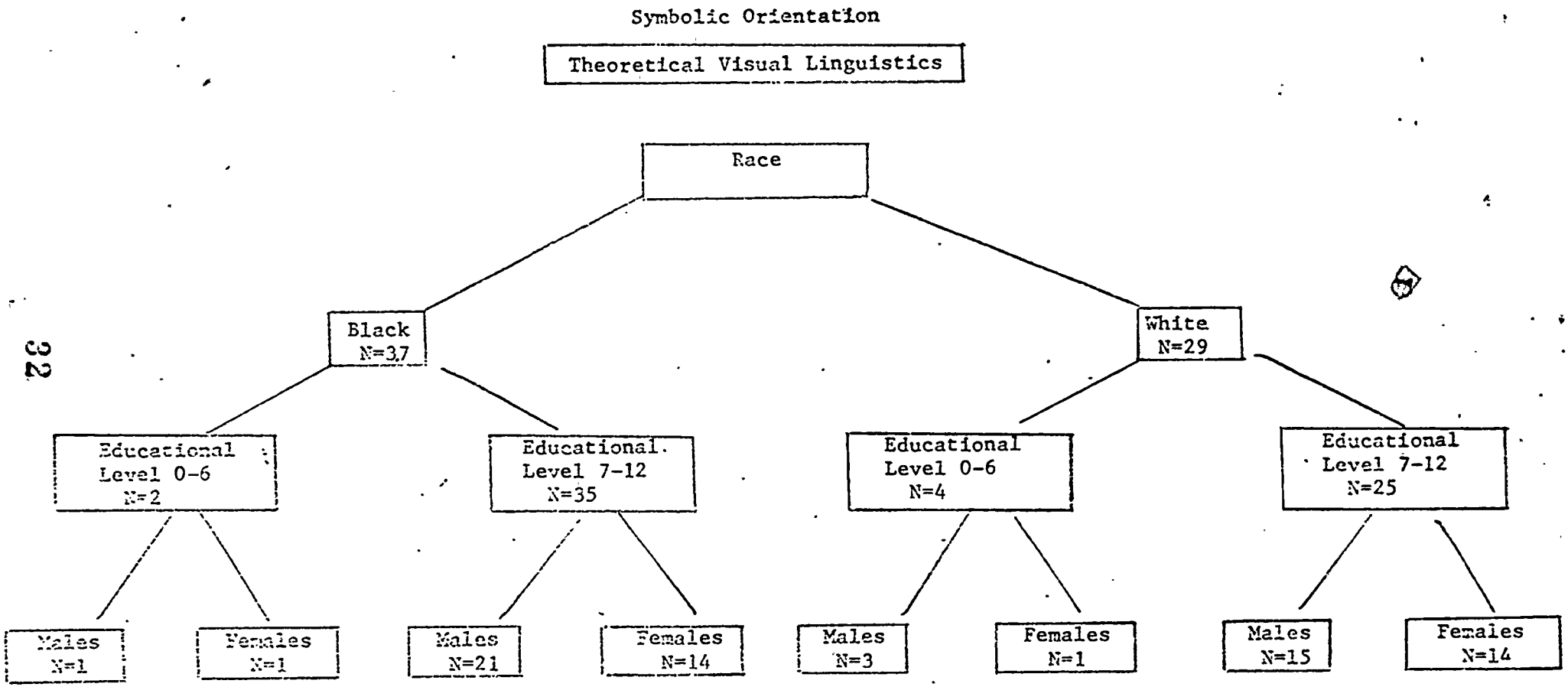

Figure 3
Breakdown of subjects with a major TVL orientation by race, educational level and sex.

or above, since this is the reading level required by a large number of jobs. (Stitch 1969). It may, however, reflect above average reading level for the students age/grade. For example, if a fourth grade student read at the fifth or sixth grade level this could be described as reading with above average comprehension. Although the definition lacks clarity, the intent was clearly to describe a person who gains most of his information through reading.

As can be seen from Figure 3, 56.1% of the respondents characterized themselves as utilizing this method most of the time. Of this group, 37, or 53.6% were Black, while 29, which represented 42.1%, were white. As would have been expected, the bulk of those indicating that this was a major mode for them were in the 7-12 educational level. Those students in the 0-6 grade level were probably responding to the mode they would prefer to utilize most.

Those students with a major Theoretical Visual Quantitative, T(VQ), can be found in Figure 4. T(VQ) refers to the "Ability to acquire meaning from numerical symbols, relationship and measurements that are seen." This, of course, is quite similar to T(AQ) except in this category meaning is perceived more quickly from visual stimuli. Sixty-eight of the respondents categorized themselves in this manner. This reflected 55.3% of the total sample. One would again expect students in the lower grade levels to use this mode less frequently than students in

