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ABSTRACT

Observations of career decision-making (CDM) behaviors of college students were analyzed to investigate how variations in the CDM process may be associated with age, sex, and "sex-typed" values. This descriptive study was based on records of students' interactions with the computer-based System of Interactive Guidance and Information (SIGI). First, the effects of age and sex on a wide range of CDM variables were examined. Then, for groups classified as having values "typical" or "atypical" of each sex, statistical analyses were made of differences and similarities in such behaviors as preferences for major fields of interest and kinds of occupations chosen. Effects of initial status on CDM variables were sometimes found when age and sex effects were absent. Age differences were relatively infrequent and small. While sex differences tended to confirm the usual sex stereotypes, the two "typical" sub-groups accounted for many of these differences. Differences between the "typical" and "atypical" sub-groups within each sex often paralleled those between the sexes. Findings show that there is a precedent for people of either sex who want to escape sex-role stereotypes and seek career satisfactions in terms of their own values. A major conclusion is that similarities between age and sex groups in the CDM process outweigh differences and justify "sex-blind" guidance, such as facilitated by the SIGI program. (An illustration of a student's interaction with SIGI is included.) (Author/BM)

SEX DIFFERENCES IN THE CAREER DECISION-MAKING PROCESS

by

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Educational Testing Service
Princeton, New Jersey

March 1978

FINAL REPORT

Sex Differences in the Career Decision-Making Process

National Institute of Education Project No. NIE-G-77-0002

Principal Investigators: L. Norris, M. Katz

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Princeton, New Jersey

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ABSTRACT

Observations of the career decision-making (CDM) behaviors of college students were analyzed to investigate how variations in the CDM process may be associated with age, sex, and "sex-typed" values. The study was primarily descriptive rather than an experimental testing of hypotheses. It took advantage of the unique "window" provided by records of students' interaction with the computer-based System of Interactive Guidance and Information (SIGI) to look into the process of CDM. First, the effects of age and sex on a wide range of CDM variables were examined. Then, for groups classified as having values "typical" or "atypical" of each sex, analyses were made of differences and similarities in such behaviors as preferences for major fields of interest and kinds of occupations chosen.

Effects of initial status on CDM variables were sometimes found when age and sex effects were absent. Age differences were relatively infrequent and small. While sex differences found tended to confirm the stereotype of the striving, active, positive male and nurturant, passive female, the two "typical" sub-groups accounted for many of these differences. Furthermore, differences between the "typical" and "atypical" sub-groups within each sex often parallel those between the sexes.

A major conclusion is that similarities between age and sex groups in the CDM process outweigh differences and justify "sex-blind" guidance. Students from every age-sex group found the structure and process embodied in SIGI relevant and congenial. Thus, ample precedent is seen for people of either sex who want to escape from sex-role stereotypes and seek career satisfactions in terms of values that may reflect any conceivable gradation of sex identification.

ACKNOWLEDGMENTS

A study of this scope always draws on the experience and good will of many persons besides the authors of the report. We wish to acknowledge especially the contributions of John Conklin and Allen Yates for their help in executing the discriminant analyses; Gunnar Gruvaeus for his indispensable help in working out computer programs for transforming raw data into usable form; and Madeline Bara for typing and retyping the drafts and final report. We thank them all.

Princeton, New Jersey
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CHAPTER I

INTRODUCTION

This research was designed to capitalize on unique sets of observations of the Career Decision-Making process (CDM) already being collected in the course of a clearly defined intervention. The intervention is the computer-based System of Interactive Guidance and Information (SIGI), developed to help students in or about to enter college make informed and rational career decisions--and also to increase their freedom of choice, develop their understanding of the elements involved in choice, and improve their competencies in the CDM process. The intervention is specified, in part, by the structure and content of SIGI--the model of CDM it employs, the scripts, the data bases, the format of displays on a cathode-ray tube, the response mode on the keyboard, and so on. These resources are accessible to all users. The intervention is further specified by the distinctive way in which each user interacts with the structure and resources of the system. These distinctive interactions are automatically recorded by the computer for research purposes and are printed in compressed form. Through this "window" on the CDM process, we can observe individual variations in CDM behavior (within the common framework of the system). An interpreted record of one student's interactions with SIGI appears in the next chapter, showing the kinds of data available.

In seeking to understand "factors which influence the CDM process" (NIE, 1976), an early question is how such variations in the CDM process as we can observe are associated with age, sex, and sex-typed values. Our sample of observations provides us with substantial numbers of SIGI users in three age categories: 18 and under, 19-24, and 25 and over. It also includes sizeable numbers of males and females. It furnishes unusually rich data on the exploration of values and on examined values.

The findings in this report, like the research, naturally fall into two parts. Part 1 is primarily concerned with uncovering the effects of age and sex on a wide variety of CDM variables. These variables, which are largely derived from observations of students as they interact with SIGI, are described by age and sex early in the report under the heading, "Career Decision-Making Variables." Using findings from the first part of the study, Part 2 discusses procedures for classifying students into sex-typical and sex-atypical groups. These groupings are then used to help explain and clarify whatever sex differences were found earlier and to help understand why students plan for specific occupations. The question of interest here is, Are the sex-associated differences mainly a function of differences in values profiles, which may to some extent reflect sex but may also tend independently to determine CDM processes?

If this proves to be the case, it should be a liberating finding. It would demonstrate that a guidance treatment can counter rather than compound the effects of sex stereotyping. We know from previous research that male and female college freshmen differ in the mean importance they attach to some values and also differ in their structuring of values (Norris and Katz, 1970). But these findings are based on a national sample of students who had not been exposed to any one specific kind of intervention. Their values may be called (relatively) "unexamined." But what about values of college freshmen who have gone through a systematic exploration and examination of values (in SIGI)? Will female and male differences still be apparent not only in distributions of weights assigned to some values dimensions, but also in the structure of the values domain? If the treatment represented by SIGI, which is entirely undifferentiated as to sex, discloses a full range of values profiles for each sex such that there is ample overlap even though means may be somewhat different, if the distinctive values profile of an individual, independently of sex, influences the other CDM process variables; then it becomes clear that guidance need not concern itself with such pseudo-issues as within-sex vs. between-sex norms.

But this speculation gets ahead of the game. The study is descriptive rather than an experimental testing of hypotheses. It observes behavior during the CDM process on such variables as values profiles, information-seeking, predicting, planning, and use of decision rules in evaluating occupations for choice. It controls for initial status of individuals as they embark on this formal, systematic CDM process. It compares age and sex groups in these behaviors and describes similarities and differences. In addition, it ascertains whether sex-typical and sex-atypical values profiles can be defined for each sex, and compares groups so identified on such variables as major field of interest, comprehensiveness of information-seeking, types of occupations for which plans are made, and types of occupations ultimately preferred after the joint utility and probability of entering several occupations have been evaluated.

REFERENCES IN THIS CHAPTER

1. National Institute of Education. Grants for Research on Education and Work: Spring 1976. Washington, D.C.: U. S. Department of Health, Education and Welfare, 1976.

2. Norris, L., and Katz, M. The Measurement of Academic Interests, Part II: Academic Interest Measuring. College Board Research and Development Report 70-71, No. 5, and ETS Research Bulletin 70-67. Princeton, New Jersey: Educational Testing Service, 1970.

CHAPTER II

IDENTIFICATION OF DATA FROM SIGI

Most of the data for this report come from the records of responses that the computer may collect as students interact with SIGI. One way to familiarize the reader with these data is to present an actual student record together with an explication of it. Such a presentation already exists as a chapter in the report[1] of the field test of SIGI, and it will be convenient simply to transfer that chapter to this report as Exhibit I.

The "tags" and labels that identify data in Exhibit I do not always agree with those used in this report. Each tag or label, however, is identified when it is introduced in later chapters.

The page numbers at the bottom of the page are those for this report. The page numbers at the top are those of the original chapter.

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[1] Warren Chapman, Martin R. Katz, Lila Norris, Laura Pears, SIGI: Field Test and Evaluation of a Computer-Based System of Interactive Guidance and Information. (Princeton, New Jersey: Educational Testing Service, 1977).

EXHIBIT I

CHAPTER II

ILLUSTRATION OF SIGI INTERACTION

The remainder of this report will of necessity assume an understanding of the structure of SIGI. This structure is not easy to describe in words. Although its general features are always the same, the structural details vary according to the behavior of the individual user. The number of possible different paths through SIGI is almost infinite.

One way to describe SIGI is to look over the shoulder of a student experiencing it. We can do this by examining one of the records compiled by the computer from a random sample of SIGI users. The record we have chosen charts the responses of a woman at one of the community colleges participating in the field test. Since every student uses the system in a unique way, the model student should not be regarded as "typical." We chose her because her record illustrates a number of the most important features of the system.

Student Printout

The printout of the student's interaction has been cut up and reproduced as Figure 1, pages 1-6, at the end of this chapter. The leftmost column of the printout contains the descriptive tags ("INTR4," "END2," etc.) that identify the place in the program where a response occurred. The second column lists the response number, value weight, specification level, or whatever, that constituted the response. The remaining columns clarify or give meaning to that response. Generally the tags and labels have no meaning except to the SIGI research staff. They will be explained in the

description that follows.

Let us now sit down at the terminal and go through SIGI with her.

Figure 1, Page 1

DATE. This is the date of the student's first session.

INTIN. This is the time (12:01 p.m.) when the student signed on and entered the introductory (INT) section of SIGI.

STATUS. The variable STATUS keeps track of where the student is in SIGI. SIGI was designed to meet two needs related to career decision-making. First, it attempts to meet the need for a rational and orderly method of decision-making. Second, it meets the need for an information system that will supply the various kinds of data that a rational decision requires. The first need should be satisfied before the second because the student must have some systematic way to handle information before acquiring it. In order to teach a rational method, SIGI leads the beginner, or NOVICE, through the subsystems in an order that constitutes an algorithm for decision-making. What this order is will become apparent as we follow this student's interaction. The student's STATUS counter is incremented every time she finishes a subsystem so that, if she then signs off, the computer can start her at the right place when she returns. When the student finishes the last subsystem, Strategy, her status reaches 7. At this point she will presumably have mastered the method and will be competent to use SIGI mainly as an information system. She then becomes an INITIATE with the privilege of roaming through SIGI at will.

INTR4. Many displays are in a multiple-choice format. The display asking about the student's enrollment status has four categories of re-

sponses. This student's respon 3, indicates that she has already undertaken some college work. The computer will store this response and will look at it whenever it must select a display that is worded one way for a returning student and a different way for a student who has not yet enrolled.

INTR5. This is the student's age category.

INTR6. Data on age and sex are used only for research studies. No displays in SIGI are differentiated on the basis of age or sex; males and females get exactly the same treatment.

PRT1. Students may get hardcopy printouts of various SIGI displays for study off line. The printer is wired to the terminal and simply copies what the student is looking at. In this case, the display summarizes the student's responses to INTR7-10, which constitute an introduction to the decision-making model embraced by SIGI.

INTR7-INTR10. After INTR6, the student responds to displays asking about the four major aspects of decisions about occupations: Does she know which values are important to her? Does she know which occupations are likely to satisfy her values? Can she successfully predict her grades in the courses she will be taking as she prepares herself for an occupation? Does she know which courses and other steps to take in the preparation? The model student's answers are in the middle range between confidence and doubt. PRT1 (above) shows that the student wanted a record of her responses to these questions.

INTR11. The introduction concludes with a tiny "computer-assisted instruction" (CAI) sequence consisting of a single display with feedback. The student is asked to identify a logical first step in a decision-making process. She got the right answer: She should examine her values

so that she will know what satisfactions and rewards to look for in an occupation. This sequence leads her directly into the subsystem where the examination occurs.

The Values System (VALIN-VAL10)

VALIN. This is the clock time of her entry into the Values system.

VAL2. In the Values system the student weights the importance, to her, of each of ten occupational values. The weights are on a scale of 0 (no importance) to 8 (highest importance). Another tiny CAI sequence introduces the weighting process. The record shows that the student understood the explanation, for she made the correct response to the test question.

VAL3-VAL6. The order in which things appear in the student record is different from the order in which they happen at the terminal. The chronological order is VAL5 (with VAL3 appearing just before notation of the weight assigned to Interest Field), END2, END5, INCON3 (each of which may appear more than once), VAL4, and VAL6. In this discussion they will be treated in that order rather than in the order in which they are listed in the record.

VAL5. This is the record of the weights the student assigned to each value when she considered one at a time. The value is defined in [illegible] terms and the student considers the importance (to her) of satisfying that value through her occupation. Income is defined as having more than enough to live on. Interest Field is the importance of working in a particular field of interest; before weighting that value, the student selects the field of paramount interest to her: Scientific, Techno-

logical, Administrative, Personal Contact, Verbal, and Aesthetic. (The tag VAL3 shows that this student selected the Scientific field.) Early Entry is the importance of entering an occupation without long delay for training and education; it is a kind of reverse education value--the greater the weight, the less tolerance for prolonged education. When she finished weighting the values one at a time, she saw them brought together in the form of a histogram and was given the opportunity to adjust the weights. VAL5 records the weights at the conclusion of this process. For this student, Income and Security, weighted 5, were the most important values. It is curious that the sum of all her weights came to only 31. For most students the sum is much higher, about 50. Apparently none of the SIGI values was of pressing importance to this student.

END2-END5 (first occurrence). With the preliminary weighting completed, the student engages in a playful, nonthreatening Values Game. To begin the game the student had to choose between two imaginary "jobs," one as a Tenurist, featuring a maximum amount of Security (the last item, VALUE GAME JOB ACCEPTED, in END2) and the other as a Velociter, featuring Early Entry (the first item in END2). She chose Tenurist. She was then faced with another dilemma: Her job as Tenurist lacked opportunities Leadership. Did she want to quit and try another job? She decided that would stick with the Security that Tenurists enjoy. But when she was tempted by the offer of a job as Buckster, featuring a good income (first item in END5), she decided to take it. Thus the information tagged in END2 and END5 is the choices she made in a series of bipolar confrontations in one game. Sometimes the confrontation involves the news that the job is deficient in opportunity to satisfy a value. At other times the dilemma is in the form of a temptation to switch to a job offering unusual

opportunities to satisfy a rival value. The order in which the values appear is unrelated to the weights the student assigned in her previous interaction. To the extent possible, the order is random.

END2-END5 (second occurrence). In her second game, she stuck to her job as Buckster in the face of bad news or temptations with respect to Prestige, Independence, Helping Others, Variety, Interest Field, and Leisure (END2). She quit, however, on learning that her job lacked opportunities for Leadership (END5).

INCON3 (first occurrence). The computer compares the weights previously assigned (as recorded in VAL5) to the "winners" and "losers" in the Values Game. This student had weighted High Income at 5 and Leadership at only 2. Nevertheless, she had rejected a job featuring the preferred value because it was deficient in the less cherished value. This inconsistency is noted in INCON3. (The student would also be inconsistent if she stuck with a job featuring a value she had weighted less than the rival value. This student did not fall into tha[illegible]y, and no [illegible]N2 messages appear in her record.)

EN[illegible]INCON3 (third occurrence). The student must play enough games to allow for the appearance of all ten values at least once. After that, she can play as many games as she finds useful or entertaining. This student elected to play a third game. This time the luck of the draw once again presented her with the opportunity to be a Buckster (last item in END2), and she chose that occupation over one featuring Prestige (first item in END2). She also preferred High Income to Independence, Leadership, and Leisure, but not to Interest Field (END5). Her choice of Interest Field over High Income was inconsistent with her value weightings, and she got a message to this effect (INCON3). The messages delivered to the student

in the END2, END5, and INCON displays are mere reports of outcomes. No analysis or statistical inference is attempted on the basis of such a brief game. The purpose of the game is to stimulate reflection about values, not to scale them.

VAL4. Before proceeding to the final adjustment of her value weights, the student is offered the opportunity to change the field of interest (Scientific) that she selected earlier in VAL3. She accepted the offer, but in the end decided to stick with her earlier choice.

VAL6. The student must now readjust her value weights, but this time with the restriction that they sum to 40 points. This restriction forces the student to consider the relative, as opposed to the absolute, importance of each value--i.e., to establish priorities. For most students, it also underlines the sad fact that decision-making nearly always involves trade-offs. For this student however, the restriction is something of a dividend, for she can increase her total weights by nine points. VAL6 records the adjusted weights. Interest Field, which had been tied with High Income, became her top value, Security was relegated to second place, and the range extended from 7 to 1 instead of 5 to 1. These results seem consistent with the outcomes of the Values Games. Since the restriction to 40 points did not force trade-offs on this student, one may speculate that the difference between pre- and postgame weights was due almost wholly to the impact of the Values Game.