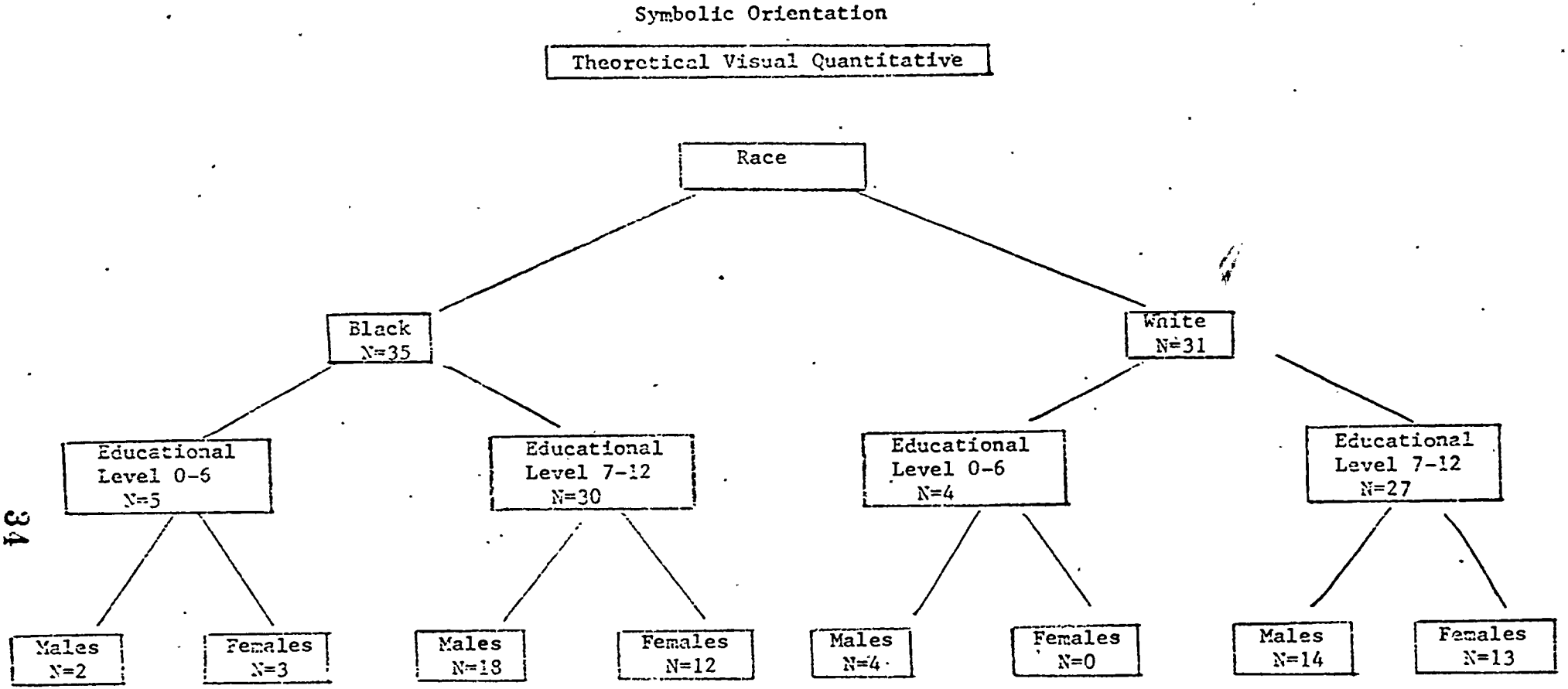

Figure 4

Breakdown of subjects with a major TVQ orientation by race, educational level and sex.

the higher grade levels, and this is reflected in the display. Only nine of the 14 students in the 0-6 grade level said these items were true for them most of the time.

Cultural Determinants

This next section describes the breakdown in the Cultural Determinants Area.

The first mode described is Associates (See Figure 5). Associates is defined as representing those persons who "seek meaning through interaction with associates." One half, 50.4%, of the students described themselves as relying on Associates (A) when making decisions. Knowing this kind of information is very important in understanding how an individual processes information and it can help one in designing instructional programs for students. A person in this category will usually ask the advice of friends, cohorts or work associates. A student such as this likes to arrive at decisions through discussions with classmates and will do well in small groups. He most definitely would not prefer to work alone.

The next mode in the Cultural Determinants area is Family. This mode refers to how much the individual relies on his family when making decisions and processing information. This is an interesting area because more females said this was true of them most of the time than they did in any other mode. (See Figure 6). 33 females had majors in this area as compared to 19 in the Associates

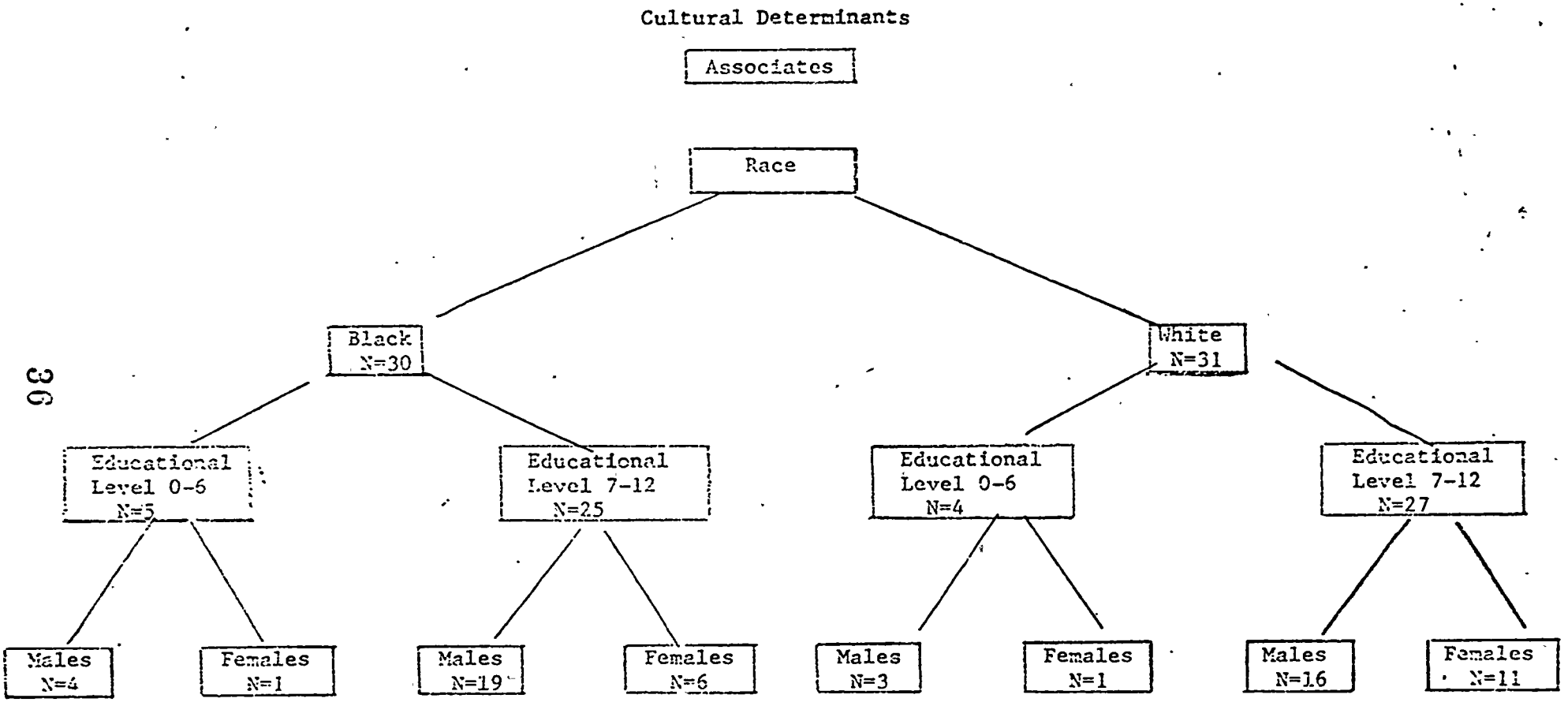

Figure 5
Breakdown of subjects with a major A orientation by race, educational level and sex.

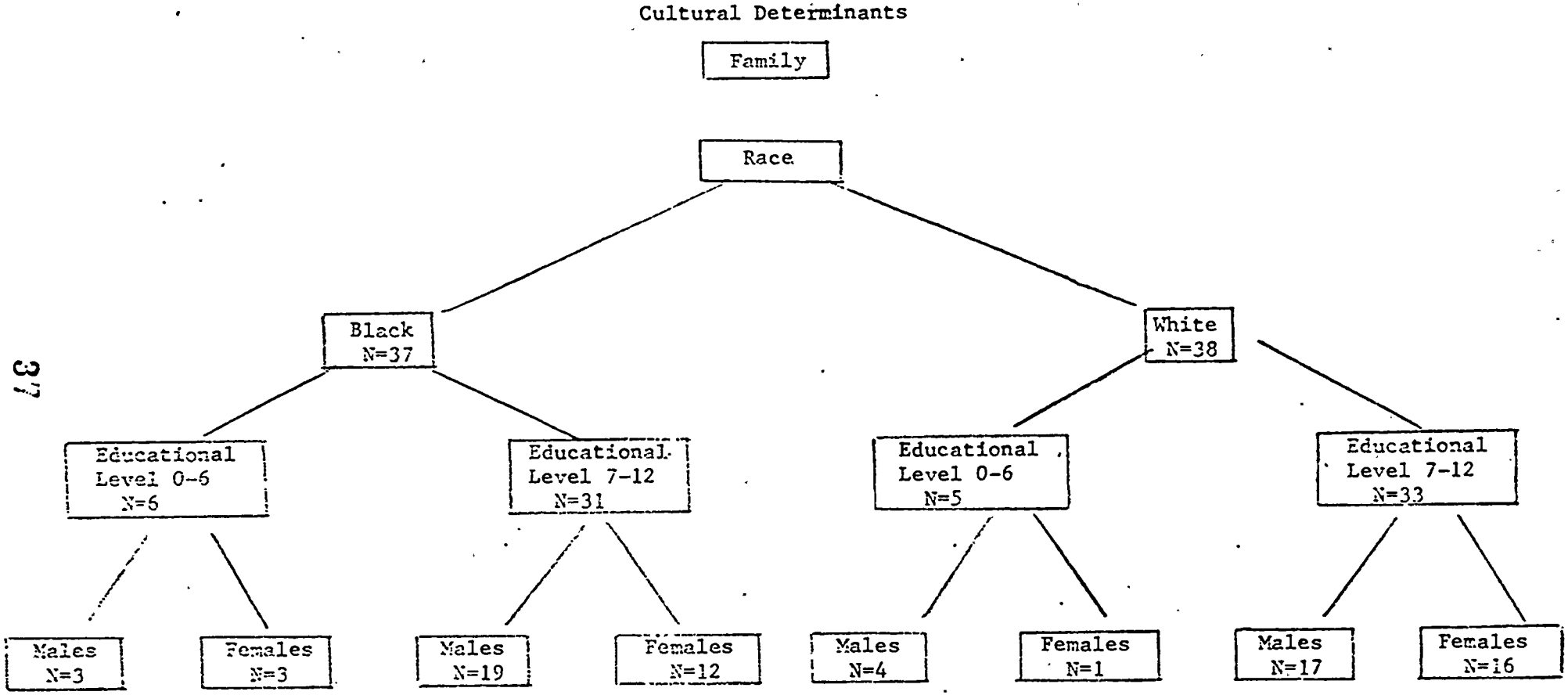

Figure 6
Breakdown of subjects with a major F orientation by race, educational level and sex.

and 29 in the Individuality area. In general, the respondents who fit this category represented 62.6% of the total sample and the number of Blacks and whites were about even. The data do not give us any clues as to why there were more women in this area, however, one might speculate that it may be due to the socialization process.

The next area, Individuality, indicates that a person "seeks meaning independently." It is interesting to compare the data on Individuality with that on Family. In this area 76% of the total sample said that this was true of them most of the time. (See Figure 7) Blacks and whites were again quite even, 45 and 46 respectively, and women again were well represented (29) although not to the extent that they were in the Family area. What is more interesting, however, is to look at the data in the 0-6 educational level. In this group there were no Black males who said that they arrived at their decisions primarily independently, whereas in this same educational group there were no white females that characterized themselves as using this mode most of the time. These differences may be accounted for in that many Black women in this group are frequently heads of households and must make decisions independently or rely on Family for assistance, whereas most white women in this group are generally homemakers and may tend to leave the primary decision making up to either husbands or other family members.

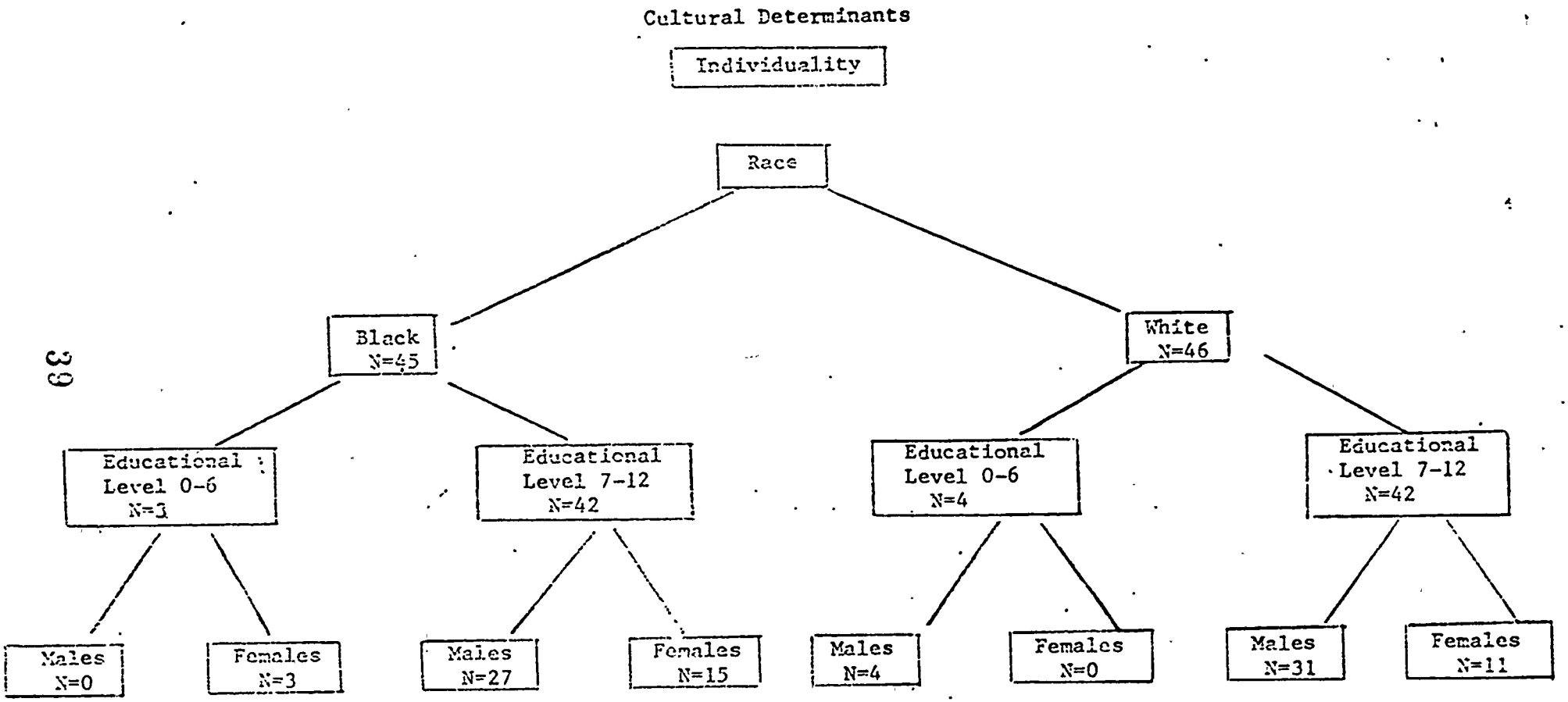

Figure 7
Breakdown of subjects with a major I orientation by race, educational level and sex.