VAL7-VAL10 (Figure 1, page 2). Interaction in the Values system concludes with a CAI sequence that reinforces the concept of weighting one's values and leads into the next system, Locate. The student recognized (VAL7) that one reason for weighting values was to direct the search for occupational information. She also understood (VAL8) the concept, the

greater the value weight, the more important the value. She recognized (VAL9) that if a person gave a high weight to Security, he would probably prefer a secure job (Autonomist, an imaginary job) to a job featuring some other value. And in VAL10, she saw that the second step in a rational decision-making process should be to identify a set of occupations that are likely to satisfy her more important values. Such an identification is the function of Locate. At this point she could choose between signing off or going directly to Locate. She chose to go to Locate.

The Locate System (LOCIN-LOC9)

LOCIN (Figure 1, page 2). The student took 58 minutes to reach the Locate system. She went more slowly than most students.

LOC3 (Figure 1, page 2). In Locate, the student selects a set of five of the ten values and then specifies a minimum of return that she would accept from an occupation on each value. (For Interest Field, the specification is for one of the six fields of interest.) This student chose her five top-weighted values (first column) and specified the levels and interest field named in the right column. The numbers that precede the specification label are the numerical equivalent of the specification—five levels for High Income, six fields for Interest Field, and four levels for each of the other eight values.

LOC4 (Figure 1, page 2). These three columns list the occupations, with their identification numbers, that were retrieved with the values/specifications named in LOC3. All of the occupations in SIGI have been rated on the opportunity they provide to satisfy each of the ten values. The rating scale is the same as that used to designate the level of speci-

fication. Consequently, the meaning of LOC4 is that all the listed occupations are rated at 3 or above on Income (i.e., their median salary exceeds $11,000 per year), lie to some extent in the Scientific interest field, offer an average or above average opportunity to help others, and so on. If no occupation had been retrieved, the student would have been forced to loosen specifications. If more than 20 had been retrieved, she would have had to make them more strict.

PRT2 (Figure 1, page 2). The student decided to get a printout of LOC3 and LOC4, which are combined into a single display with the values/specifications on the left and the occupations retrieved with them on the right.

LOC5 (Figure 1, page 2). As a novice, the student is exposed to an explanation of how SIGI retrieves occupations. Its purpose is to reinforce the concept that occupations retrieved in Locate have special significance in terms of the student's own values. The explanation ends by asking the student whether any of the occupations that had been retrieved for her required more education than she was contemplating. For this student the answer was yes. The display tagged LOC5 told her to use Early Entry as one of her search values and to set its specification at the level of education she would accept. For example, by specifying that the retrieved occupations should require no more than two or three years of educational preparation, she would eliminate from the list all occupations that required a bachelor's or advanced degree for entry.

LOC6-LOC8 (Figure 1, page 2). The student is now offered four options: (a) to learn why a particular occupation was not retrieved; (b) to change the specification on one or more of the values originally selected; (c) to assemble a different set of values for the purposes of retrieval; or

(d) to get out of Locate. The student chose the first option (LOC6) and asked why Physician's Assistant (LOC7) had not been retrieved. As it happened, the occupation had been retrieved. She then asked why Registered Nurse had failed to appear and learned (LOC8) that that occupation failed to meet her specification for Income.

PRT4 (Figure 1, page 2). The student asked for a printout of the information about Registered Nurse. The information as to fit/not fit is presented in the same display as the values/specification so that she will know which specification was too high when she studies the printout off line.

LOC6 (Figure 1, page 2). This time the student decided to change a specification for one of her original set of values.

LOC3 (Figure 1, page 2). She reduced the specification for High Income from 3 to 2--from a minimum of $11,000 to a minimum of $8,000. The other specifications were unchanged. The student's behavior seems to be related to the disclosure that Registered Nurse failed to meet her earlier specification.

LOC4 (Figure 1, page 2). A second set of occupations is retrieved. It of course contains all the occupations in the first set, since they exceed the lowered specification for Income, and four new occupations: 193 Registered Nurse, 221 Biology Teacher, 227 Mathematics Teacher, and 229 Physical Science Teacher.

PRT2-LOC6 (Figure 1, page 2). The student got a printout of the revised list and, apparently satisfied now that Registered Nurse had been made to appear, elected to move out of Locate.

LOC9 (Figure 1, page 2). Locate concludes with another tiny CAI sequence that is designed to introduce the novice to the next subsystem of SIGI and the next logical step in a rational decision-making process.

That step is to inform herself about the occupations uncovered in Locate. The Compare subsystem, which is the occupational information system, provides the opportunity to do that.

Compare System (COMPIN-ENDFIL)

COMPIN (Figure 1, page 2). The student could have signed off after completing Locate, to begin in Compare when she returned; or she could go to Compare immediately. She chose the latter course. She spent 20 minutes in Locate and had now been on SIGI for one hour and 18 minutes.

SAVE (Figure 1, page 2). Compare gets its name from the fact that the student is informed about three occupations at a time so that she can compare them with one another. SAVE is a reminder list of the occupations that are presumably of paramount interest to her. At this point the list contains all the occupations that were retrieved in her two passes through Locate. The student does not have to select from this list; she may select any occupation in SIGI for use in Compare.

OCC2 (Figure 1, page 2). These are the three occupations she chose for query. They were all on the SAVE list.

COMP4-PRT5 (several occurrences, Figure 1, pages 2 & 3). The questions available to the student are shown in Figure 2. She may designate up to five questions at a time, and the answers will then be displayed in sequence in the format shown in Figure 3. Each COMP4 tag means that a question was asked (the number in the second column is the number of the question as shown in Figure 2), and the third column indicates the nature of the question. The tag PTR5 means that the student asked for a printout of the answer. Thus this student asked questions 1, 2, 4, 8, 10, 11, 12,

13, 16, and 27 with respect to Registered Nurse, Physician's Assistant, and Public Health Specialist. Among the questions are two that concern her top-weighted values: number 11, High Income, and 16, Interest Field.

SAVE, OCC2, COMP4 (Figure 1, page 3). When the student's preselected questions, up to five in number, have been answered, she is given the opportunity of selecting more questions, assembling a new set of occupations to ask about, or moving on in SIGI. This student exercised the first option the first time it was presented to her, as shown by the fact that she asked ten questions about her first set. Next she assembled a new set consisting of Registered Nurse, Flight Attendant, and Advertising Copywriter. Note that the latter two were not among the SAVE occupations when she entered Compare. The computer added them to the list, and they appeared when she assembled her third set of occupations (see the third occurrence of the tag SAVE). The student asked five questions (and demanded no printouts) about her second group of occupations. She then assembled a third set of occupations, Registered Nurse, Purchasing Agent, and Secretary, and asked four questions about them. Since Registered Nurse was a member of each set, one may infer that this was her first-choice occupation at this time and that she was comparing it with potential rivals.

TRY1-TRY5 (Figure 1, page 3). The student now elected to move out of Locate. As a novice, she was exposed to a short review of the decision-making process taught by SIGI. The five steps that constitute the process, along with two "distractors," were displayed in scrambled order. The student was asked to identify the first step, then the second, and so on. This student identified the first three steps correctly (TRY1-TRY3), but it took her two attempts to get the correct answers for the fourth and fifth steps, which involve prediction and planning. The next

two systems she would encounter concern those activities.

LOGOUT (Figure 1, page 3). The student decided to sign off and to begin with the Prediction subsystem when she returned. She had been at the terminal nearly two hours.

Prediction System (PREDIN-PRT6)

The purpose of the Prediction system is to help the student assess her abilities with regard to the academic preparation for entry into various occupations. The assessment takes the form of a probability table showing what her chances are of getting a final grade of A to B, C, or below C in a course that represents some curriculum or "major" of interest. Predictions of this sort depend on institutional studies to determine the degree of correlation between some predictor variable(s) and the final grade. If these studies have not been completed, the computer simply omits the Prediction system and all references to it. In that case, the novice would go from Compare to Planning.

INTIN-PREDIN (Figure 1, page 4). The student returned at 10:58 the day after the preceding interaction. Her status had climbed to 4, and the computer consequently sent her to the Prediction system. The computer once again asked about her enrollment status, for it could have changed between sessions. The rest of the introductory interaction is omitted for returning students, and she entered the Prediction system one minute after she signed on.

RANK-ENGH (Figure 1, page 4). The computer collects data about the student's previous performance. RANK asks the student to report her rank in her high school graduating class (top fifth, second fifth, etc.). MATH and ENG are her average high school mathematics and English grades.

ENGH is the answer to the question, "Do you need help with English?" Her responses are stored for use as potential predictor variables. If the student's college had a mandatory testing program, the computer would also ask for test scores, which would likewise become potential predictor variables.

PRED2 (first occurrence, Figure 1, page 4). The student picked from the list of predictable programs the one that was of interest to her--Nursing, in this case. For each program the college has designated a key course. (The key course for Nursing is named in the right-hand column as BY 110, General Biology.) A key course is defined as one that comes early in the program, that more or less represents the kind of aptitudes and activities required for success in the program, that is taken by most of the students in the program, and that tends to separate those who will succeed in the program from those who will not. The prediction will be made for the key course, not the program that it represents. What is the prediction based on?

PRED4 (first occurrence, Figure 1, page 4). The computer presents the student with five pieces of information about the criterion and asks her to respond with self-estimates of her competency. The first piece is Grade Factor 1, interest in the subject matter of the course. The student sees a description of the subject matter (prepared by the college) and rates her interest in it as above average, average, or below average. This student rated herself as 1, or above average, on this factor. Grade Factor 2, the second item, asks her to rate herself on the degree of her commitment to the program that the key course represents; in this case, she rated herself as above average on her commitment to Nursing. Items 3 and 4 require a little more explanation. When the validitiy studies

for the system were begun, teachers of each key course selected two factors--Grade Factors 3 and 4-- from a menu of 29 potential factors that our research had shown were linked to good grades in the minds of faculty. The factors cover such competencies and attitudes as ability to think logically, knowledge of basic English skills, finger/hand dexterity, keeping up with homework, and so on. (The complete list appears on Form B of Appendix A, the Prediction System Manual and Forms.). For BY 110, Factor 3 is knowledge of English fundamentals, and Factor 4 is regular attendance. The student rated herself as average on the former and above average on the latter.

PRED5 (First occurrence, Figure 1, page 4). The fifth piece of information about the criterion is a histogram showing the distribution of grades of former students in the class. Text of the display interprets the histogram for the student. She now sees a display (Figure 4) containing all of her relevant inputs--previous performance, self-ratings on the grade factors, and distribution of course grades. She then estimates her own grade in the course. This student estimated her grade as B.

PRED6 (first occurrence, Figure 1, page 4). Predictions are computed from regression equations stored in the computer. The equations were derived from validity studies that we conducted when the local Prediction system was being developed. If the college has a mandatory testing program, two regression equations are stored for each key course, one containing test scores among the predictor variables and the other excluding them. Possible predictor variables include biographical data (sex is never used, and age was used once by one college for one course), the record of previous performance (rank, English grades, and mathematics grades), test scores (if any), self-ratings on the four grade factors, and esti-

mated grade. No more than three variables are used for any key course, and no prediction is rendered if the combination of variables produces a multiple R of less than .40. The prediction for this student was that she has 65 chances in 100 of getting an A or B in Biology 110, 25 chances of getting exactly C, and 10 chances of getting a grade of W (withdraw--her college does not assign grades below C).

PRED10 (Figure 1, page 4). The prediction chart does not explicitly tell the student what her chances are of passing the course. Therefore she is asked to indicate what her chances are getting a C or better. This student correctly added 65 and 25 and saw that the answer was 90.

PRT6 (first occurrence, Figure 1, page 4). She asked for a printout.

PRED11. The student may now ask for another prediction, may ask a question about predictions, or may move on. She chose to ask a question and was presented with the menu reproduced as Figure 5. The concept of probability is not easy for students to grasp, and the opportunity to ask questions is SIGI's attempt to cope with that problem. This student wanted to know whether to interpret her prediction favorably or unfavorably.

PRED36-PRED29 (Figure 1, page 4). The question is answered in an interactive sequence of some eighteen displays. The record of an archer's score in target practice provides an analogy for using records of past academic performance to predict future academic performance. The sequence ends with a few displays explaining that "goodness" and "badness" depend partly on the expectations or hopes of the student and partly on the requirements for achieving the student's goal. This student apparently followed the sequence with considerable care, for she made only two incorrect responses during the interaction (PRED40 and PRED23).

PRED2-PRED6 (second occurrence, Figure 1, page 4). The student sought a second prediction, this time for Business Administration (key course, BA 211, Accounting). She rated herself as average on the four grade factors (Grade Factors 3 and 4 were good reading ability and ability to work independently), and estimated her final grade as B. The new prediction was added to her chart and both were displayed simultaneously. In BA 211 she had 40 chances of A or B, 30 chances of C, and 30 chances of W.

PRED2-PRED6 (third occurrence, Figure 1, page 4). The student followed the same procedure to get a prediction for the Physician's Assistant program (key course, BY 251, Anatomy and Phsyiology). She rated herself as above average on all four grade factors (Grade Factors 3 and 4 were in this instance superior memorization and good reading ability), and estimated her grade as B. The probability figures, displayed on the same chart as the previous two, were 55 chances of A or B, 35 of C, and 10 of W.

PRED2-PRT6 (fourth occurrence, Figure 1, page 5). The student asked for a fourth prediction, this time for Registered Nursing (this is a two-year program and is not the same as the Nursing program that was the subject of her first inquiry). The key course for Registered Nursing is the same as the key course for Physician's Assistant, which had already been predicted. Therefore the prediction was simply repeated. There were now four predictions displayed--all that the student was interested in. She asked for a printout. She then moved on to the Planning system without signing off.

Planning System (PLNIN-PLNI9)

The purpose of the Planning system is to supply information about what the student should do, after graduation from high school, in order to prepare herself for entry into an occupation. Such information will help her decide whether the occupation is feasible for her in terms of what she is willing and able to put into preparation for it. Can she meet the demands on her resources of time, energy, money, and ability? Another purpose of the system is to provide the student with an agenda for entry into an occupation once she has selected it.

The Planning system gives, first, general information about the steps, beyond high school, that lead to entry into the occupation, including requirements (if any) for certification and licensing. Second, it gives specific information about the program of study that the student should take at her college, the prerequisites for admission into that program, and the names of institutions to which the student can transfer in order to complete her preparation. The local college prepares the displays containing the second class of information; the displays are added to the college's SIGI disks at ETS and the disks are mailed to the college. If the college has not completed the local displays, the interaction in the Planning system stops at the end of the generalized displays. The college that the model student attended had a complete Planning system with local information.

PLNIN (Figure 1, page 5). The student went directly to the Planning system from the Prediction system without signing off. She had spent 29 minutes in the Prediction system.

SAVE (first occurrence, Figure 1, page 5). SAVE now consists of the

19 occupations retrieved in Locate, to which were added the four new occupations that the student requested in Compare: Advertising Copywriter, Flight Attendant, Purchasing Agent, and Secretary.

PLN2 (first occurrence, Figure 1, page 5). The student chose Secretary for her first tour through Planning.

PLN13 (Figure 1, page 5). The student was asked if she was willing to tolerate the amount of time that preparation for her occupation would require. For the purposes of the Planning system, the occupations in SIGI are classified into six categories: PROF (graduate study required for preparation), GRAD (graduate study recommended), BACH (a bachelor's degree required), SHUD (a bachelor's degree recommended), WICH (two mutually exclusive paths to entry, one requiring a bachelor's degree and the other not), and TERM (less than a bachelor's degree required for entry). Secretary is classified TERM, and hence the student's response signified that she was willing to accept up to three years of education as a condition for becoming a secretary. Had she been unwilling to accept so long a span of time, she would be allowed to abandon Secretary, to choose an alternative occupation, to inquire about General Studies, or to exit from Planning.

PLN15 (Figure 1, page 5). Now the student was asked if she thought herself capable of passing the required coursework. The display that asks about her abilities includes the answer to question 7 from Compare, "Examples of College Courses?" On the basis of this information our model student signified that she had the ability to complete a secretarial program successfully.

PLN3 (first occurrence, Figure 1, page 5). The student is invited to see a pair of displays that discuss the rewards and risks of aiming at an occupation that is academically hard to get into as opposed to finding an

easier alternative. This student decided to ignore those displays, presumably because she was confident that there was little risk, for her, in attempting the secretarial program.