Modalities of Inference

The first section evaluated in the area of Modalities of Inference is called Magnitude. Magnitude refers to "A tendency to use norms, rules or categorical classifications as the basis of one's decisions (e.g. persons who need to define things in order to understand them)." The breakdown for these data, shown in Figure 8, indicate that 98 respondents, which represent 78% of the total population, describe themselves as using this mode of information processing most of the time. This figure is composed of 39.8% Blacks and 37.4% whites and is higher than any of the other categories in this section. Fifty-eight males and 37 females were in this category.

If we were to compare this particular mode with Bloom's Taxonomy, we would probably classify it among the lower levels in the cognitive hierarchy. This is significant, because of the kinds of tests in which students who score higher in this area would do best. On examinations where definitions are required, or items which require strict identification of rules, a student who uses this particular mode most frequently would do well. On other types of tests which require more evaluative skills, these students would do less well.

The second area in Modalities of Inference is labeled Difference. Difference is defined as "A tendency to reason in terms of one-to-one contrasts or comparisons, perceives what a concept is by what it is not. Tends to be very creative

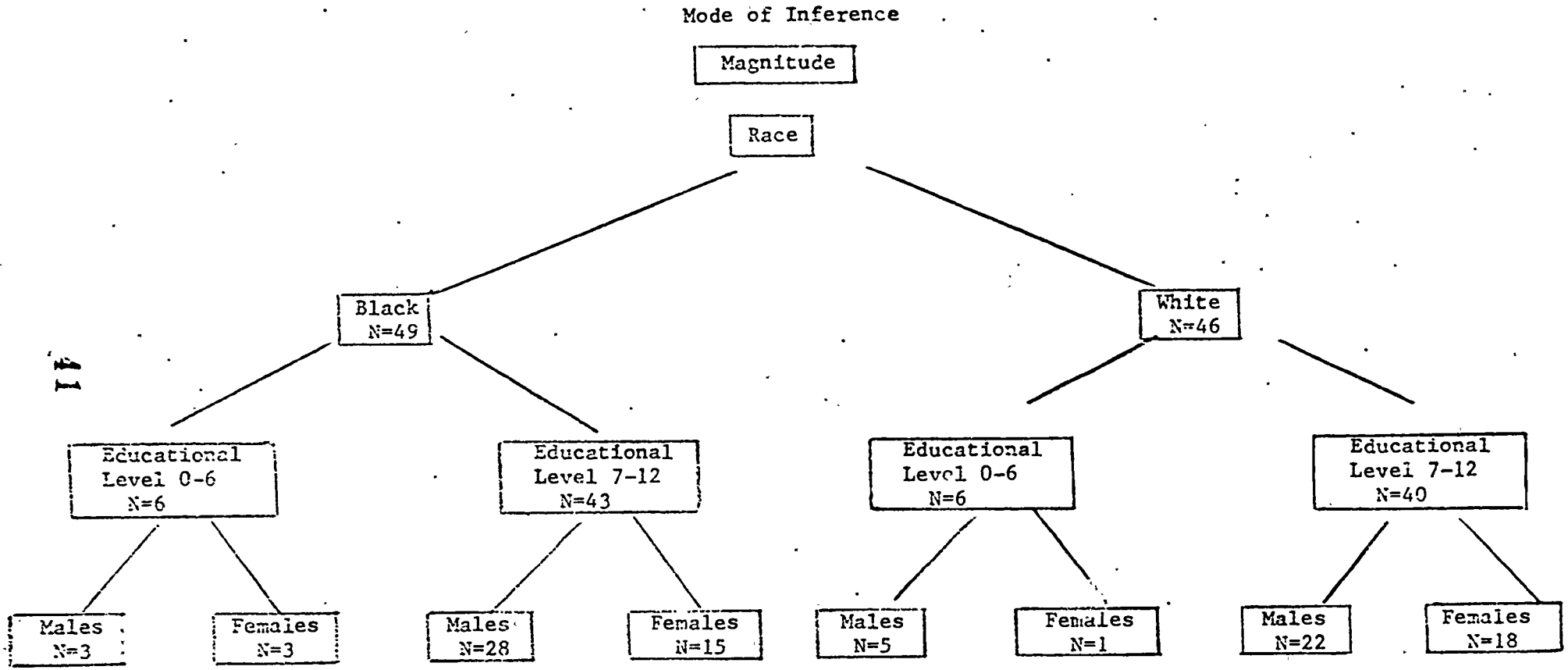

Figure 8
Breakdown of subjects with a major M orientation by race, educational level and sex.

(e.g. poets, artists, and inventors). These data are displayed in Figure 9. Sixty percent of the total population described themselves as using this mode most of the time. Of this 60.9%, 30.95% were Black and 27.6% were white. This figure reflects the responses of 44 males and 28 females.

The third mode in Modalities of Inference is described as Relationship. Relationship is defined as "A tendency to perceive meaning through the identification of relationship (e.g. someone who uses analogies and examples)." A total of 50 people described themselves in this manner. (See Figure 10) This represents only 41% of the total population and includes the responses of 20 Blacks and 28 whites. Only one of the Black and 4 of the white respondents in the 0-6 educational level described themselves in this manner. One probable reason that the percentage of respondents is lowest in this category is that this mode requires the most complex skills and one would not expect large numbers of people in ABE programs to utilize these skills most of the time. Indeed, one would not expect large numbers of people in general to use this mode most of the time.

The last mode analyzed was Appraisal. This mode is defined as "A tendency to employ all methods of inference (M,D, and R), giving equal weight to each, when reasoning." Seventy-nine people, who represent 64.2% of the total population, said that they used a combination of means to arrive at solutions to problems most of the time. (See Figure 11) This is probably true of most of