PLN23 (first occurrence, Figure 1, page 5). The student's decision not to abandon Secretary generated a sequence showing her, first, a general plan for achieving her goal (Figure 6); second, the high school prerequisites for admission into the secretarial program at her college (Figure 7); and, third, the program itself (Figure 8). If achievement of her occupational goal had required transfer to another institution--say, from a community college to a four-year college or from a four-year college to graduate school--a fourth display would list the most practicable institutions. At the end of the sequence the student is asked whether, having seen the requirements for preparation, she now wishes to pursue the occupation. This student replied no.

PLN21 (Figure 1, page 5). Was the decision to abandon the occupation due to the amount of education it required? If the student answers yes, SIGI will propose a method of locating alternative occupations similar in their values structure to the one that was rejected but less demanding in education. The design of SIGI allows occupations to be clustered in accordance with innumerable combinations of value satisfactions. By using Early Entry as a search variable in Locate, a student may specify any level of education that she will tolerate in preparing for an occupation. The model student, however, did not reject Secretary because it demanded too much education.

SAVE-PLN2 (second occurrence, Figure 1, page 5). The student chose another occupation for inspection, Registered Nurse.

PLN12 (Figure 1, page 5). Registered Nurse is classified WICH, since

mutually exclusive two- and four-year paths to entry exist. She chose the four-year path.

PLN10-PLN23 (Figure 1, page 5). The student signified that she was willing to spend four years in preparation, was able to cope with the kinds of courses she would take, was desirous of inspecting the displays that discuss the rewards and risks of aspiring to a difficult goal, and decided to proceed farther with the occupation. As a result, she saw the local college sequence of prerequisites, program, and (in this case) transfer colleges. Then she was asked once more whether she wanted to pursue the occupation. This time she answered yes.

PLN4-PLN25 (Figure 1, page 5). Her acceptance of nursing now generated a new sequence designed to help her become enrolled. PLN24 asked her whether she had completed the prerequisites for enrollment (she had), and PLN25 asked whether she wanted to see information about financial aid. Her yes response led to five displays outlining the major sources of student assistance available at her college, as well as naming the places where she could get detailed information. Other displays showed her how to estimate whether or not she would lose academic credits by transferring into the nursing program, and they provided information about how to enroll.

PLN 19 (Figure 1, page 5). The student had seen the four-year path to entry into her occupation. SIGI now asked her if she would like to see the two-year path. She declined and moved into the Strategy section.

Strategy System (STRIN-STR25)

The purpose of the Strategy system is to propose a method for making decisions in the face of complexity and to lead the student step by step

through the process. By the time the student has reached Strategy, she has encountered many different kinds of information, more of each kind than she is likely to remember. How should she incorporate what she now knows about her values into what she has learned about the 23 occupations competing for her attention in SAVE? What roles should prediction and planning information play? Is hard-earned information about her options to be neglected simply because the student does not see how to fit it into her decision?

STR3-STR10 (Figure 1, page 5). Strategy begins with an assessment of the rewards one may expect from a decision provided that it is realized. In order to illustrate the process, the computer follows members of the Logic family as they buy new cars. They weight four automotive values and, gathering information from magazines and pamphlets, rate three automobiles on their potential to satisfy each of the values. Finally, they multiply the weight they assigned to a value by the an automobile's rating on that value, add the four products thus obtained for each car, and compare the sums (called Desirability Sums in SIGI). A Desirability Sum may be represented by the following formula, where W = the numerical weight assigned to a value, R = the rating of an option (e.g., a car, an occupation) on its capacity to satisfy the value, and N = the number of values that the decision takes into account:

$$\text{Desirability Sum} = \sum_{i=1}^{N} W_i R_i$$

A Desirability Sum is the wedding of what the student wants, as represented by the value weights, with what reality offers, represented by the ratings on the values. As it turns out, one car is "best" for one member

of the family, a second car for another, and the third car for the third Logic.

The process of obtaining Desirability Sums is developed in a sequence of CAI-like displays demanding reasoned responses from the student. The model student got all these right except the last (STR10). She failed to see that the reason why a different car was "best" for each member of the family was that each Logic had a different structure of values.

STR11-VAL6 (Figure 1, page 5). The strategy that the Logics used to evaluate cars will now be applied to occupations. Since value weights are obviously important in computing Desirability Sums, the student is invited to review them. The model student accepted the invitation. VAL5 shows the weights as she left them upon her departure from the Values system. VAL6 shows the adjustments she made on this occasion: She deducted one point from the weight of High Income and added it to Interest Field. (The student chose the Scientific interest field on her previous trip through the Values system. She was invited to change the field before she reweighted her values, but she declined. The printout would have recorded any interaction involving the selection of a new field.)

SAVE-STR14 (Figure 1, page 6). The student next selected three occupations that she was considering: Registered Nurse, Physician's Assistant, and Purchasing Agent (STR14). The first two had been retrieved in the Locate process, and Purchasing Agent had been selected for brief examination in Compare. (The student could have selected any occupation in SIGI.) She was then asked which of the three she considered to be her top choice; she chose Physician's Assistant (STR12).

Now the Desirability Sums were worked out. Figure 9 shows the culmination of that process. The computer first displayed the form for the

table containing the names of the occupations, the list of values, and the value weights. Next, the ratings of the three occupations on Income appeared (3, 3, and 4) and the student was invited to see the information that would explain the basis for the ratings or to go on to the ratings on Prestige. Had she asked to see the basis (she did not do so for any of the values), the screen would have been erased and the student would, in effect, be transported back to the Compare system. There she would see the answer to question number 11 ("Average Income?"); the income figures would show why the ratings of the three occupations differed with respect to this value. This privilege of accessing verbal information that explains the numerical ratings is available for each value, and the student could alternate between Strategy and Compare ten times if she happened to be curious about the rating of every value.

When the ratings have all appeared, the computer calculates the Desirability Sums. The computation takes place before the student's eyes, and the swift appearance of the thirty products followed by the sums contributes a small moment of drama to the SIGI experience.

This phase of Strategy concludes with a brief discussion of the outcome with respect to her top-choice occupation: Physician's Assistant, with a Desirability Sum of 118, would be a satisfactory choice among these occupations if the sole criterion for selection were desirability. (Students are told to disregard differences of less than 10 points.)

STR16-STR26 (Figure 1, page 6). The emphasis now shifts to the risks side of the decision equation. The interaction leads the student to four simple concepts: (a) The student should reject an option that is impossible to attain; (b) the student should reject an option that offers a worthless reward; (c) the best option, if it exists, combines the largest

reward with the least risk; and (d), if none of these combinations is present, the student must accept greater risks if she hopes to maximize reward, or accept reduced rewards if she hopes to minimize risk, or settle somewhere in between. Again, the teaching mode is CAI. The model student got three wrong answers in this sequence. She said she would choose a (hypothetical) occupation with a large Desirability Sum, even though it would be impossible to attain (STR16). She failed to observe that one of three (hypothetical) occupations in a list offered a combination of maximum reward and minimum risk (STR20), and, given another set of three hypothetical occupations, she failed to notice that none of them satisfied the largest reward/least risk formula. Perhaps she was pressed for time and was hurrying.

Now the student estimated her own risks with regard to the three occupations she had selected earlier. She told the computer what she thought the chances were (chances in 100) that she would successfully complete all the steps required for entry into the first occupation, then the second, and, finally, the third. Displays advised her in her estimation, telling her to consider the number of steps involved and the difficulty of each step. The occupational overview (Figure 6), which the student might have seen earlier in the Planning system, provided information about the preparation task. The student could examine this display as often as she wished until she signified that she was ready (STR26) to make a statement about her chances.

STR23 (Figure 1, page 6). The student reported her chances of successfully entering the Nursing, Physician's Assistant, and Purchasing Agent occupations as 88, 75, and 50, respectively. Although these estimates might seem somewhat optimistic considering the job market at the

time, they are nevertheless useful in decision-making. The student's evident interest in the health professions suggests that she may already have some investment of study or experience in Registered Nursing and Physician's Assistant which she might lose if she switched to Purchasing Agent. Furthermore, Physician's Assistant is a fairly new occupation; there are far fewer programs for that occupation than for Registered Nurse, competition for admission is fierce, and candidates with previous experience are favored over rank novices. In short, the student probably succeeded in rank ordering these occupations on the basis of her chances of getting into them. There is, of course, no way to determine the amount of error in her estimates.

STR24 (Figure 1, page 6). The student was asked to designate again her top choice of these three occupations in light of what she knew about their rewards and risks. She switched from Physician's Assistant to Registered Nurse. This was a logical choice, since the two occupations were essentially equal in desirability, but Registered Nurse would be easier to get into. Her choice generated a display saying that the choice was logical because Registered Nurse had the highest (or within ten points of the highest) Desirability Sum and also the best chances for successful entry. Had she designated another occupation, the wording of the display would have been different.

PRT12 (Figure 1, page 6). The student asked for a printout of the display containing her Desirability Sums, estimated chances, and discussion.

STR25 (Figure 1, page 6). The system contains advice on how to use the Prediction system for help in estimating risks. The advice is optional, and the student declined to see it.

Activity as an Initiate

EXIN-EX2 (first occurrence, Figure 1, page 6). The student was now promoted to initiate. In this status she became free to move at will among the subsystems in SIGI, and her path within any system would be much shorter than it was when she went through the system as a novice. Displays that were previously mandatory would now be optional, and the "CAI" that reinforced the concepts underlying the Values, Locate, and Compare systems would be skipped. The vehicle for moving from system to system is the menu shown in Figure 10. The model student decided to return to the Values system once more and elected option 2.

VAL5-EXIN (Figure 1, page 6). The initiate returning to the Values system does not go through the whole system. Instead, she is given the opportunity to play the Values Game again (this student declined) and then to adjust the weights she assigned earlier. VAL5 lists the weights as she found them and VAL6 as she left them. Since the weights in the two listings are the same, the student was apparently satisfied that she had finally got them as refined as she could. Then she was returned to the menu (EXIN).

EX2 (second occurrence, Figure 1, page 6). This time the student decided to sign off.

SO2 (Figure 1, page 6). The display the student asked to see contained information about applying the SIGI decision-making model to occupations that are not in SIGI. The display encourages the student to use her values as a guide for judging the occupational information in non-SIGI sources, particularly the Occupational Outlook Handbook. She is also advised to ask her counselor for help.

LOGOUT-ENDFIL (Figure 1, page 6). The student had been at the terminal one hour and 32 minutes during this session and three hours and 22 minutes total. The computer would store her value weights; the list of occupations in SAVE; RANK, MATH, ENG, and ENGH (the record of her previous performance from the Prediction system); and her status, which was now 7. If she should return to SIGI at any time, she would go through a brief sign on and then to the menu.

```
DK2:[1,13]
          15:51          04-Jan-77

DATE    04-Dec-75
INTIN   12:01
STATUS   0     NOVICE.
INTR4    3     COMPLETED 1 OR MORE SEMESTERS.          ENROLLMENT.
INTR5    2     19-21                                   AGE.
INTR6    2     FEMALE.                                 SEX.
PRT1           PRINT SIGI OVERVIEW.
INTR7    2     GENERAL IDEA OF WHAT I WANT.            VALUES STATUS.
INTR8    3     NOT SURE THEY FIT MY VALUES.            OCCUPATION STATUS.
INTR9    2     PREDICT GRADES IN SOME PROGRAMS.        PREDICTION STATUS.
INTR10   2     GENERAL IDEA WHICH IS BEST.             PLANNING STATUS.
INTR11   1     EXAMINE YOUR VALUES.                    FIRST STEP.
VALIN   12:15
VAL2     1     MAIN FIELD OF INTEREST-CORRECT.         CAI IMPORTANT VALUES.
VAL3     1     SCIENTIFIC.                             FIRST TIME INTEREST FIELD.
END2    10     EARLY ENTRY.                            VALUE GAME JOB REJECTED.
         7     LEADERSHIP.                             VALUE GAME JOB REJECTED.
         5     SECURITY.                               VALUE GAME JOB ACCEPTED.
END5     1     INCOME.                                 VALUE GAME JOB ACCEPTED.
         5     SECURITY.                               VALUE GAME JOB REJECTED.
END2     2     PRESTIGE.                               VALUE GAME JOB REJECTED.
         3     INDEPENDENCE.                           VALUE GAME JOB REJECTED.
         4     HELPING OTHERS.                         VALUE GAME JOB REJECTED.
         6     VARIETY.                                VALUE GAME JOB REJECTED.
         8     INTEREST FIELD.                         VALUE GAME JOB REJECTED.
         9     LEISURE.                                VALUE GAME JOB REJECTED.
         1     INCOME.                                 VALUE GAME JOB ACCEPTED.
END5     7     LEADERSHIP.                             VALUE GAME JOB ACCEPTED.
         1     INCOME.                                 VALUE GAME JOB REJECTED.
INCOM3   7     LEADERSHIP.                             JOB VALUE RATED LOWER.
         1     INCOME.                                 JOB VALUE IS INCONSISTENT.
END2     2     PRESTIGE.                               VALUE GAME JOB REJECTED.
         3     INDEPENDENCE.                           VALUE GAME JOB REJECTED.
         7     LEADERSHIP.                             VALUE GAME JOB REJECTED.
         9     LEISURE.                                VALUE GAME JOB REJECTED.
         1     INCOME.                                 VALUE GAME JOB ACCEPTED.
END5     8     INTEREST FIELD.                         VALUE GAME JOB ACCEPTED.
         1     INCOME.                                 VALUE GAME JOB REJECTED.
INCOM2   8     INTEREST FIELD.                         JOB VALUE RATED LOWER.
         1     INCOME.                                 JOB VALUE IS INCONSISTENT.
VAL5     5     INCOME.
         4     PRESTIGE.
         1     INDEPENDENCE.
         4     HELPING OTHERS.
         5     SECURITY.
         3     VARIETY.
         2     LEADERSHIP.
         4     INTEREST FIELD.
         1     LEISURE.
         2     EARLY ENTRY.
VAL4     1     SCIENTIFIC.                             SECOND TIME INTEREST FIELD.
VAL6     7     INCOME.
         4     PRESTIGE.
         1     INDEPENDENCE.
         5     HELPING OTHERS.
         5     SECURITY.
         3     VARIETY.
```


Figure 1, Page 1. Printout of a student record.

```
          3    LEADERSHIP.
          7    INTEREST FIELD.
          3    LEISURE.
          2    EARLY ENTRY.
VAL7      3    OCCUPATION INFO. SEARCH-CORRECT.
VAL8      2    INDEPENDENCE-CORRECT.
VAL9      3    AUTONOMIST-CORRECT.
VAL10     2    SATISFY YOUR VALUES-CORRECT.
LOCIN   12:59
LOC3      1    INCOME.
          8    INTEREST FIELD.
          4    HELPING OTHERS.
          5    SECURITY.
          2    PRESTIGE.
LOC4    127 CIVIL ENGINEER.
        143 FORESTER
        159 PHYSICIAN
        180 PHARMACIST.
        205 SPEECH PATHOLOGIST/AUDIOLOGIST.
PRT2        PRINT OCCUPATION MEET SPECS.

LOC5      1    TOO MUCH EDUCATION REQUIRED.
LOC6      1    WHY OCCUPATION FAILS.
LOC7    243 PHYSICIAN'S ASSISTANT.

LOC6      1    WHY OCCUPATION FAILS.
LOC7    193 NURSE, REGISTERED.
LOC8      1    SPECIFICATIONS DO NOT FIT.
          0    SPECIFICATIONS FIT.
          0    SPECIFICATIONS FIT.
          0    SPECIFICATIONS FIT.
          0    SPECIFICATIONS FIT.
PRT4       PRINT OCCUPATION FIT - NO FIT.
LOC6      2    CHANGE SPECIFICATIONS.
LOC3      1    INCOME.
          8    INTEREST FIELD.
          4    HELPING OTHERS.
          5    SECURITY.
          2    PRESTIGE.
LOC4    127 CIVIL ENGINEER.
        143 FORESTER
        159 PHYSICIAN
        180 PHARMACIST.
        199 SOIL CONSERVATIONIST.
        221 TEACHER, BIOLOGY.
        243 PHYSICIAN'S ASSISTANT.
PRT2        PRINT OCCUPATION MEET SPECS.
LOC6      4    MOVE OUT OF LOCATE.
LOC9      2    GET MORE INFORMATION-CORRECT.
COMPIN  13:19
SAVE    127 CIVIL ENGINEER.
        143 FORESTER
        159 PHYSICIAN
        180 PHARMACIST.
        199 SOIL CONSERVATIONIST.
        221 TEACHER, BIOLOGY.
        243 PHYSICIAN'S ASSISTANT.
LOC2    193 NURSE, REGISTERED.
COMP4     1    DEFINITION OF OCCUPATION?
PRT5        PRINT QUESTION & ANSWER FRAME.
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```
          CAI WHY KNOW VALUES.
          CAI IMPORTANT VALUES.
          CAI JOB VALUE FIT.
          CAI SECOND STEP.

          3    MORE THAN $11,000.
          1    SCIENTIFIC.
          2    AVERAGE AMOUNT.
          3    MORE THAN AVERAGE AMOUNT.
          2    AVERAGE AMOUNT.
        129 DENTIST                          132 DIETITIAN
        145 HOME ECONOMIST                   149 INDUSTRIAL ENGINEER
        161 METEOROLOGIST                    177 PUBLIC HEALTH SPECIA
        188 PSYCHOLOGIST.                    199 SOIL CONSERVATIONIST
        217 VETERINARIAN.                    243 PHYSICIAN'S ASSISTAN

          LIMIT OF EDUCATION.
          WHERE NEXT IN LOCATE.


          WHERE NEXT IN LOCATE.

          TEST OCCUPATION FOR FIT.
          TEST OCCUPATION FOR FIT.
          TEST OCCUPATION FOR FIT.
          TEST OCCUPATION FOR FIT.
          TEST OCCUPATION FOR FIT.

          WHERE NEXT IN LOCATE.
          2    MORE THAN $8,000.
          1    SCIENTIFIC.
          2    AVERAGE AMOUNT.
          3    MORE THAN AVERAGE AMOUNT.
          2    AVERAGE AMOUNT.
        129 DENTIST                          132 DIETITIAN
        145 HOME ECONOMIST                   149 INDUSTRIAL ENGINEER
        161 METEOROLOGIST                    177 PUBLIC HEALTH SPECIAL
        188 PSYCHOLOGIST.                    193 NURSE, REGISTERED.
        205 SPEECH PATHOLOGIST/AUDIOLOGIST.  217 VETERINARIAN.
        227 TEACHER, MATHEMATICS.            229 TEACHER, PHYSICAL SCI

          WHERE NEXT IN LOCATE.
          CAI NEXT DECISION STEP.

        129 DENTIST                          132 DIETITIAN
        145 HOME ECONOMIST                   149 INDUSTRIAL ENGINEER
        161 METEOROLOGIST                    177 PUBLIC HEALTH SPECIAL
        188 PSYCHOLOGIST.                    193 NURSE, REGISTERED.
        205 SPEECH PATHOLOGIST/AUDIOLOGIST.  217 VETERINARIAN.
        227 TEACHER, MATHEMATICS.            229 TEACHER, PHYSICAL SCI

        243 PHYSICIAN'S ASSISTANT.           177 PUBLIC HEALTH SPECIALIST.
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Figure 1, page 2

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COMP4    2    DESCRIPTION OF WORK ACTIVITIES?
PRTS          PRINT QUESTION & ANSWER FRAME.
COMP4    4    WHERE TO GET MORE INFORMATION?
PRTS          PRINT QUESTION & ANSWER FRAME.
COMP4    8    PERSONAL QUALIFICATIONS?
         10   BEGINNING SALARY?
PRTS          PRINT QUESTION & ANSWER FRAME.
COMP4    11   AVERAGE INCOME-HIGH INCOME?
PRTS          PRINT QUESTION & ANSWER FRAME.
COMP4    12   TOP SALARY POSSIBILITIES?
         13   HOW SALARIES VARY?
         16   WHAT FIELDS OF INTEREST?
         27   ADVANCEMENT?
SAVE     127 CIVIL ENGINEER.          129 DENTIST                  132 DIETITIAN
         143 FORESTER                 145 HOME ECONOMIST           149 INDUSTRIAL ENGINEER
         159 PHYSICIAN                161 METEOROLOGIST            177 PUBLIC HEALTH SPECIALITST.
         180 PHARMACIST.              188 PSYCHOLOGIST.            193 NURSE, REGISTERED.
         199 SOIL CONSERVATIONIST.    205 SPEECH PATHOLOGIST/AUDIOLOGIST.  217 VETERINARIAN.
         221 TEACHER, BIOLOGY.        227 TEACHER, MATHEMATICS.    229 TEACHER, PHYSICAL SCIENCE.
         243 PHYSICIAN'S ASSISTANT.
OCC2     193 NURSE, REGISTERED.       142 FLIGHT ATTENDANT         102 ADVERTISING COPYWRITER.
COMP4    1    DEFINITION OF OCCUPATION?
         11   AVERAGE INCOME-HIGH INCOME?
         23   FRINGE BENEFITS?
         7    RELATED COLLEGE COURSES?
         5    EDUCATION REQUIRED-EARLY ENTRY?
SAVE     102 ADVERTISING COPYWRITER.  127 CIVIL ENGINEER.          129 DENTIST
         132 DIETITIAN                142 FLIGHT ATTENDANT         143 FORESTER
         145 HOME ECONOMIST           149 INDUSTRIAL ENGINEER      159 PHYSICIAN
         161 METEOROLOGIST            177 PUBLIC HEALTH SPECIALITST.  180 PHARMACIST.
         188 PSYCHOLOGIST.            193 NURSE, REGISTERED.       199 SOIL CONSERVATIONIST.
         205 SPEECH PATHOLOGIST/AUDIOLOGIST.  217 VETERINARIAN.    221 TEACHER, BIOLOGY.
         227 TEACHER, MATHEMATICS.    229 TEACHER, PHYSICAL SCIENCE.  243 PHYSICIAN'S ASSISTANT.

OCC2     193 NURSE, REGISTERED.       175 PURCHASING AGENT.        201 SECRETARY.
COMP4    1    DEFINITION OF OCCUPATION?
         11   AVERAGE INCOME-HIGH INCOME?
         13   SPECIAL PROBLEMS?
         26   JOB SECURITY?
TRY1     4    SATISFACTIONS AND REWARDS.        CAI COMPARE 1ST STEP.
TRY2     6    OCCUPATION WHICH SATISFY VALUES.  CAI COMPARE 2ND STEP.
TRY3     1    GET LOTS OF INFORMATION.          CAI COMPARE 3RD STEP.
TRY4     7    PREPARE FOR DIFERENT OCCS.        CAI COMPARE 4TH STEP.
         2    ESTIMATE CHANCES OF SUCCESS.      CAI COMPARE 4TH STEP.
TRY5     5    STATE EMPLOYMENT AGENCY.          CAI COMPARE 5TH STEP.
         7    PREPARE FOR DIFERENT OCCS.        CAI COMPARE 5TH STEP.
LOGOUT   13:51
ENDFIL
```


Figure 1, page 3

```
DK2:[1,13]
                15:52          04-Jan-77

DATE    05-Dec-75
INTIN   10:58
STATUS   4     PREDICTION.
INTR4    3     COMPLETED 1 OR MORE SEMESTERS.
PREDIN  10:59
RANK     1     TOP FIFTH.
MATH     2     MOSTLY B'S.
ENG      1     MOSTLY A'S.
ENGH     2     NO.
PRED2  174     NURSING:
PRED4    1     ABOVE AVERAGE.
         1     ABOVE AVERAGE.
         2     AVERAGE.
         1     ABOVE AVERAGE.
PRED5    2     B.
PRED6   65     CHANCE OF A OR B.
        25     CHANCE OF C.
        10     CHANCE BELOW C.
PRED10  1      CORRECT.
PRT6           PRINT PREDICTION TABLE.
PRED11  4      CHANCES GOOD OR BAD.
PRED36  1      CORRECT NUMBER = 1.
PRED37  7      HIT-CORRECT.
PRED38  2      NO-CORRECT.
PRED40  2      MISS-WRONG.
PRED41  2      MISS-CORRECT.
PRED42  2      NO-CORRECT.
PRED43  1      YES-CORRECT.
PRED44  2      NO-CORRECT.
PRD44A  2      PROBABILITY-CORRECT.
PRED45  1      CORRECT NUMBER = 10.
PRED47 60      CORRECT NUMBER = 70.
PRED23  1      YES-WRONG.
PRED24  2      NO-CORRECT.
PRED25  2      NO-CORRECT.
PRED26  1      YES-CORRECT.
PRED27  1      YES-CORRECT.
PRED28  2      BAD-CORRECT.
PRED29  1      GOOD-CORRECT.
PRED2  118     BUSINESS ADMINISTRATION:
PRED4    2     AVERAGE.
         2     AVERAGE.
         2     AVERAGE.
         2     AVERAGE.
PRED5    2     B.
PRED6   40     CHANCE OF A OR B.
        30     CHANCE OF C.
        30     CHANCE BELOW C.
PRED2  182     PHYSICIAN'S ASSISTANT:
PRED4    1     ABOVE AVERAGE.
         1     ABOVE AVERAGE.
         1     ABOVE AVERAGE.
         2     AVERAGE.
PRED5    2     B.
PRED6   55     CHANCE OF A OR B.
        35     CHANCE OF C.
```

ENROLLMENT.

RANK IN CLASS.
HIGH SCHOOL MATH GRADE.
HIGH SCHOOL ENGLISH GRADE.
NEED HELP WITH ENGLISH?
BY 110, GENERAL BIOLOGY
FACTOR #1 - INTEREST.
FACTOR #2 - COMMITMENT.
FACTOR #3.
FACTOR #4.
SELF ESTIMATED GRADE.
CHANCES IN 100 FOR AN "A-B".
CHANCES IN 100 FOR A "C".
CHANCES IN 100 FOR "BELOW C".
UNDERSTAND C OR BETTER.

QUESTIONS IN PREDICTION.
CAI HOW MANY BULL'SEYES.
CAI HOW MANY HIT TARGET.
CAI KNOW NEXT OUTCOME.
CAI HOW WOULD YOU BET.
CAI BULL'S EYE OR MISS MORE.
CAI EXPECT 10 BULL'S EYES.
CAI COUNT ARCHERY OUTCOMES.
CAI COUNT FUTURE OUTCOMES.
CAI PROBABILITY STATEMENT.
CAI CHANCES BULL'S EYE.
CAI CHANCES FOR A HIT.
CAI IS PRED. GOOD OR BAD?
CAI AGREE GOOD CHANCES OF HIT.
CAI FAINTHEART SAID GOOD.
CAI REDBLOOD SAID GOOD.
CAI ARCHER SAID GOOD.
CAI CHANCES IF TINY REWARD.
CAI CHANCES IF BIG REWARD.
BA 211, ACCOUNTING
FACTOR #1 - INTEREST.
FACTOR #2 - COMMITMENT.
FACTOR #3.
FACTOR #4.
SELF ESTIMATED GRADE.
CHANCES IN 100 FOR AN "A-B".
CHANCES IN 100 FOR A "C".
CHANCES IN 100 FOR "BELOW C".
BY 251, ANATOMY & PHYSIOLOGY
FACTOR #1 - INTEREST.
FACTOR #2 - COMMITMENT.
FACTOR #3.
FACTOR #4.
SELF ESTIMATED GRADE.
CHANCES IN 100 FOR AN "A-B".
CHANCES IN 100 FOR A "C".

Figure 1, page 4

```
          10   CHANCE BELOW C.                    CHANCES IN 100 FOR "BELOW C".
PRED2     193  REGISTERED NURSING:                BY 251, ANATOMY & PHYSIOLOGY
PRT6           PRINT PREDICTION TABLE.
PLNIN     1;27
SAVE      102  ADVERTISING COPYWRITER.            127 CIVIL ENGINEER.          129 DENTIST
          132  DIETITIAN                          142 FLIGHT ATTENDANT         143 FORESTER
          145  HOME ECONOMIST                     149 INDUSTRIAL ENGINEER      159 PHYSICIAN
          161  METEOROLOGIST                      175 PURCHASING AGENT.        177 PUBLIC HEALTH SPECIALIST.
          180  PHARMACIST.                        188 PSYCHOLOGIST.            193 NURSE, REGISTERED.
          199  SOIL CONSERVATIONIST.              201 SECRETARY.               205 SPEECH PATHOLOGIST/AUDIOLOGIST.
          217  VETERINARIAN.                     221 TEACHER, BIOLOGY.        227 TEACHER, MATHEMATICS.
          229  TEACHER, PHYSICAL SCIENCE.        243 PHYSICIAN'S ASSISTANT.
PLN2      201  SECRETARY.                             OCCUPATION TO BE PLANNED FOR.
PLN13     1    YES, I AM WILLING.                     WILLING-TERMINAL OCC?
PLN15     1    YES, I HAVE THE ABILITY.               ABILITY-TERMINAL OCC.
PLN3      2    PLAN FOR THIS OCCUPATION.              WANT TO SEE RISK DISPLAYS?
PLN23     2    NO.                                    FOLLOW THIS PROGRAM OF STUDY?
PLN21     2    NO, EDUCATION NO PROBLEM.              TOO MUCH EDUCATION.
SAVE      102  ADVERTISING COPYWRITER.            127 CIVIL ENGINEER.          129 DENTIST
          132  DIETITIAN                          142 FLIGHT ATTENDANT         143 FORESTER
          145  HOME ECONOMIST                     149 INDUSTRIAL ENGINEER      159 PHYSICIAN
          161  METEOROLOGIST                      175 PURCHASING AGENT.        177 PUBLIC HEALTH SPECIALIST.
          180  PHARMACIST.                        188 PSYCHOLOGIST.            193 NURSE, REGISTERED.
          199  SOIL CONSERVATIONIST.              201 SECRETARY.               205 SPEECH PATHOLOGIST/AUDIOLOGIST.
          217  VETERINARIAN.                     221 TEACHER, BIOLOGY.        227 TEACHER, MATHEMATICS.
          229  TEACHER, PHYSICAL SCIENCE.        243 PHYSICIAN'S ASSISTANT.
PLN2      193  NURSE, REGISTERED.                     OCCUPATION TO BE PLANNED FOR.
PLN12     2    TAKE THE 4 YEAR PROGRAM.
PLN10     1    YES, SPEND THE TIME.                   WILLING-BACHELOR OCC?
PLN11     1    YES, I HAVE THE ABILITY.               ABILITY-BACHELOR OCC.
PLN3      1    SEE DISPLAYS.                          WANT TO SEE RISK DISPLAYS?
PLN4      1    PLAN FOR THIS OCCUPATION.              WHAT IS YOUR CHOICE?
PLN23     1    YES.                                   FOLLOW THIS PROGRAM OF STUDY?
PLN24     1    YES.                                   COMPLETE PREREQUISITES.
PLN25     1    YES, SEE THE INFORMATION.              FINANCIAL AID INFORMATION?
PLN19     2    NO, CONTINUE.                          SEE THE 2 YEAR PROGRAM?
STRIN     1;52
STR3      1    VALUES ARE IMPORTANT-CORRECT.          CAI BEGIN DECISION MAKING.
STR4      2    HOW CAR FITS VALUES-CORRECT            CAI WHAT SHOULD YOU DO NEXT?
STR5      1    RATES MORE ON PERFORM.-CORRECT.        CAI PERFORMANCE OR PRICE?
STR6      1    WEIGHT TIMES RATING-CORRECT.           CAI VALUE X RATING OR 1 VALUE?
STR7      2    SUM PRODUCTS FOR CAR CORRECT-C         CAI FINISH THE THOUGHT.
STR8      2    NO-CORRECT.                            CAI IS THRUST BEST FOR ALL?
STR9      1    YES-CORRECT.                           CAI FIT VALUES OF A 3RD PERSON?
STR10     1    DIFFERENT RATINGS-WRONG.               CAI WHY SUMS DIFFER.
STR11     1    SEE VALUE WEIGHTS.                     DO YOU WANT TO REVIEW WEIGHTS?
VALS      7    INCOME.
          4    PRESTIGE.
          1    INDEPENDENCE.
          5    HELPING OTHERS.
          3    SECURITY.
          8    VARIETY.
          7    LEADERSHIP.
          6    INTEREST FIELD.
          2    LEISURE.
          2    EARLY ENTRY.
VAL6      6    INCOME.
          4    PRESTIGE.
          1    INDEPENDENCE.
          5    HELPING OTHERS.
```