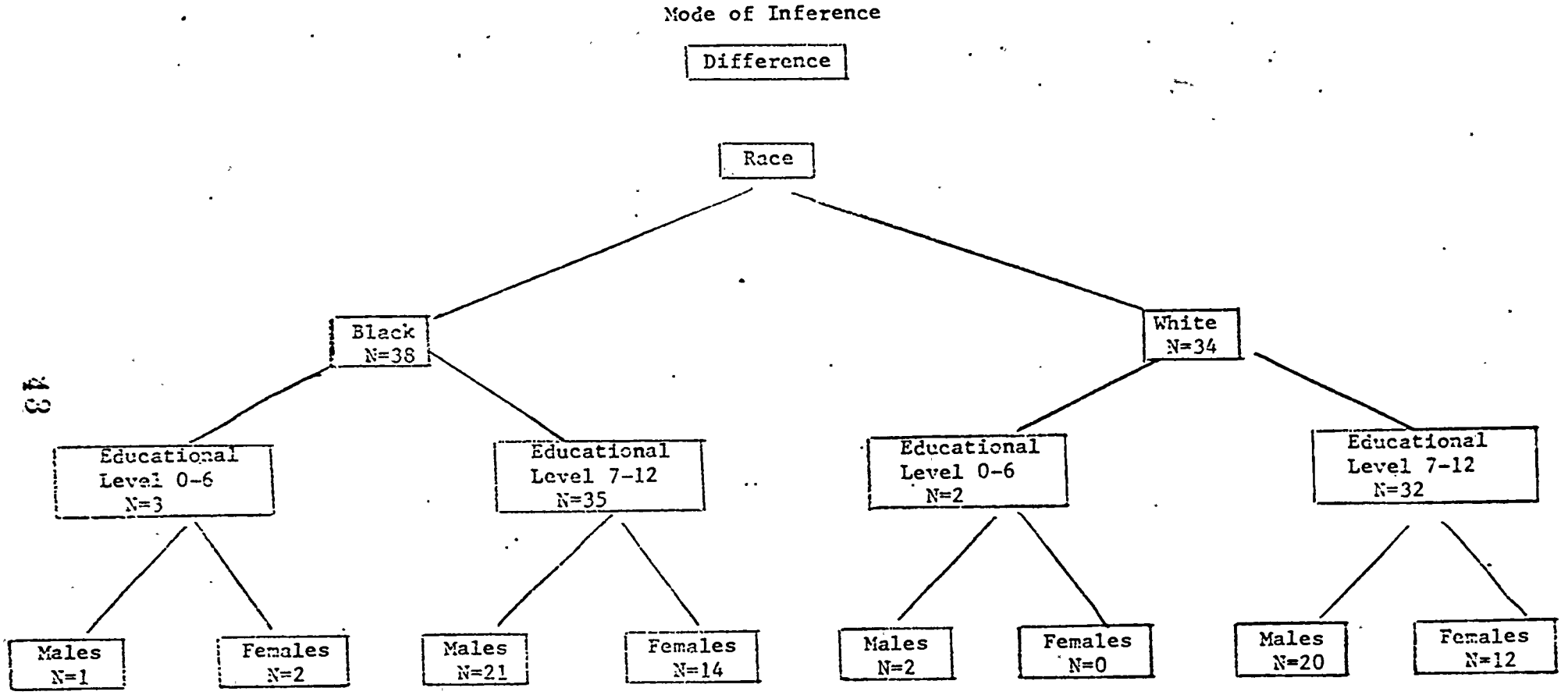

Figure 9
Breakdown of subjects with a major D orientation by race, educational level and sex.

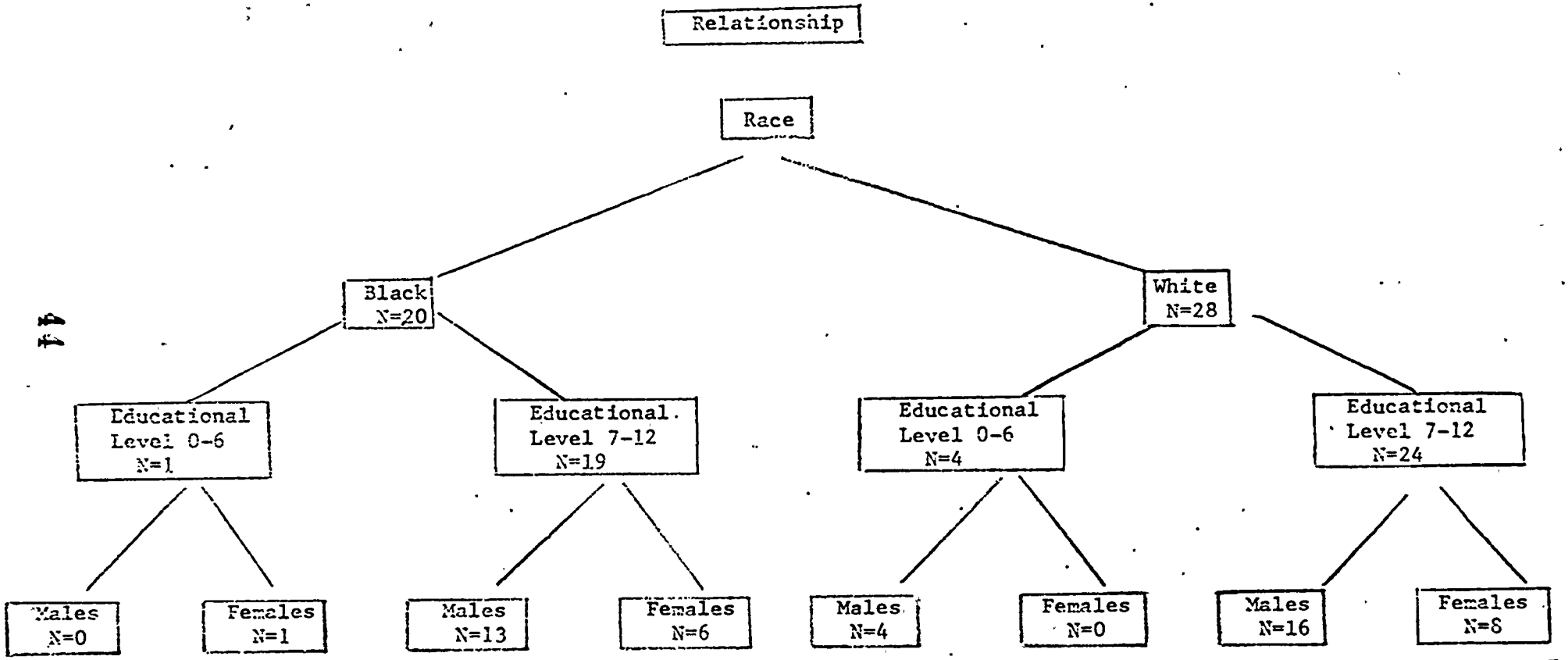

Figure 10
Breakdown of subjects with a major R orientation by race, educational level and sex.