Figure 1, page 5

```
          5    SECURITY.
          3    VARIETY.
          3    LEADERSHIP.
          8    INTEREST FIELD.
          3    LEISURE.
          2    EARLY ENTRY.
SAVE    102 ADVERTISING COPYWRITER.          127 CIVIL ENGINEER.                  129 DENTIST
        132 DIETITIAN.                       142 FLIGHT ATTENDANT                 143 FORESTER
        145 HOME ECONOMIST                   149 INDUSTRIAL ENGINEER              159 PHYSICIAN
        161 METEOROLOGIST                    175 PURCHASING AGENT.                177 PUBLIC HEALTH SPECIALIST.
        180 PHARMACIST.                      188 PSYCHOLOGIST.                    195 NURSE, REGISTERED.
        199 SOIL CONSERVATIONIST.            201 SECRETARY.                       205 SPEECH PATHOLOGIST/AUDIOLOGIST.
        217 VETERINARIAN.                    221 TEACHER, BIOLOGY.                227 TEACHER, MATHEMATICS.
        229 TEACHER, PHYSICAL SCIENCE.       243 PHYSICIAN'S ASSISTANT.
STR12   243 PHYSICIAN'S ASSISTANT.                 OCCUPATION-FIRST CHOICE.
STR14   193 NURSE, REGISTERED.              124    OCCUPATION WEIGHTED VALUES.
        243 PHYSICIAN'S ASSISTANT.          118    OCCUPATION WEIGHTED VALUES.
        175 PURCHASING AGENT.               .80    OCCUPATION WEIGHTED VALUES.
STR16     1    YES-WRONG.                         CAI GO FOR IMPOSSIBLE OCC.
STR17     2    NO-CORRECT.                        CAI CHOOSE LEAST DESIRABLE OCC.
STR18     1    ARTICIAN 168-CORRECT.              CAI OCCUPATION-GREATEST REWARD.
STR19     1    ARTICIAN 1 CHANCE-CORRECT.         CAI OCCUPATION-MOST RISK.
STR20     2    NO-WRONG.                          CAI BEST REWARD AND LEAST RISK.
STR21     2    ?-CORRECT.                         CAI WHICH ONE WOULD YOU CHOOSE?
STR22     1    YES-WRONG.                         CAI RULE 62 WORK.
STR26     1    YES.                               READY TO ESTIMATE?
          1    YES.                               READY TO ESTIMATE?
          1    YES.                               READY TO ESTIMATE?
STR23   193 NURSE, REGISTERED.              80     EST. CHANCES FOR ENTERING OCC.
        243 PHYSICIAN'S ASSISTANT.          75     EST. CHANCES FOR ENTERING OCC.
        175 PURCHASING AGENT.               50     EST. CHANCES FOR ENTERING OCC.
STR24   193 NURSE, REGISTERED.                     NOW I WOULD SELECT THIS OCC.
PRT12       PRINT FIRST CHOICE OCCUPATION.
STR25     2    NO, SKIP THIS INFORMATION.         WHAT PREDICTIONS TO ASK FOR.
EXIN    12:26
EX?       2    VALUES.                            WHAT TO DO NEXT?
VALIN   12:27
VAL5      6    INCOME.
          4    PRESTIGE.
          1    INDEPENDENCE.
          5    HELPING OTHERS.
          5    SECURITY.
          3    VARIETY.
          3    LEADERSHIP.
          8    INTEREST FIELD.
          3    LEISURE.
          2    EARLY ENTRY.
VAL6      6    INCOME.
          4    PRESTIGE.
          1    INDEPENDENCE.
          5    HELPING OTHERS.
          5    SECURITY.
          3    VARIETY.
          3    LEADERSHIP.
          8    INTEREST FIELD.
          3    LEISURE.
          2    EARLY ENTRY.
EXIN    12:29
EX?       1    SIGN OFF.                          WHAT TO DO NEXT?
SO2       1    YES, SEE THE DISPLAY.              DISPLAY OF OCCS. NOT IN SIGI.
LOGOUT  12:30
ENDFIL
```

Figure 1, page 6

DEFINITION AND DESCRIPTION
(1) Definition of occupation?
(2) Description of work activities?
(3) Level of skill in interacting
(4) with data, people, things?
(4) Where to get more information?

EDUCATION, TRAINING, OTHER REQUIREMENTS
(5) Early Entry: Education required?
(6) Specific occupational training?
(7) Examples of college courses?
(8) Personal qualifications?
(9) Other requirements?

INCOME (National figures)
(10) Beginning salary?
(11) Average income? (Shows the mid-point of salaries nationwide)
(12) Top salary possibilities?
(13) How salaries vary?

PERSONAL SATISFACTIONS
(14) Help others: Chances to help?
(15) Leadership: Chances to lead?
(16) Interest Field: Which field?
(17) Prestige level?
(18) Special problems?

CONDITIONS OF WORK
(19) Physical surroundings?
(20) Leisure: hours, vacation?
(21) Independence on the job?
(22) Variety?
(23) Fringe benefits?

OPPORTUNITIES AND OUTLOOK
(24) National employment outlook?
(25) Where are the jobs (U.S.)?
(26) Security in the occupation?
(27) Advancement?
(28) How many women?

You can pick 5 questions at a time. Press the number of your first question.
The number you select will be repeated here so that you can check it:
If you make a mistake, press RUBOUT and start over. When finished, press NEXT.

Figure 2. Questions the student can ask in Compare.

DEFINITION OF OCCUPATION?

175 Purchasing Agent

Purchases materials, supplies, services, and equipment for a company.

193 Nurse, Registered

A professional nurse (RN) administers nursing care to patients following a doctor's instructions. May supervise licensed practical nurses, aides and orderlies. May work in a hospital, nursing home, on private duty, or as a public health, school or industrial nurse.

243 Physician's Assistant

Assumes many tasks once performed only by the physician. Works under supervision of licensed physician to extend medical services. May specialize in surgery, pediatrics, family or internal medicine, etc.

For a copy of this information, press PRINT; otherwise press NEXT.

Figure 3. An answer to a question in Compare.

NURSING: BY 110, General Biology

PAST PERFORMANCE: Class rank: First fifth
Math grade: B
English grade: A
Need help with English: No

GRADE FACTORS:	(1) Above average	(2) Average	(3) Below avera
Interest in subject area	X		
Commitment to program	X		
Third factor		X	
Fourth factor	X		

PERCENT OF PREVIOUS STUDENTS RECEIVING VARIOUS GRADES:

Grade	Percent of students receiving grade
GROUP (1) A+, A, A-	********** (22%)
GROUP (2) B+, B, B-	********** (28%)
GROUP (3) C+, C, C-	********** (30%)
GROUP (4) W/Below C	********* (20%)

Which GROUP (1-4) do you think your grade will be in? Press that number.

Figure Display that the student uses as the basis for estimating her grade.

Program: Key Course	Chances in 100 for a Grade of: A to B	C	W/Below C
Nursing: BY 110, General Biology	65	25	10

Press the number (1-5) of the question you want to ask.

(1) What does "Chances in 100" mean?
(2) What are my chances of passing this course?
(3) How can I predict what grade I will get in this course?
(4) How can I tell whether my chances are good or bad?
(5) SIGI and I disagree about the predictions. Is SIGI right or am I right?

Figure 5. Questions the student may ask about predictions.

201 SECRETARY

You do not have to go to college to become a secretary. Better jobs are easier to get, however, if you have received the Associate degree. For best preparation, you should:

1. Enroll in the secretarial studies program at a community college.

2. Try to get a summer or part-time job in an office so that you gain experience in typing, stenography, and office practice.

3. Make sure you fulfill requirements for the Associate degree.

For a copy press PRINT; otherwise press NEXT.

Figure 6. Planning system display summarizing a path to entry into an occupation.

201 SECRETARY

High School Prerequisites for This Program

There are no prerequisites for admission to this program at Santa Fe Community College. It would be helpful to the student if he/she had completed courses in typing, shorthand, office machines, English and speech before entering the program, but such courses are not absolutely necessary.

If there are prerequisites for this program and you have not completed them, you may not be allowed to take some of the courses in your program of study. You will have to take lower level courses first, and this will put you behind schedule. You can:

1. Get back on schedule by making up work in summer school.
2. Take longer to graduate.
3. Get back on schedule by taking extra courses during a semester.

Each case is different. SEE YOUR COLLEGE COUNSELOR OR COLLEGE ADVISER.

You will want a copy of this information. Press PRINT.

Figure 7. Planning system display showing prerequisites for admission into a program at the student's college.

201 SECRETARY

A suggested Secretarial program includes:

6 sem. hrs. Communic./Humanities

6 sem. hrs. Math/Science

MS 190 Business Math
Math/Science Elective

6 sem. hrs. Social/Behavioral Sci.

ES 110 Basic Economics
Social/Behavioral Science Elect.

Completion of the following courses:

BA	101	Intro. to Business	BA	220	Adv. Typewriting
BA	102	Basic Business Writing OR	BA	230	Dictation & Transcription II
EH	111	Lab in Communication Skills	BA	111	Intro. to Data Processing OR
BA	120	Elementary Typewriting	BA	240	Prin. of Management
BA	121	Intermediate Typewriting	BA	225	Prof. Typewriting
BA	130	Elementary Shorthand I	BA	232	Machine Transcription
BA	131	Elementary Shorthand II	BA	231	Secretarial Procedures
BA	132	Dictation & Transcription I	BA	270	Business Law
BA	140	Office Machines			
BA	160	Basic Accounting I			

For a copy press PRINT.

Figure 8. Planning system display showing the courses recommended by the student's college as preparation for an occupation.

	VALUE	WT.	OCCUPATION					
			RN		PhyAst		PurAgt	
(1)	High Income	6	3	18	3	18	4	24
(2)	Prestige	4	3	12	3	12	2	8
(3)	Independence	1	2	2	2	2	3	3
(4)	Help Others	5	4	20	4	20	1	5
(5)	Security	5	3	15	3	15	2	10
(6)	Variety	3	3	9	3	9	2	6
(7)	Leadership	3	3	9	3	9	2	6
(8)	Interest Field	8	3	24	3	24	1	8
(9)	Leisure	3	3	9	1	3	2	6
(10)	Early Entry	2	3	6	3	6	2	4
		SUM =		124		118		80

Your weight for Income (6) x the rating of RN On Income (3) = 18, etc.

The sum of the products appears at the bottom of each column.
The occupation with the highest sum is probably the one that would fit your values best. The highest possible sum is 168; the lowest is 40.
In general, a difference of 10 points or more between sums is significant.

You will want a copy of this chart. Press PRINT.

Figure 9. Desirability Sums computed in Strategy.

What do you want to do next?

(1) Sign off.

(2) Go to VALUES and examine your Values again.

(3) Go to LOCATE and look for occupations that fit your Values.

(4) Go to COMPARE and ask questions about occupations.

(5) Go to PREDICTION and get probabilities of success in key courses for various programs of study.

(6) Go to PLANNING and plan how to prepare for various occupations.

(7) Go to STRATEGY and see which occupations fit your Values best and also learn a method of choosing an occupation.

Figure 10. Menu (called "EXIT") that allows the initiate to move at will among the SIGI subsystems.

CHAPTER III

REVIEW OF THE LITERATURE

Writings about career development and guidance often refer to the process of career decision-making; but a process is very difficult to observe. It is not surprising, therefore, that attempts to describe the career decision-making process more frequently focus on the content of decisions. Thus, career-related choices or preferences are commonly related to antecedent or concurrent characteristics of persons. Project TALENT represents this kind of research on a massive and comprehensive scale (e.g., Flanagan, Tiedeman, and others, 1973). But the content of decisions and the characteristics of decision-makers are not the same as the process of career decision-making, nor are they adequate for inferring process. Nowhere do such studies provide a description of the actual behavior of persons engaged in deciding about careers; they miss the dynamics of the decision process.

Differences in the Characteristics of Decision-Makers

Decision-makers differ in so many ways that they can be studied on almost any characteristic that strikes the researcher as relevant. For convenience this review groups the studies into four classes: differences with respect to (a) sex, (b) socio-economic status, (c) race/ethnicity, and (d) career expectations. There is, of course, much overlap. Studies of sex differences are far more numerous than studies in the other areas, partly because sex differences seem easy to get at and partly because the "women's movement" has focused attention on the subject.

Sex differences. The conventional wisdom with regard to sex differences is that women are more "social" than men, and that men score higher in such "hard" areas as money and power. Often, however, there is such ambiguity in terminology (especially with respect to values) that a reviewer is uncertain as to what differences the researcher was seeking or whether two researchers who use the same word meant the same thing. For example, Rokeach

Courageous, Helpful, Honest, Independent, Intellectual, Obedient, Polite, Responsible, and Self-Controlled.

One may ask whether the differences found by Rokeach are comparable to those found by Allport, Vernon, and Linzey (1970), who reported that in most studies women score higher than men on social, aesthetic, and religious scales and lower on theoretical, economic, and political scales.

An opinion survey more directly concerned with career decision-making was conducted by the Yankelovich group (1972) on a population of college students. Included was a comparison of responses of men and women to questions about "factors important to career choice." More women than men thought that Make a contribution and Challenge of the job would exert a strong influence on their career choice. The sexes were tied on the influence of self-expression. And more men than women would be influenced by Job security, Chance to get ahead, Money, and Prestige.

College freshmen who had been a part of a national sample of high school juniors were followed up by a questionnaire which included weighting of values (Norris and Katz, 1970). While the usual sex differences appeared, men giving higher weight to income and prestige and women to helping others, the more striking differences were consistent with intended major field, regardless of sex. In addition, this study included factor analyses that indicated a somewhat different factor structure of values for each sex.

Some studies have been concerned with only a single value or with special values. For example, Barnett (1975) found differences in attitude toward prestige. A stronger relationship existed between occupational preference and prestige for men than for woman. The finding held up for all age groups from 9 to 17. Fox (1976), after a review of the literature pertaining to sex differences and willingness to pursue education in mathematics, suggested "that autonomy and independence are associated with both career interest and mathematical competence" (p. 7). Males almost invariably outperform females on tests of mathematical competence. Blum (1975) found no overall sex differences in a group of college juniors and seniors in scores on an inventory designed to measure desire for security in job or occupation, and concluded that security was apparently not a value linked with sex stereotypes. This conclusion seems at odds with the findings of the Yankelovich (1972) survey, referred to above, which reported that more men than women would be influenced by job security in their choice of career.

In a pilot study of sex-role values as a factor in career decision-making, Tittle, Chitayat, and Denker (1977) found differences in the way males and females weighted a set of "marriage" values, a set of "parenthood" values, and the ten SIGI occupational values. Subjects were 98 eleventh-grade students.

Females tended to weight A close relationship a little higher as a marriage value than males weighted it; they also weighted Joy higher as a parenthood value, whereas males weighted Future security higher than females did (although much lower than Joy). As to occupational values, females conformed to the usual pattern by weighting Helping Others higher than did the males.

These studies all sampled a population at a single point in time. Gribbons and Lohnes (1968) were able to follow a sample over successive stages of the decision-making process. In general, they found sex differences too slight to warrant separate analysis by sex in their small sample of students (about 100). Recognizing the central importance of values, they did create "value hierarchies" for each age and sex by ranking 12 values according to the number of subjects mentioning each value. Obviously, this procedure "involves the popularity of a value category rather than the intensity with which it is employed by those who use it" (p. 83). This procedure differs from that of SIGI not only in the values dimensions used but also in the method of assessing them (in SIGI, students weight each value to indicate its importance and then reweight it after closer scrutiny). Gribbons and Lohnes reported some sex differences of the sort that fit the stereotypes: more males mentioned salary and prestige, more females personal contact and social service, but substantial numbers of the "other" sex mentioned these sex-stereotyped values, too.

Singer and Stefflre (1954), like Gribbons and Lohnes, used frequency of choice to study similarities and differences between the job values of high school senior males and females. Their procedure involved a questionnaire asking students to rate the "kind of job" that would be chosen first, rather than the open-ended interview procedure of Gribbons and Lohnes. Their findings, however, resembled those of Gribbons and Lohnes, despite differences in values dimensions, techniques, time, and samples: more males chose power, profit, and independence; more females chose interesting experience and social service. Wagman (1965) used the same questionnaire as Singer and Stefflre in a study of college sophomores. Again, the stereotypes prevailed. Significantly more men chose profit and esteem, and more women chose social service.

Not all studies conclude that sex differences exist to any important degree. Maccoby and Jacklin (1974) found no significant differences in the self-confidence of the two sexes and concluded that the belief that women are more "social" is unfounded. And although they found differences in their study, Gribbons and Lohnes also concluded that "the comparison of the final hierarchies of the two sexes...is dominated by the similarities rather than the differences" (p. 86).

Differences due to socioeconomic status. Osipow (1973), in summarizing research related to class membership, observed

that both sex and social class identity influenced career development by affecting attitudes towards careers and by limited economic resources that can be allocated to career preparation. Osipow concluded that research in minority group status is confounded by race, social class, ethnicity, educational levels and economic conditions.