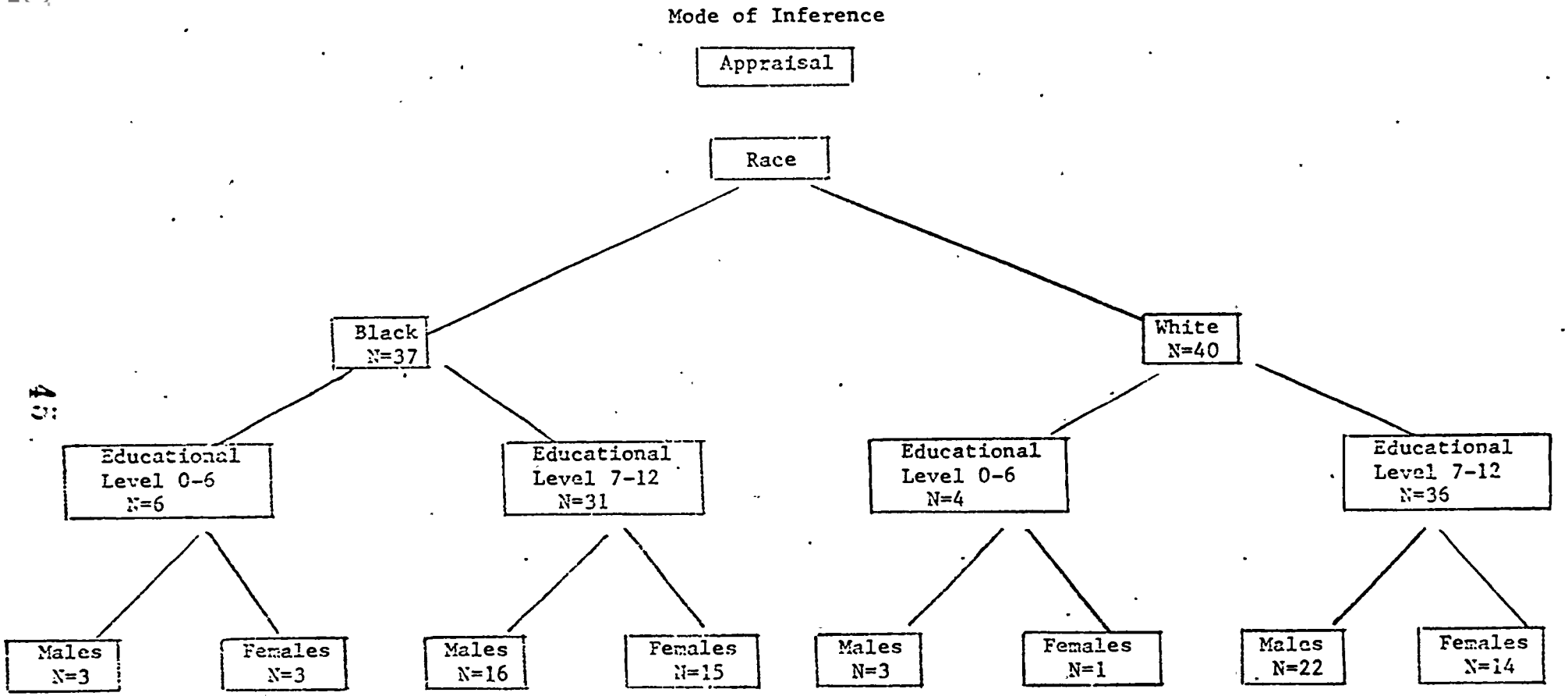

Figure 11
Breakdown of subjects with a major A orientation by race, educational level and sex.

us, but what is difficult to ascertain is the degree to which we apply these methods equally, or whether or not the need to apply each of these methods equally is required for each situation. It would seem reasonable that different situations would require different approaches and, the more sophisticated students could ascertain what was required in each situation and have the skills available which would allow them that flexibility.

INSTRUMENT EVALUATION

Two different procedures were used to evaluate the Cognitive Style Mapping (CSM) Questionnaire that was developed by the Niagara Falls Adult Basic Education Center. The first procedure was to provide information on the reliability and validity of the instrument. Reliability refers to whether the results of the instrument are stable over a period of time. This means that if a test were taken at x point in time, the results would be relatively the same at y point in time. This implies, of course, that no intervention takes place during the intervening period. This information is extremely important if you were going to develop an instructional program based upon a person's cognitive style; the results of the questionnaire has to be an actual representation of that style. In order to ascertain this, the instrument was field tested on a group of High School students in Niagara Falls. Seventy-two students were administered the instrument in early October, 1974. During the third week of November, all of those students who had participated in the initial testing were re-tested.

The directions to the students in both situations were that (1) the questionnaire was not a test and, (2) that they were to separate the cards they received according to the applicability of the statement to their own learning style. Cards were then inserted into a Language Master which "read" each

statement. By using the Language Master, students were provided with both a visual and auditory stimuli. Each student was directed to place the language master card in a box labeled "MOST OF THE TIME" if the statement described behaviors or feelings that were true for him most of the time; "SOME OF THE TIME" for those statements that reflected how he was some of the time; and "HARDLY EVER" for those statements which described behaviors or feelings that he hardly ever had.

An examiner worked with each student until the procedures were clearly understood. In addition, directions were given that no cards were to be skipped. The exercise was not timed, but the students were requested to spend only a few seconds on each card. The student was permitted to put the cards through the Language Master as many times as was felt necessary.

A "t" test was used to compare the pretest scores with the posttest scores. A "t" test essentially compares the means of two groups to ascertain if there are significant differences between the two scores. When the data were compared no significant differences were found between the pretest and the posttest scores. This means the test scores remained pretty much the same over the four week period of time. In other words, if a student initially had a major TVL his score 4 weeks later also reflected this. These results, however, do reflect group data and do not represent individual data. Consequently, while it is true that for the group as a whole, test scores remained relatively the same; for a particular individual there may have been some shifts.

The instrument was also carefully scrutinized for content validity. When looking at content or face validity we are looking to see if the items appear to test those qualities which they are supposed to test. This was a most difficult task, although most of the items appeared to have face validity. However, a factor analysis was performed to ascertain whether all of the assumed 26 variables were present and also to determine if the questions that were given in each area, actually tested that particular mode. The following discussion by Williams (1968), of the function of factor analytic procedure, provides an excellent rationale for using this particular statistical approach. "...we can view measurement overlap as the extent to which measures of different variables are measuring something in common. Factor Analysis is a mathematical procedure applied for this purpose; it aids us in answering the question; Given a relatively large number of variables, does their measurement overlap indicate that there may be fewer, more basic and unique variables underlying this larger number? Factor-analytic procedure takes the variance defined by intercorrelations among a set of measures and attempts to allocate it in terms of fewer underlying hypothetical variables. These hypothetical variables are called factors."

Table 4 shows the results of the factor analysis. Two things can be clearly seen from this table. (1) There are not 26 factors measured, at best there are 18; however, 68% of the variance is accounted for by the first 13 factors, with the first factor counting for 16.5% of the variance and the second factor, 11.2% of

Table 4 HIGHEST LEADING VARIABLES EXTRACTED FROM ROTATED FACTOR MATRIX

Factor 1		Factor 2	
Variables	Correlation Coefficients	Variables	Correlation Coefficients
I can read directions T(VL)	.77	I try to see things from the other person's point of view Q(CEM)	.55
I can find the right room by looking for the room number T(VQ)	.88	I understand the feelings of others Q(CEM)	.50
I can tell what a noise is outside Q(A)	.78	I enjoy looking at paintings Q(CES)	.53
I can tell "what's for dinner" by the smell T(VL)	.80	I enjoy poems Q(CES)	.46
When there are gas smells in a car or house, I can tell Q(O)	.90	I open my eyes wide to show surprise Q(CK)	.49
I can tell if something has been added to water Q(S).	.85	I make new friends easily Q(CP)	.46
I can tell if something needs salt Q(S)	.78	I can tell whether or not I will be able to get my work done Q(CS)	.50
I can taste the difference between sweet and sour milk Q(S)	.87	Before starting something new, I would talk it over with my friends A	.57
I decide that my hair needs washing by the way it feels Q(T)	.86	I must think about an idea in many ways before I make up my mind L	.58
I can button my coat without looking Q(T)	.88		

Table 4 Continued

Factor 3		Factor 4	
Variables	Correlation Coefficients	Variables	Correlation Coefficients
People pay attention to me Q(CP)	.50	If I found a wallet I would return it Q(CET)	.51
Others do what I want them to do Q(CT)	.49	I could organize a party for a large group of people Q(P)	.60
I like being the leader in a group I	.46	If a cashier gave me too much change, I would tell her Q(CET)	.51
I make quick decisions M	.52	My mealtimes change from time to time D	-.38
I could take apart a simple machine and put it back together again R	.52		
I buy matching pieces of clothing rather than one thing at a time R	-.54		
I plan ahead before doing something L	-.54		

Table 4 Continued

Factor 5		Factor 6	
Variables	Correlation Coefficients	Variables	Correlation Coefficients
If I found a wallet I would return it Q(CET)	--.32	When I take part in sports, I practice before I start Q(CKH)	-.30
I live according to what I think is right Q(CET)	.38	I blush easily Q(CK)	.31
I must think about an idea in many ways before I make up my mind L	.32	I can tell when people are bored with what I am saying Q(CK)	.46
I take longer than others to make decisions L	.31	Others do what I want them to do Q(CT)	.31
A person can never know enough about life L	.35	I make up my own mind on important matters I	-.33
I could organize a party for a large group of people Q(?)	.44	My mealtimes change from time to time D	.48
I move my head up and down when I agree Q(CK)	-.55	I feel that something once started should be finished Q(CET)	.45
		If I gave a party, I would make sure everyone had a good time Q(CT)	.33

Table 4 Continued

Factor 7		Factor 8	
Variables	Correlation Coefficients	Variables	Correlation Coefficients
I understand the feelings of others Q(CEM)	.42	When I take part in sports, I practice before I start Q(CKH)	.44
I can tie my shoes without looking when talking with someone Q(P)	.40	I can laugh, even though a joke is not funny Q(CH)	.42
My friends tell me that I am understanding Q(CEM)	-.37	I make a fist when I am angry Q(CK)	.32
I make a fist when I am angry Q(CK)	.30	I can run and catch a ball at the same time Q(P)	.47
I understand how a person feels when he is being punished Q(CEM)	.33	Everything in a closet should have its own special place M	-.31
I can run and catch a ball at the same time Q(P)	-.37	I choose music to change the way I feel D	-.32
I like being the leader in a group I	.33		
I choose music to change the way I feel D	-.44		

Table 4 Continued

Variables	Factor 9 Correlation Coefficients	Variables	Factor 11 Correlation Coefficients
I can tie my shoes without looking when talking with someone Q(P)	.43	I open my eyes wide to show surprise Q(CK)	.33
My friends tell me that I am understanding Q(CEM)	-.37	I feel that something once started should be finished Q(CET)	.51
I live according to what I think is right Q(CET)	-.44	When I take part in sports, I practice before I start Q(CKH)	.38
My best decisions are made alone I	.43	I can laugh, even though a joke is not funny Q(CH)	-.36
Factor 10		I can tell when people are bored with what I am saying Q(CK)	-.33
People pay attention to me Q(CP)	-.31	If I gave a party, I would make sure everyone had a good time Q(CT)	-.30
I make new friends easily Q(CP)	-.35		
I blush easily Q(CK)	-.31		
I can work well with someone, even though I don't like them Q(CH)	.49		
I make quick decisions M	.41		
I disagree D	.37		

Table 4 Continued

Factor 12		Factor 14	
Variables	Correlation Coefficients	Variables	Correlation Coefficients
Before starting something new, I would talk it over with my friends A	-.39	I make a fist when I am angry Q(CK)	.34
I make up my own mind on important matters I	.34	Everything in a closet should have its own special place M	.39
Factor 13		**Factor 15**	
People pay attention to me Q(CP)	.38	To be a good swimmer, it is necessary to practice Q(CKH)	-.36
I can pretend I'm happy, when I'm not Q(CH)	-.44	I blush easily Q(CK)	.30
		I understand how a person feels when is being punished Q(CEM)	.35
		My best decisions are made alone I	-.32

Table 4 Continued

Factor 16		Factor 17	
Variables	Correlation Coefficients	Variables	Correlation Coefficients
Others do what I want them to do Q(CT)	.30	I make a fist when I am angry Q(CK)	.38
I enjoy looking at paintings Q(CES)	-.38	Everything in a closet should have its own special place M	.30
To be a good swimmer, it is necessary to practice Q(CKH)	-.33	My mealtimes change from time to time D	-.37
		Factor 18	
		I can tie my shoes without looking when talking with someone Q(CP)	-.34
		I live according to what I think is right Q(CET)	-.33

the variance which cumulatively account for 27% of the variance.

When viewing Table 4 you will see that some of the correlations have a negative (-) sign in front of them. For those numbers without negative signs, the relationship between the variable and the factor is positive. The negative sign indicates a negative relationship between the variable and the factor.

There is apparently a great deal of overlap in what the variables measure. The table is designed so that you can see which questions (variables) load highest on each factor and the mode to which each was originally attributed. (A definition of each of the modes appears in the Appendix). There has been no attempt to rename any of the factors, however, an effort in this direction is clearly needed.

Six modes T(AL), T(AQ), Q(A), A(V), F, and R do not appear in the factor analysis as loading high on any factor. When reexamining the instrument for modifications, this should be taken into consideration, and questions in these areas should either be deleted or rewritten, if it is felt that information in these areas is indeed required.

PRODUCT EVALUATION & SUMMARY

The evaluation design stated in the proposal is:

1. The difference between pre-post test scores will be calculated and the percentage of students who gain 1.0 grade equivalents or more will be calculated.
2. The results of the pre-post testing will be analyzed for statistical significance using a real gain vs anticipated gain design.

In an attempt to evaluate the success of utilizing the CSM procedure, Schenectady, White Plains, Albany and Buffalo were recruited to assist in the implementation of this aspect of the program. After having received extensive training (previously described in the objectives section) each was requested to identify two groups of students (10 students in each group). The first group of students were to be characterized as the experimental group and were to be mapped, prescriptions provided and instructional procedures utilized based upon the information gained. The second group, described as the control group, were to fit the target population specifications but would receive instruction as is normally provided in each center. After one hundred hours of instruction (the number of hours as modified and approved during the interim evaluation) utilizing the previously described procedure, the students in the experimental group were to be compared to students in the control group on the basis of pre-post test scores.

This aspect of the program was not entirely implemented. The above named sites did select groups of students with which to work, they were mapped and prescriptions were made. This, however, took place late in the year due to the extensive work required for staff development in Niagara Falls and for the participaring sites. Consequently, the length of time that the program was implemented was not long enough to warrant evaluation and analysis of comparative data. The staff in all sites are now presently skilled enough in the concept and use of the CMS procedure that this objective is now feasible for next year and has been included as one of the recommendations.

An evaluation form was completed by each of the directors in the participating centers. Their comments have been summarized.

1. The directors felt there was no problem in getting students who fit the target population.
2. The program was implemented primarily in the instructional labs by the lab specialist. A major problem for some centers, however, was the lack of materials which fit all of the specified modes, particularly in the 0-2 reading level.
3. The directors report that students appeared to be very positive about the process and increased rapport seemed to develop between the students and the teachers as a result of this project. Many of the students reportedly liked the personal attention and perceived their

teachers to be more interested in them and their learning process.