Osipow might also have mentioned that research in the area is not sharply focused. Thus Clark (1967) compared middle class and lower class boys with respect to career preference and found that the middle class subjects were likely to prefer professional careers, whereas the lower class members were more likely to choose "government" jobs. Lunneborg and Lunneborg (1968) found that parents' occupation, especially the father's, affected the accuracy of predictions of "success" in certain college courses. Mulvey (1963) concluded that parents' socioeconomic status did not affect career patterns of women.

There also appear to be some interactions between sex and socioeconomic status. Campbell and Parsons (1972), comparing non-disadvantaged and disadvantaged junior high school students on their responses to Crites' Vocational Development Inventory, found not only that the nondisadvantaged scored higher, but also that disadvantaged males tended to choose occupations in the technical area, whereas others chose occupations related to services. Entwisle and Greenberger (1972) also found interactions in the attitudes of ninth-graders towards women's work roles. Middle class boys with high IQ were least liberal; males were more conservative than females; middle class males were less supportive of women's achievement than were either women or lower class males; and blue collar adolescents were the most liberal of all towards career achievement for women.

Tittle, Chitayat, and Denker (1977) also found socioeconomic differences. Students in the middle group with regard to socioeconomic status weighted the occupational value Interest Field higher than did the lower SES members (no high SES subjects were included in the sample), and the middle group members also weighted Friendship higher as a "Parenthood" value and Challenge higher as a "Marriage" value.

Race/ethnic differences. Studies of race and ethnicity are fewer than those of socioeconomic status, and the results seem equally tentative. The pilot study of Tittle, Chitayat, and Denker included an examination of racial differences in the way subjects weighted the three sets of values related to career choice. Blacks tended to weight Security higher as a marriage value than did Whites or Hispanics; Hispanics gave highest weight to Companionship and lowest weight to Independence (from parents), an ordering different from that of the other two groups. Hispanics also weighted Friendship higher as a parenthood value and Interest Field higher as an occupational value. All groups

weighted Future Security low, but Whites weighted it lower than did Blacks or Hispanics.

Picou and Campbell (1975) compiled articles on career behavior of special groups. American Indians, Asian Americans, Mexican Americans, and women were included in the studies. The authors concluded that membership in such a group seems to influence choice of career as well as opportunities.

Career expectations. Not surprisingly, differences are also found in the way various groups look at career choice. For example, according to Strong and Campbell (1966), for men expressed interests are a major predictor of career choice; for women, career choice is more often based on sex, not individual interests. Psathas (1968) argued that some aspects of women's sex roles influence the kinds of occupations women enter and hence influence their career decisions.

In a project that examined career choice from a less theoretical point of view, Harmon (1970) studied 169 women 10 to 14 years after entrance into college. All had high scores on the social worker scale of the SVIB-W. The subjects were asked what their "usual occupation" was and were categorized as career or noncareer on the basis of their answers. The women classified as career had attended college longer than women in the other category, had worked longer after leaving college, had married later, had produced fewer children (who were born later in their mother's life), or had remained unmarried in greater numbers. There was no difference in the high school ranking of the two groups. Such differences in behavior with respect to careers may be related to differences in values. Allport, Vernon, and Linzey (1970) found that women with different value profiles made different educational and occupational choices. For example, women medical students differed from women graduate students in nursing and business and also from art students.

Differences in attitude toward career possibilities apparently begin early. In a study previously cited, Looft (1971) found that six-to-eight-year-old boys and girls responded differently when asked what they wanted to be when they grew up. Much variability was evident in the response of the boys, but 75% of the girls named only two occupations, teacher and nurse. Boys named occupations in 18 categories, girls in only 8. Tittle, Chitayat, and Denker (1977), in their pilot study of career decision-making, also concluded that stereotyping of occupations by sex begins at an early age. They believe that socioeconomic and cultural status are also relevant to the study of career choice, but that women's careers are relatively unpredictable compared with men's. When subjects were asked what effect children would have on their career plans, females were aware that the effect would be large and would force decisions about whether to stay home or to work, or whether to work full time

or part time. Males seemed to think the only effect would be to make them steadier and more responsible. Angrist (1969) makes an observation that more or less summarizes all these findings: For men, sex roles are seen in terms of occupations; for women, in terms of family.

One longitudinal study (Astin and Myint, 1971) followed 5,387 women who had been tested in 1960 in Project TALENT. The researchers used measures of abilities, interests, personality, background, and high school educational aspirations to assess the subjects five years beyond high school. They found (a) that scholastic aptitudes, especially ability in mathematics, were the best predictors of career orientation toward the sciences, social services, professions, and teaching; interests and personality measures were not good predictors; and (b) possession of a BA degree or attendance at college or graduate school were important predictors for separating women who went into the sciences, social services, and teaching occupations from women who were housewives or who performed office work; having the AA degree, being married, or producing children carried negative weights as predictors in these areas.

Estimation of ethnic and socioeconomic effects on career choice is clouded by the difficulties mentioned earlier. Gump and Rivers (1975), however, found that twice as many black women as white women wanted full time employment even though they were wives and mothers.

Stereotyping

Implicit--and often explicit--in all these studies is the great weight that role stereotyping carries in the decision-making process, especially sex-role stereotypes. Stereotyping clouds the vision of both the decision-maker and the researcher; it screens from the former the full range of options, and for the latter it means that in experimental studies the social forces leading to stereotypy are confounded with true group differences (if they exist). For example, none of the cited studies controlled for stereotyping--if, indeed, control is possible.

Stereotyping has another unfortunate consequence for research studies in that the researcher may be the victim of his own stereotypic prejudices. Sherman (1976) had the following reaction to her review of the literature about the biological factors that have been suggested to explain "cognitive differences" between the sexes:

> It would be difficult to find a research area more characterized by shoddy work, overgeneralization, hasty conclusions, and unsupported speculations. This is particularly unfortunate since biological factors in sex-related cognitive

> differences is a research area with considerable social risk to the female group. It is also unfortunate because the poor quality of the research introduces confusion and retards the evolution of intelligent, well-grounded opinions on this subject. (p. 40)

Fennema (1976) hypothesized that the apparent difference between males and females in mathematics ability in the later secondary school grades may be an artifact of inadequate research procedures. Males have taken far more math courses by then, so that the two populations being tested are different on that dimension.

The tendency to stereotype occupations by sex apparently begins quite early. (Maccoby and Jacklin, 1974; Schlossberg and Goodman, 1972; Looft, 1971). The main effect seems to be to cause boys and girls to view their future roles through different eyes. For boys, the adult role is seen in terms of occupations; for girls, in terms of family (Angrist, 1969; Iglitzin, 1972; Lipman-Blumen and Tickamyer, 1975). The result is rigidity in the approach to occupational choice. Fox (1976) observed that women base their career expectations on the women they see, but there are no good role models for them to imitate. Russo (1976) went farther and stated that even though women's options may be increased, owing to social changes, no real change will occur as long as motherhood is the chief aspect of sex typing and as long as raising well-adjusted children is women's main goal.

The Process of Career Decision-Making

The message conveyed by these reports is singularly unrewarding as far as the present study is concerned. The main message appears to be that if one looks for differences between groups, one is likely to find them. But for the most part these differences turn out to be differences in status, not process. That is, one can say, for example, that men and women differ in their values (however values are construed--there was much variability in the construct in these studies) or in their attitudes toward careers or in the actual occupations they enter. But there have been few attempts to study such variables in the context of the decision-making process.

The study of Gribbons and Lohnes (1968) mentioned above did attempt to relate "values hierarchies" to "occupational preferences," but that study differed from the present undertaking in such important respects as the definitions of the values dimensions, the procedures used to measure values, the ages of the students, the nature of the "treatment" in values clarification, and the further analysis of relationships between values and other variables in the career decision-making process. Further-

more, it is far from clear that the subjects in that study were actively engaged in career decision-making at the times the data were collected.

Another project that attempts to examine process is the pilot study of Tittle, Chitayat, and Denker (1977), also referred to earlier. The authors are concerned with sex roles, values, and career decision-making. With respect to sex roles, they accept that the normative areas for females are the marriage relationship, motherhood and child-rearing, and homemaking; for men they are education and occupations. One of the main purposes of their study is to identify sets of values that will serve the domains of marriage and parenting in the same way that occupational values serve the domain of occupations. Examples of marriage values are companionship, parenthood, security; examples of parenthood values are joy, challenge, and stability. The goal of the study is to develop a system of decision-making that will lead to sex equality, to decision-making without regard to gender, to the integration of work with other aspects of life that influence the choice of career.

The Tittle, Chitayat, and Denker study is, of course, provisional. Nevertheless, it has produced some tentative results. The authors found many of the usual sex differences, but also many similarities. They observe, "Thus, the choices that directly reflect the differances in sex roles for women and men continue to show differences, despite this preliminary evidence that many of the values or needs related to marriage, parenthood, and occupations may be evaluated similarly by the two sexes [p. 32]." Males weighted Fulltime career and Fulltime job higher than females weighted them; females weighted Parttime career and Parttime job higher than did males.

Other studies of the process have used different approaches. Jepsen (1975) tried to examine sex differences in developmental trends in career decision-making by administering questionnaires to males and females in three Wisconsin high schools, first at grade 9 and then at grade 12. A number of scales were derived to represent classes of behavior in the decision process, and change scores were derived by subtracting grade 9 from grade 12 status. Two of six occupational decision scores showed greater change for females than for males: the complexity of bases for choice (derived from Gribbons and Lohnes' interview schedule) and the extent of information-seeking activities. There appears to have been no treatment after administering the first questionnaire and before administering the second. Presumably, students at all three schools were exposed to similar guidance programs, but there is no information as to their content. At any rate, Jepsen attempted to measure concepts that may be deemed process variables--if a process can be assumed to have been going on.

Jepsen's attempt to identify and measure concepts is in keeping with the review of career decision-making theories by Jepsen

and Dilley (1974). Their armchair analysis found some consanguinity of concepts across various theories.

Lunneborg (1977) examined sex differences with regard to decision-making styles (Planning, Intuitive, and Dependent) as formulated by Miller and Tiedeman (1972). Three studies were reported on samples of college and high school students to test the hypothesis that females would rely more heavily on the Intuitive style and males more heavily on the Planning in their approach to career decisions. However, no sex differences were found in style, in vocational self-concept crystallization, or self-related vocational decisiveness. The Planning style was associated with such nonsexual factors as vocational decisiveness, the "Choice" stage of occupational choice, and stronger work values, particularly Management, Security, and Prestige.

The Lunneborg study apparently agrees with the opinion of Barrett and Tinsley (1977), who concluded that men and women college students were similar in their decision-making behavior, although no definitive statement was possible.

The impression left by all these studies is that they shine only a dim light on the career decision-making process. Evidently, differences exist between groups, but one cannot tell whether they are fundamental or a cultural byproduct. And do these differences between groups operate by restricting the number of options the groups see as available? Or do they actually affect the process whereby members of groups go about making decisions? For example, do more women than men lean toward "social" occupations and homemaking because they have been preconditioned to believe that these are the available options? Or do the women select these occupations because they process information in a distinctive manner? It is hard to tell from these studies; the studies underline the importance of looking at the process while it is going on rather than while it may be dormant or after it has been completed. Thus, one of the distinctive features of the present study is that the subjects were not just a cross-section of an age or grade group. They were all actively and consciously engaged in career decision-making at the time the data were collected. They were involved in a voluntary commitment to spend several hours of intensive thinking about their careers, including self-appraisal, identification and exploration of options, information-gathering, analysis, reasoning, and planning. As participants in the process of career decision-making, these college students may well provide us with more insight into the dynamic relevance of certain variables to career decisions.

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CHAPTER IV

PROCEDURES

Design

This research was conceived as a descriptive rather than an experimental study, and therefore there are no formal statements of hypotheses. It is essentially an observational study, using the unique window on the CDM process provided by SIGI. The plan was to obtain various kinds of data from a random sample of records of students' behavior in the CDM process, as represented by their interaction with SIGI. On the average, each record contains information on approximately four hours of student interaction. An example of a student record and explication of it is presented in Chapter II of this report. The data obtained from the student records were analyzed to examine age and sex differences in the career decision-making process.

A description of the SIGI variables taken directly from the record (or derived from it) and summary statistics for these variables are provided in Tables B1-B50. Where possible, variable names correspond to those given on the student record.

The variables are grouped into five main categories. The categories correspond to major subsystems of SIGI and represent crucial elements in the structure of career decision-making that is provided by SIGI.

Career Decision-Making Variables

Assessment of prior knowledge. In the Introduction to SIGI, there are four questions about the career decision-making process. They include the following:

INTR7 - Assessment of knowledge of values
INTR8 - Assessment of knowledge of occupations
INTR9 - Assessment of knowledge for predicting grades
INTR10 - Assessment of knowledge of plans

Responses to these "initial status" questions are used as covariates in analyzing the data obtained from five categories. These variables are described and tabulated in Tables B1-B4.

Category 1. Values clarification. The Values section of SIGI allows students to examine values relevant to CDM. Ultimately, students assign weights to 10 values dimensions to indicate the relative importance they attach to each dimension. Variables for this category show the amount of interaction students have with the Values system (END 5), and the degree to which their values are crystallized (RATIO, SDI, SDR, SKEWI,

SKEWR, CORRV). These variables are described in Tables B-5 through B-11. The weights assigned to the 10 SIGI values (VAL5, VAL6, as described in Tables B-12 through B-31, give a further picture of students' values.

Category 2. Information-seeking. Two sections of SIGI allow students to seek and obtain occupational information. In LOCATE, they select five values and specify for each one a minimum of return that they would accept from an occupation. In COMPARE, they ask questions about three occupations at a time. The variables in this category describe the amount of exploration students engage in (#LOC3) and the amount and kind of information sought about occupations (COMP4, #CAT, and #OCC2). These variables are described in Tables B-32 through B-35.

Category 3. Prediction. The Prediction section of SIGI enables students to obtain probability estimates of achieving various grades in key courses of programs that are preparatory for entry to occupations they select. The variables in this category indicate the number of programs for which predictions were requested (PRED2), and the number of questions asked about the concepts of probability and predicting grades (PRED11). These variables are described in Tables B-36 and B-37.

Category 4. Planning. The Planning section enables students to make step-by-step plans for entering occupations they select. Variables in this category describe the number of occupations for which plans are made (NPLN2), and the consistency with which an occupation that is planned for has appeared in other sections of SIGI (CONSIS). These variables are described in Tables B-38 and B-39.

Category 5. Occupational choice. The variables in this category come from the Strategy system, which brings students to grips with decision rules for selecting occupations on the joint criteria of desirability and probability. The variables describe the amount of interaction with this system and the kind of strategy students follow in selecting occupations (DES1, DES2, PROB1, PROB2, UTIL1, UTIL2, STR). These variables are described in Tables B-40 through B-46.

Other Variables. Other variables available from the SIGI record include: RANK, MATH, ENG, VAL3. These are described in Tables B-47 through B-50.

Sample

As part of a field test of SIGI, individual records of interactions were automatically collected on a five percent random sample of SIGI users at six colleges in different regions of the country, varying in size, setting, nature of population,

and so on. Five of these colleges are two-year institutions (Pasadena City College in California, Mercer County Community College in New Jersey, Eastfield College in Texas, Santa Fe Community College in Florida, and Delta College in Michigan), and one is a four-year college (Illinois State University).

A total sample of 433 complete individual records was drawn from the automatically collected data set. In drawing records from the five percent random sample at a college, consideration was given to obtaining adequate (though not necessarily equal) numbers of records in each age/sex group. The age and sex distribution of the sample and the number of records drawn from each of the six colleges are presented in Table a, b below.

SAMPLE SIZES (a) by Age & Sex
(b) by School

(a)

		SEX		
		Male	Female	
AGE	18 & under	46	94	140
	19 to 24	60	77	137
	25 & over	70	86	156
		176	257	433

(b)

School	N
Delta	97
Eastfield	60
Illinois	56
Mercer	70
Pasadena	64
Santa Fe	86
	433

There is little reason to suspect that SIGI users differ from the general college population in ways unrelated to career decision-making; no special screening procedures were used nor were special incentives provided. Therefore, our sample is likely to be a good representation of the population of college students who are ready and willing to engage in career decision-making activities.

TABLE B-1

INTR7 — Assessment of Knowledge of Values

In the Introduction to SIGI students are asked, "How well do you know what you want from an occupation?" There are four possible responses, namely:

(1) I have thought about my Values, and I know what I want from an occupation.