4. The directors noted that additional staff would probably be required for effective implementation.
5. All felt that CMS was a valuable procedure for both the staff and the students and felt that the program should be continued.

Summary

The project in Niagara Falls should actually be considered as a pilot project. The staff did an outstanding job in accomplishing the majority of a large number of very complex objectives and, it was not possible given the time they had, to have provided comparative data. This refers primarily to the product objective whereby the success of the project would be evaluated by gain scores. This seems a reasonable objective now, but not previously.

The Niagara Falls group have become skilled in the theory and application of CMS and have trained personnel in other centers as well. They developed a most complex instrument and, although modifications need to be made, it appears to be useful in assessing preferences of students learning styles.

The utilization of this instrument not only appears to have resulted in positive attitudes of the students, but also positive attitudes on the part of the staff, and this is a tremendous benefit in any program.

The completion of the evaluation and categorization of the instructional material in the 0-6 level available in Niagara Falls is not only a benefit to the staff but could also be an important document for all ABE centers.

In conclusion, specific recommendations follow for improvement of the program, however, in terms of what has been accomplished this year, the project can only be described as highly successful. This success can only be attributed to the excellent administration of the program and the highly professional and diligent work of the staff.

Recommendations

1. An evaluation of CSM relative to achievement gains needs to be made. The cognitive mapping procedure, prescriptions and instruction should be utilized for a period of not less than 200 instructional hours and then accurate pre and post test gains should be evaluated. The scores should be evaluated to the test scores of a control group drawn from a random sample of students involved in ABE programs statewide. (It is understood that a record is kept by the State Education Department of all entering students' initial test scores and placement as well as hours of instruction and follow-up test evaluation.) It is from these data that it is recommended that the sample be drawn.

2. A sorting out of actual hours when the implementation of instructional procedures which facilitate the utilization of

a student's preferred cognitive style are in process is required. For example, if a student is in attendance at an ABE center for four hours a day (1) What time is actually allotted for actual instruction in the student's preferred mode and (2) What is the actual time spent in reading instruction and/or reading related activities?

3. If other centers are to be used as part of the experimental group in which you will compare gain scores to students who have not used this procedure, a close monitoring for actual use of cognitive strategies should be made. For it is only in this way that reasonable cause and effect relationships can be suggested.

4. Greater emphasis needs to be placed on helping teachers utilize instructional materials which require cognitive styles which are compatible with those preferred by the student and less emphasis needs to be placed on the instrument. The instrument itself in some cases appeared to overshadow the purpose for which it was designed - which was essentially to provide information which would improve the instructional program of the students. It is this purpose, designing a more efficient instructional program for students, which should be highlighted.

5a. Presently, the instrument is very lengthy and time consuming to both administer and to score. Since the information derived from the Factor Analysis (See section on Factor Analysis) indicated that (1) not all 26 Factors were present and

(2) some questions tapped a particular area better than others, it is recommended that the instrument be shortened.

5b. In many cases, items which were considered to have tapped a particular mode actually fell in another area, it is suggested that some reconsideration be given to the labeling of some modalities.

6. Development of in-service programs which will help teachers become aware of what modes students need to develop in order to be successful in the tasks that are required of them and to assist them in developing strategies which can be utilized to help students make the transition from their preferred modes to other modes as they are required should be instituted.

7. An evaluative questionnaire to obtain students' perception of the program needs to be developed and administered after the 200 hour block of instruction.

APPENDIX

MAP ANALYSIS SHEET

Board of Education
Adult Basic Education
Niagara Falls, New York

COGNITIVE STYLE MAPPING

LED - R ___ V ___ M ___

TEACHER'S NAME ___

MAP SYMBOLS	DEFINITIONS	ORIENTATIONS		
		MAJOR	MINOR	NEGLIG.
T(AL) Theoretical Auditory Linguistics	Ability to acquire meaning through hearing spoken words.			
T(AQ) Theoretical Auditory Quantitative	Ability to acquire meaning from numerical symbols, relationship and measurements that are spoken.			
T(VL) Theoretical Visual Linguistics	Ability to acquire meaning from words that are seen. Indicates someone who reads with an above-average degree of comprehension.			
T(VQ) Theoretical Visual Quantitative	Ability to acquire meaning from numerical symbols, relationship and measurements that are seen.			
Q(A) Qualitative Auditory	Ability to perceive meaning through the sense of hearing. Can distinguish between sounds, tones or music, etc.			
Q(O) Qualitative Olfactory	Ability to perceive meaning through the sense of smell.			
Q(S) Qualitative Savory	Ability to perceive meaning through the sense of taste.			
Q(T) Qualitative Tactile	Ability to perceive meaning through the sense of touch.			
Q(V) Qualitative Visual	Ability to perceive meaning through the sense of sight.			

MAP ANALYSIS SHEET #2

MAP SYMBOLS	DEFINITIONS	ORIENTATIONS		
		Major	Minor	Neglig.
Q(P) Qualitative Proprioceptive	Ability to coordinate a number of behaviors simultaneously in order to perform a complex task. Indicates someone who uses initiative and intuition (a sixth sense) e.g. playing the piano, dancing to rock music, typing from a dictaphone, running an efficient office.			
Q(CEM) Qualitative Code Empathetic	Sensitivity to the ideas and feelings of others, ability for someone to put himself in another person's place.			
Q(CES) Qualitative Code Esthetic	Ability to enjoy the beauty of an object or an idea.			
Q(CET) Qualitative Code Ethic	Commitment to one's own set of values, a group of principles, obligations and/or duties. This commitment need not imply morality.			
Q(CH) Qualitative Code Histrionic	Ability to perceive expected behavior and act it out.			
Q(CK) Qualitative Code Kinesics	Ability to understand and use body language (e.g. the use of facial expressions).			
Q(CKH) Qualitative Code Kinesthetic	Ability to perform motor skills according to a recommended or acceptable form (e.g. bowling, golfing).			
Q(CP) Qualitative Code Proxemics	Ability to judge physical and social distance between oneself and another.			
Q(CS) Qualitative Code Synnoetics	Ability to know oneself.			
Q(CT) Qualitative Code Transactional	Ability to develop rapport with others, and thereby influence them (e.g. sales representative, hostess, receptionist.)			

MAP ANALYSIS SHEET #3

MAP SYMBOLS	DEFINITIONS	ORIENTATIONS		
		Major	Minor	Neglig.
A Associates	Seeks meaning through interaction with associates.			
F Family	Seeks meaning through interaction with family.			
I Individuality	Seeks meaning independently.			
M Magnitude	A tendency to use norms, rules or categorical classifications as the basis of one's decisions (e.g. persons who need to define things in order to understand them).			
D Difference	A tendency to reason in terms of one-to-one contrasts or comparisons, perceives what a concept is by what it is not. Tends to be very creative (e.g. poets, artists, and inventors).			
R Relationship	A tendency to perceive meaning through the identification of relationship (e.g. someone who uses anologies and examples).			
L Appraisal	A tendency to employ all methods of inference (M, D, and R), giving equal weight to each, when reasoning.			