(2) I have not analyzed these Values carefully, but I have a general idea of what I want.

(3) I have seldom thought about my Values, but I would know what I want if I saw it.

(4) I have seldom thought about my Values, and I am in the dark about what I want.

AGE/SEX GROUP MEANS & STANDARD DEVIATIONS

SEX		AGE: 18 & under	AGE: 19-24	AGE: 25 & over	
Males	$\bar{X}$	2.20	2.35	2.03	2.10
	S.D.	.85	1.00	.94	.95
Females	$\bar{X}$	2.08	1.95	1.88	1.98
	S.D.	.86	.84	.71	.76
		2.12	2.12	1.90	
		.86	.85	.82	

FREQUENCY DISTRIBUTIONS FOR MALES & FEMALES

Response	Males F	Males %	Females F	Females %
(4)	28	15.9	18	7.0
(3)	14	8.0	18	7.0
(2)	96	54.5	162	62.8
(1)	38	21.6	60	23.3

TABLE B-2

INTR8 — Assessment of Knowledge of Occupations

In the Introduction system students are asked to show how much information they have about occupations. The four possible responses are:

(1) I can list at least three occupations that fit my Values, and I know a lot about them.

(2) I know one or two occupations that might fit my Values, and I know quite a lot about them.

(3) I know a lot about one or two occupations, but I am not sure they fit my Values.

(4) I need a lot of information about occupations that might fit my Values.

AGE/SEX GROUP MEANS & STANDARD DEVIATIONS

SEX		AGE: 18 & under	AGE: 19-24	AGE: 25 & over	
Males	$\bar{X}$	3.13	3.12	3.03	3.09
	S.D.	1.08	.97	1.05	1.03
Females	$\bar{X}$	3.12	3.15	3.31	3.19
	S.D.	.95	.92	.84	.91
		3.12	3.14	3.19	
		1.00	.94	.95	

FREQUENCY DISTRIBUTIONS FOR MALES & FEMALES

	Males		Females	
Response	F	%	F	%
(4)	85	48.3	127	49.2
(3)	38	21.6	63	24.4
(2)	36	20.5	60	23.3
(1)	17	9.7	8	3.1

TABLE B-3

INTR9 -- Assessment of Knowledge for Predicting Grades

In the Introduction system students are asked how well they can predict their grades in various programs at their college. The four possible responses are:

(1) I think I could predict my grades accurately in any program of study I might take.

(2) I think I could predict my grades accurately in one or two programs, but not in all.

(3) I have only a general idea of my grades in one or two programs.

(4) I can't predict my grades well in any program.

AGE/SEX GROUP MEANS & STANDARD DEVIATIONS

SEX		AGE: 18 & under	19-24	25 & over	
Males	$\bar{X}$	1.76	2.05	1.82	1.89
	S.D.	.81	.86	.83	.85
Females	$\bar{X}$	1.96	1.92	2.06	1.98
	S.D.	.63	.83	.93	.80
		1.89	1.98	1.96	
		.76	.86	.89	

FREQUENCY DISTRIBUTIONS FOR MALES & FEMALES

Response	Males F	Males %	Females F	Females %
(4)	9	5.1	11	4.3
(3)	27	15.3	48	18.6
(2)	75	42.6	124	48.1
(1)	65	36.9	75	29.1

TABLE B-4

INTR10 — Assessment of Knowledge of Plans

In the Introduction system students are asked, "Which of the following best describes the present state of your plans?" The three possible responses are:

(1) I know which program to enroll in, which courses to take, and most of the other steps necessary to reach my occupational goal.

(2) I have a general idea of which program would be best, but I am not sure what other steps are necessary to reach my occupational goal.

(3) I don't know which program to take. I need help in planning my education.

AGE/SEX GROUP MEANS & STANDARD DEVIATIONS

SEX		AGE: 18 & under	19-24	25 & over	
Males	$\bar{X}$	2.15	2.18	2.07	2.13
	S.D.	.72	.74	.76	.75
Females	$\bar{X}$	2.23	2.09	2.26	2.20
	S.D.	.69	.82	.78	.76
		2.21	2.13	2.17	
		.70	.79	.78	

FREQUENCY DISTRIBUTIONS FOR MALES & FEMALES

Response	Males F	Males %	Females F	Females %
(3)	62	35.2	105	40.7
(2)	75	42.6	100	38.8
(1)	39	22.2	53	20.6

Table B-5

END5 -- Number of Value Games Played

In the Values system students play a series of value games, each one of which involves accepting or rejecting an imaginary job featuring one of the ten SIGI values.

END5 is the total number of games played by a student.

AGE/SEX GROUP MEANS & STANDARD DEVIATIONS

SEX		AGE: 18 & under	19-24	25 & over	
Males	$\bar{X}$	8.78	10.00	8.83	9.22
	S.D.	5.20	5.51	5.57	5.49
Females	$\bar{X}$	8.53	9.09	8.94	8.84
	S.D.	3.25	9.37	5.04	6.22
		8.61	9.49	8.89	
		4.00	7.93	5.28	

FREQUENCY DISTRIBUTIONS FOR MALES & FEMALES

Score Interval	Males F	Males %	Females F	Females %
21+	7	4.0	6	2.3
19-20	1	0.6	1	0.4
17-18	5	2.8	4	1.6
15-16	6	3.4	4	1.6
13-14	11	6.3	9	3.5
11-12	17	9.7	32	12.5
9-10	24	13.6	40	15.6
7-8	35	19.9	65	25.3
5-6	40	22.7	58	22.6
3-4	22	12.5	27	10.5
1-2	8	4.6	11	4.3

TABLE B-6

RATIO -- Ratio of Inconsistent to Consistent Value Ratings

While playing the values games, students may make responses which are inconsistent with the weights they assigned to values prior to the game. An inconsistency occurs when the student, during the course of a game, rejects a value which he originally weighted higher than the one he accepted; or when the student accepts a value which he originally weighted lower than the one he rejected. The total number of inconsistencies made in all the games a student plays is divided by the number of consistent value judgments made by that student.

AGE/SEX GROUP MEANS AND STANDARD DEVIATIONS

SEX		AGE: 18 & under	AGE: 19-24	AGE: 25 & over	
Males	$\bar{X}$	0.35	0.33	0.27	0.31
	S.D.	0.35	0.31	0.31	0.32
Females	$\bar{X}$	0.31	0.36	0.34	0.34
	S.D.	0.27	0.26	0.37	0.31
		0.33	0.34	0.31	
		0.30	0.28	0.35	

FREQUENCY DISTRIBUTIONS FOR MALES AND FEMALES

Score Interval	Males F	Males %	Females F	Females %
2.31 - 2.50	0	0.0	1	0.4
1.91 - 2.10	2	1.1	0	0.0
1.71 - 1.90	1	0.6	0	0.0
1.51 - 1.70	1	0.6	3	1.2
1.31 - 1.50	0	0.0	1	0.4
1.11 - 1.30	1	0.6	3	1.2
0.91 - 1.10	4	2.3	3	1.2
0.71 - 0.90	5	2.8	12	4.7
0.51 - 0.70	17	9.7	41	16.0
0.31 - 0.50	36	20.5	55	21.4
0.11 - 0.30	74	42.0	92	35.8
0.00 - 0.10	35	19.9	46	17.9

SDI -- Standard Deviation of Initial Value Weights (VAL 5)

The standard deviation is an index of the variability of a set of measurements. A small value of SDI indicates that a student assigned similar weights, (high, low, or moderate) to all ten values (VAL 5).

AGE/SEX GROUP MEANS & STANDARD DEVIATIONS

SEX		AGE: 18 & under	19-24	25 & over	
Males	$\bar{X}$	1.68	1.71	1.81	1.74
	S.D.	0.47	0.48	0.51	0.49
Females	$\bar{X}$	1.67	1.74	1.70	1.70
	S.D.	0.50	0.47	0.49	.49
		1.67	1.73	1.75	
		0.49	0.48	0.50	

FREQUENCY DISTRIBUTIONS FOR MALES AND FEMALES

Score Interval	Males F	Males %	Females F	Females %
3.00+	1	0.6	2	0.8
2.91 - 3.00	3	1.7	1	0.4
2.71 - 2.90	2	1.1	6	2.3
2.51 - 2.70	5	2.8	5	1.9
2.31 - 2.50	11	6.3	11	4.3
2.11 - 2.30	20	11.4	28	10.9
1.91 - 2.10	22	12.5	33	12.8
1.71 - 1.90	26	14.8	41	16.0
1.51 - 1.70	29	16.5	44	17.1
1.31 - 1.50	24	13.6	28	10.9
1.11 - 1.30	15	8.5	35	13.6
.91 - 1.10	10	5.7	13	5.1
.71 - .90	8	4.5	5	1.9
.51 - .70	0	0.0	3	1.2
.31 - .50	0	0.0	2	0.8

Table B-8

SDR -- Standard Deviation of Restricted Value Weights (VAL6)

The standard deviation is an index of the variability of a set of measurements. A small value of SDR indicates that a student assigned similar weights, (high, low, or moderate) to all ten values (VAL6).

AGE/SEX GROUP MEANS & STANDARD DEVIATIONS

SEX		AGE: 18 & under	19-24	25 & over	
Males	$\bar{X}$	1.76	1.92	1.86	1.85
	S.D.	.48	.49	.56	.52
Females	$\bar{X}$	1.85	1.96	1.81	1.87
	S.D.	.57	.59	.56	.58
		1.82	1.94	1.84	
		.55	.55	.56	

FREQUENCY DISTRIBUTIONS FOR MALES & FEMALES

Score Interval	Males F	Males %	Females F	Females %
2.91 - 3.00	8	4.6	9	3.5
2.71 - 2.90	5	2.8	13	5.1
2.51 - 2.70	5	2.8	11	4.3
2.31 - 2.50	14	8.0	26	10.1
2.11 - 2.30	12	6.8	22	8.6
1.91 - 2.10	27	15.3	37	14.4
1.71 - 1.90	30	17.0	36	14.0
1.51 - 1.70	27	15.3	32	12.5
1.31 - 1.50	23	13.1	33	12.8
1.11 - 1.30	16	9.1	14	5.4
.91 - 1.10	7	4.0	9	3.5
.71 - .90	2	1.1	11	4.3
.51 - .70	0	0.0	3	1.2
.31 - .50	0	0.0	1	0.4

SKEWI -- Skewness of Unrestricted Value Weights (VAL 5)

Skewness is a measure of the symmetricalness of a distribution. If a distribution is symmetrical its skewness is zero. If, on the other hand, a distribution is asymmetrical with a long tial on the right, it has a positive skew; if the long tail is on the left, it has a negative skew.

SKEWI is the skewness of the ten unrestricted value weights (VAL 5). A positive value indicates a pile-up of low value weights; a negative value indicates a pile up of high value weights.

AGE/SEX GROUP MEANS & STANDARD DEVIATIONS

SEX		AGE: 18 & under	19-24	25 & over	
Males	$\bar{X}$	-.39	-.37	-.36	-.37
	S.D.	.49	.54	.58	.54
Females	$\bar{X}$	-.20	-.10	-.25	-.19
	S.D.	.56	.55	.60	.57
		-.26	-.22	-.30	
		.54	.56	.59	

FREQUENCY DISTRIBUTIONS FOR MALES & FEMALES

Score Interval	Males F	Males %	Females F	Females %
1.303 - 1.500	0	0.0	1	0.4
1.103 - 1.300	1	0.6	3	1.2
.903 - 1.100	1	0.6	3	1.2
.703 - .900	2	1.1	5	1.9
.503 - .700	5	2.8	16	6.2
.303 - .500	8	4.5	20	7.8
.103 - .300	17	9.7	30	11.7
-.097 - .100	19	10.8	36	14.0
-.297 - -.100	25	14.2	47	18.3
-.497 - -.300	36	20.5	19	7.4
-.697 - -.500	16	9.1	28	10.9
-.897 - -.700	17	9.7	22	8.6
-1.097 - -.900	12	6.8	11	4.3
-1.297 --1.100	8	4.5	9	3.5
-1.497 --1.300	5	2.8	3	1.2
-1.697 --1.500	1	0.6	1	0.4
-1.897 --1.700	2	1.1	0	0.0
-2.097 --1.900	1	0.6	3	1.2

SKEWR -- Skewness of Restricted Value Weights (VAL6)

Skewness is a measure of the symmetricalness of a distibution. If a distribution is symmetrical its skewness is zero. If, on the other hand, a distribution is asymmetrical with a long tail on the right, it has a positive skew; if the long tail is on the left, it has a negative skew.

SKEWR is the skewness of the ten restricted value weights (VAL6). A positive value indicates a pile up of low value weights; a negative value indicates a pile up of high value weights.

AGE/SEX GROUP MEANS & STANDARD DEVIATIONS

SEX		AGE: 18 & under	19-24	25 & over	
Males	$\bar{X}$	-.[redacted]	-.09	-.10	-.10
	S.D.	.46	.49	.56	.51
Females	$\bar{X}$	.05	.08	.06	.06
	S.D.	.45	.48	.58	
		-.02	.00	.00	
		.47	.49	.57	

FREQUENCY DISTRIBUTIONS FOR MALES & FEMALES

Score Interval	Males F	Males %	Females F	Females %
1.201 - 1.6000	1	0.6	3	1.2
.801 - 1.2000	5	2.8	14	5.4
.401 - .800	26	14.8	46	17.9
.001 - .400	29	16.5	59	23.0
-.399 - .000	73	41.5	94	36.6
-.799 - -.400	24	13.6	28	10.9
-1.199 - -.800	13	7.4	9	3.5
-1.599 --1.200	5	2.8	3	1.2
-1.999 --1.600	0	0.0	1	0.4

Table B-11

CORRV -- Correlation Between Value Weights

In the Values system students assign weights to ten values, first without any restrictions placed on the weightings (VAL5) and then again, after the Values Game, subject to the restriction that the sum of the weights equal forty (VAL6). CORRV is the correlation between these two sets of weights.

AGE/SEX GROUP MEANS & STANDARD DEVIATIONS

SEX		AGE: 18 & under	19-24	25 & over	
Males	$\bar{X}$	.80	.77	.79	.78
	S.D.	.19	.23	.17	.20
Females	$\bar{X}$	.80	.81	.78	.80
	S.D.	.15	.15	.18	.16
		.80	.79	.78	
		.16	.19	.17	

FREQUENCY DISTRIBUTIONS FOR MALES & FEMALES

Score Interval	Males F	Males %	Females F	Females %
.975 - 1.000	13	7.4	14	5.4
.925 - .974	35	19.9	37	14.4
.875 - .924	25	14.2	42	16.3
.825 - .874	21	11.9	48	18.7
.775 - .824	18	10.2	30	11.7
.725 - .774	13	7.4	27	10.5
.675 - .724	14	8.0	14	5.4
.625 - .674	8	4.5	15	5.8
.575 - .624	6	3.4	6	2.3
.525 - .574	4	2.3	5	1.9
.475 - .524	5	2.8	5	1.9
.425 - .474	0	0.0	5	1.9
.375 - .424	4	2.3	3	1.2
.325 - .374	0	0.0	1	0.4
.275 - .324	5	2.8	3	1.2
.225 - .274	1	0.6	0	0.0
.175 - .224	1	0.6	0	0.0
.125 - .174	2	1.1	0	0.0
.025 - .075	0	0.0	1	0.4
-.025 - .024	1	0.6	1	0.4

Table B-12

VAL 5 (Income) -- Initial Value Weight

In the Values system students assign weights on a scale from 0 (of no importance) to 8 (of greatest importance) to ten values. The figures below are for the value High Income.

AGE/SEX GROUP MEANS & STANDARD DEVIATIONS

SEX		AGE: 18 & under	AGE: 19-24	AGE: 25 & over	
Males	$\bar{X}$	6.17	5.80	5.67	5.85
	S.D.	1.26	1.29	1.60	1.43
Females	$\bar{X}$	5.42	5.08	5.40	5.31
	S.D.	1.50	1.74	1.50	1.59
		5.67	5.39	5.52	
		1.47	1.60	1.55	

FREQUENCY DISTRIBUTIONS FOR MALES & FEMALES

Scale Score	Males F	Males %	Females F	Females %
8	21	11.9	21	8.1
7	35	19.9	32	12.4
6	65	36.9	72	27.9
5	22	12.5	63	24.4
4	21	11.9	44	17.1
3	9	5.1	11	4.3
2	2	1.1	10	3.9
1	1	0.6	2	0.8
0	0	0.0	3	1.2

Table B-13

VAL5 (Prestige) -- Initial Value Weight

In the Values system students assign weights on a scale from 0 (of no importance) to 8 (of greatest importance) to ten values. The figures below are for the value Prestige.

AGE/SEX GROUP MEANS & STANDARD DEVIATIONS

SEX		AGE: 18 & under	19-24	25 & over	
Males	$\bar{X}$	5.11	4.85	4.87	4.93
	S.D.	1.66	1.73	1.90	1.79
Females	$\bar{X}$	4.88	4.43	4.81	4.68
	S.D.	1.79	1.69	2.01	1.85
		4.89	4.61	4.84	
		1.75	1.72	1.96	

FREQUENCY DISTRIBUTIONS FOR MALES & FEMALES

Scale Score	Males F	Males %	Females F	Females %
8	11	6.3	21	8.2
7	21	11.9	21	8.2
6	44	25.0	44	17.1
5	28	15.9	50	19.5
4	39	22.2	58	22.6
3	17	9.7	34	13.2
2	9	5.1	17	6.6
1	3	1.7	7	2.7
0	4	2.3	5	1.9

Table B-14

VAL 5 (Independence) -- Initial Value Weight

In the Values system students assign weights on a scale from 0 (of no importance) to 8 (of greatest importance) to ten values. The figures below are for the value Independence.

AGE/SEX GROUP MEANS & STANDARD DEVIATIONS

SEX		AGE: 18 & under	19-24	25 & over	
Males	$\bar{X}$	5.48	5.43	6.06	5.69
	S.D.	1.54	1.58	1.36	1.51
Females	$\bar{X}$	5.50	5.03	5.48	5.34
	S.D.	1.67	1.81	1.72	1.74
		5.49	5.21	5.71	
		1.63	1.73	1.60	

FREQUENCY DISTRIBUTIONS FOR MALES & FEMALES

Scale Score	Males F	Males %	Females F	Females %
8	24	13.6	35	13.6
7	28	15.9	35	14.6
6	50	28.4	54	20.9
5	38	21.6	47	18.2
4	23	13.1	52	20.2
3	7	4.0	20	7.8
2	5	2.8	11	4.3
1	1	0.6	3	1.2
0	0	0.0	1	0.4

Table B-15

VAL5 (Helping Others) -- Initial Value Weight

In the Values system students assign weights on a scale from 0 (of no importance) to 8 (of greatest importance) to ten values. The figures below are for the value Helping Others.

AGE/SEX GROUP MEANS & STANDARD DEVIATIONS

SEX		AGE: 18 & under	19-24	25 & over	
Males	$\bar{X}$	4.26	4.67	4.96	4.68
	S.D.	1.81	2.33	2.13	2.14
Females	$\bar{X}$	5.59	5.77	5.87	5.74
	S.D.	2.00	2.00	1.76	1.92
		5.15	5.28	5.46	
		2.04	2.22	1.99	

FREQUENCY DISTRIBUTIONS FOR MALES & FEMALES

Scale Score	Males F	Males %	Females F	Females %
8	22	12.5	66	25.7
7	20	11.4	43	16.7
6	23	13.1	34	13.2
5	23	13.1	41	16.0
4	38	21.6	38	14.8
3	19	10.8	17	6.6
2	20	11.4	16	5.2
1	5	2.8	1	0.4
0	6	3.4	1	0.4

Table B-16

VAL5 (Security) -- Initial Value Weight

In the Values system students assign weights on a scale from 0 (of no importance) to 8 (of greatest importance) to ten values. The figures below are for the value Security.

AGE/SEX GROUP MEANS & STANDARD DEVIATIONS

SEX		AGE: 18 & under	19-24	25 & over	
Males	$\bar{X}$	6.52	5.85	5.63	5.94
	S.D.	1.54	1.55	1.87	1.72
Females	$\bar{X}$	6.13	6.32	6.03	6.16
	S.D.	1.63	1.72	1.69	1.68
		6.26	6.12	5.85	
		1.61	1.66	1.78	

FREQUENCY DISTRIBUTIONS FOR MALES & FEMALES

Scale Score	Males F	Males %	Females F	Females %
8	41	23.3	69	26.7
7	27	15.3	56	21.7
6	53	30.1	54	20.9
5	17	9.7	36	14.0
4	22	12.5	24	9.3
3	7	4.0	10	3.9
2	7	4.0	6	2.3
1	2	1.1	2	0.8
0	0	0.0	1	0.4

Table B-17

VAL5 (Variety) -- Initial Value Weight

In the Values system students assign weights on a scale from 0 (of no importance) to 8 (of greatest importance) to ten values. The figures below are for the value Variety.

AGE/SEX GROUP MEANS & STANDARD DEVIATIONS

SEX		AGE: 18 & under	19-24	25 & over	
Males	$\bar{X}$	5.43	5.43	5.74	5.56
	S.D.	1.84	1.95	1.70	1.83
Females	$\bar{X}$	5.80	5.48	5.44	5.58
	S.D.	1.61	1.80	1.90	1.77
		5.68	5.46	5.58	
		1.70	1.87	1.82	

FREQUENCY DISTRIBUTIONS FOR MALES & FEMALES

Scale Score	Males F	Males %	Females F	Females %
8	26	14.8	40	15.6
7	35	19.9	47	18.3
6	41	23.3	58	22.6
5	25	14.2	47	18.3
4	26	14.8	31	12.1
3	10	5.7	15	5.8
2	9	5.1	15	5.8
1	2	1.1	4	1.6
0	2	1.1	0	0.0

Table B-18

VAL5 (Leadership) -- Initial Value Weight

In the Values system students assign weights on a scale from 0 (of no importance) to 8 (of greatest importance) to ten values. The figures below are for the value Leadership.

AGE/SEX GROUP MEANS & STANDARD DEVIATIONS

SEX		AGE: 18 & under	19-24	25 & over	
Males	$\bar{X}$	5.37	4.68	5.00	4.99
	S.D.	1.49	1.90	2.02	1.87
Females	$\bar{X}$	4.45	4.08	4.49	4.35
	S.D.	1.92	1.91	1.79	1.88
		4.75	4.34	4.72	
		1.84	1.93	1.91	

FREQUENCY DISTRIBUTIONS FOR MALES & FEMALES

Scale Score	Males F	Males %	Females F	Females %
8	14	8.0	15	5.8
7	22	12.5	17	6.6
6	42	23.9	46	17.8
5	35	19.9	37	14.3
4	26	14.8	60	23.3
3	21	11.9	34	13.2
2	7	4.0	36	14.0
1	4	2.3	8	3.1
0	5	2.8	5	1.9

Table B-19

VAL5 (Interest Field) -- Initial Value Weight

In the Values system students assign weights on a scale from 0 (of no importance) to 8 (of greatest importance) to ten values. The figures below are for the value, Work in Major Field of Interest.

AGE/SEX GROUP MEANS & STANDARD DEVIATIONS

SEX		AGE: 18 & under	19-24	25 & over	
Males	$\bar{X}$	5.98	5.78	5.57	5.75
	S.D.	1.54	1.89	1.89	1.81
Females	$\bar{X}$	6.32	6.24	6.02	6.20
	S.D.	1.60	1.86	1.58	1.68
		6.21	6.04	5.82	
		1.59	1.89	1.74	

FREQUENCY DISTRIBUTIONS FOR MALES & FEMALES

Scale Score	Males F	Males %	Females F	Females %
8	39	22.2	74	28.7
7	24	13.6	56	21.7
6	42	23.9	49	19.0
5	31	17.6	35	13.6
4	20	11.4	24	9.3
3	10	5.7	13	5.0
2	7	4.0	5	1.9
1	1	0.6	1	0.4
0	2	1.1	1	0.4

Table B-20

VAL5 (Leisure) -- Initial Value Weight

In the Values system students assign weights on a scale from 0 (of no importance) to 8 (of greatest importance) to ten values. The figures below are for the value Leisure.

AGE/SEX GROUP MEANS & STANDARD DEVIATIONS

SEX		AGE: 18 & under	19-24	25 & over	
Males	$\bar{X}$	4.54	4.78	4.11	4.45
	S.D.	1.48	1.58	1.77	1.66
Females	$\bar{X}$	4.27	4.22	4.42	4.30
	S.D.	1.70	1.66	1.81	1.73
		4.36	4.46	4.28	
		1.63	1.65	1.81	

FREQUENCY DISTRIBUTIONS FOR MALES & FEMALES

Scale Score	Males F	Males %	Females F	Females %
8	5	2.8	9	3.5
7	10	5.7	18	7.0
6	34	19.3	33	12.8
5	40	22.7	56	21.7
4	42	23.9	66	25.6
3	24	13.6	39	15.1
2	13	7.4	23	8.9
1	4	2.3	7	2.7
0	4	2.3	7	2.7

Table B-21

VAL5 (Early Entry) -- Initial Value Weight

In the Values system students assign weights on a scale from 0 (of no importance) to 8 (of greatest importance) to ten values. The figures below are for the value Early Entry.

AGE/SEX GROUP MEANS & STANDARD DEVIATIONS

SEX		AGE: 18 & under	19-24	25 & over	
Males	$\bar{X}$	3.09	3.08	3.51	3.26
	S.D.	2.12	2.16	2.23	2.19
Females	$\bar{X}$	3.67	4.09	4.43	4.05
	S.D.	2.01	2.20	2.35	2.21
		3.48	3.65	4.02	
		2.07	2.26	2.34	

FREQUENCY DISTRIBUTIONS FOR MALES & FEMALES

Scale Score	Males F	Males %	Females F	Females %
8	7	4.0	24	9.3
7	8	4.5	16	6.2
6	21	11.9	34	13.2
5	11	6.3	29	11.2
4	13	18.8	46	17.8
3	16	9.1	32	12.4
2	34	19.3	43	16.7
1	32	18.2	26	10.1
0	14	8.0	8	3.1

Table B-22

VAL 6 (Income) -- Restricted Value Weight

In the Values system students assign weights on a scale from 0 (of no importance) to 8 (of greatest importance) to ten occupational values. After assigning these weights they are required to reweight the values subject to the restriction that the sum of the weights equals 40. The figures below are for the value High Income.

AGE/SEX GROUP MEANS & STANDARD DEVIATIONS

SEX		AGE: 18 & under	19-24	25 & over	
Males	$\bar{X}$	5.72	5.38	4.97	5.31
	S.D.	1.14	1.56	1.64	1.53
Females	$\bar{X}$	4.76	4.47	4.87	4.71
	S.D.	1.35	1.67	1.63	1.56
		5.07	4.86	4.92	
		1.36	1.69	1.64	

FREQUENCY DISTRIBUTIONS FOR MALES & FEMALES

Scale Score	Males F	Males %	Females F	Females %
8	13	7.4	5	1.9
7	24	13.6	26	10.1
6	50	28.4	43	16.7
5	35	19.9	81	31.5
4	34	19.3	54	21.0
3	14	8.0	25	9.7
2	3	1.7	15	5.8
1	3	1.7	4	1.6
0	0	0.0	4	1.6

Table B-23

VAL 6 (Prestige) -- Restricted Value Weight

In the Values system students assign weights on a scale from 0 (of no importance) to 8 (of greatest importance) to ten occupational values. After assigning these weights they are required to reweight the values subject to the restriction that the sum of the weights equals 40. The figures below are for the value Prestige.

AGE/SEX GROUP MEANS & STANDARD DEVIATIONS

SEX		AGE: 18 & under	19-24	25 & over	
Males	$\bar{X}$	3.43	3.45	3.31	3.39
	S.D.	1.36	1.35	1.66	1.48
Females	$\bar{X}$	3.34	2.88	3.25	3.17
	S.D.	1.61	1.52	1.67	1.62
		3.37	3.13	3.28	
		1.54	1.47	1.67	

FREQUENCY DISTRIBUTIONS FOR MALES AND FEMALES

Scale Score	Males F	Males %	Females F	Females %
8	1	0.6	1	0.4
7	0	0.0	5	1.9
6	16	9.1	16	6.2
5	17	9.7	30	11.6
4	50	28.4	53	20.5
3	48	27.3	62	24.0
2	26	14.8	51	19.8
1	12	6.8	30	11.6
0	6	3.4	10	3.9

Table B-24

VAL 6 (Independence) -- Restricted Value Weight

In the Values system students assign weights on a scale from 0 (of no importance) to 8 (of greatest importance) to ten occupational values. After assigning these weights they are required to reweight the values subject to the restriction that the sum of the weights equals 40. . The figures below are for the value Independence.

AGE/SEX GROUP MEANS & STANDARD DEVIATIONS

SEX		AGE: 18 & under	19-24	25 & over	
Males	$\bar{X}$	4.22	4.50	5.03	4.64
	S.D.	1.22	1.60	1.60	1.55
Females	$\bar{X}$	4.32	4.13	4.22	4.23
	S.D.	1.59	1.64	1.47	1.57
		4.29	4.29	4.58	
		1.48	1.63	1.58	

FREQUENCY DISTRIBUTIONS FOR MALES AND FEMALES

Scale Score	Males F	Males %	Females F	Females %
8	7	4.0	9	3.5
7	14	8.0	12	4.7
6	33	18.8	32	12.5
5	31	17.6	45	17.5
4	51	29.0	78	30.4
3	28	15.9	47	18.3
2	9	5.1	27	10.5
1	3	1.7	7	2.7
0	0	0.0	0	0.0

Table B-25

VAL 6 (Helping Others) -- Restricted Value Weight

In the Values system students assign weights on a scale from 0 (of no importance) to 8 (of greatest importance) to ten occupational values. After assigning these weights they are required to reweight the values subject to the restriction that the sum of the weights equals 40. The figures below are for the value Helping Others.

AGE/SEX GROUP MEANS & STANDARD DEVIATIONS

		AGE			
		18 & under	19-24	25 & over	
SEX Males	$\bar{X}$	3.09	3.43	3.81	3.49
	S.D.	1.80	2.16	2.09	2.06
SEX Females	$\bar{X}$	4.49	4.76	4.58	4.06
	S.D.	2.15	2.25	2.22	2.21
		4.03	4.18	4.24	
		2.14	2.30	2.20	

FREQUENCY DISTRIBUTIONS FOR MALES AND FEMALES

Scale Score	Males F	Males %	Females F	Females %
8	6	3.4	31	12.0
7	8	4.5	24	9.3
6	22	12.5	44	17.1
5	18	10.2	42	16.3
4	27	15.3	32	12.4
3	34	19.3	29	11.2
2	31	17.6	34	13.2
1	17	9.7	14	5.4
0	13	7.4	8	3.1

Table B-26

VAL 6 (Security) -- Restricted Value Weight

In the Values system students assign weights on a scale from 0 (of no importance) to 8 (of greatest importance) to ten occupational values. After assigning these weights they are required to reweight the values subject to the restriction that the sum of the weights equals 40. The figures below are for the value Security.

AGE/SEX GROUP MEANS & STANDARD DEVIATIONS

SEX		AGE: 18 & under	AGE: 19-24	AGE: 25 & over	
Males	$\bar{X}$	5.26	5.08	4.41	4.86
	S.D.	1.33	1.54	1.62	1.56
Females	$\bar{X}$	4.69	5.03	4.52	4.74
	S.D.	1.59	1.73	1.88	1.74
		4.88	5.05	4.47	
		1.53	1.65	1.77	

FREQUENCY DISTRIBUTIONS FOR MALES AND FEMALES

Scale Score	Males F	Males %	Females F	Females %
8	8	4.5	18	7.0
7	11	6.3	26	10.1
6	49	27.8	36	14.0
5	40	22.7	61	23.7
4	35	19.9	57	22.2
3	20	11.4	35	13.6
2	9	5.1	17	6.6
1	3	1.7	3	1.2
0	1	.6	4	1.6

Table B-27

VAL 6 (Variety) -- Restricted Value Weight

In the Values system students assign weights on a scale from 0 (of no importance) to 8 (of greatest importance) to ten occupational values. After assigning these weights they are required to reweight the values subject to the restriction that the sum of the weights equals 40. The figures below are for the value Variety.

AGE/SEX GROUP MEANS & STANDARD DEVIATIONS

SEX		AGE: 18 & under	19-24	25 & over	
Males	$\bar{X}$	3.67	4.07	4.31	4.06
	S.D.	1.53	1.81	1.52	1.65
Females	$\bar{X}$	4.36	3.96	3.81	4.06
	S.D.	1.87	1.71	1.65	1.77
		4.14	4.01	4.04	
		1.79	1.75	1.61	

FREQUENCY DISTRIBUTIONS FOR MALES & FEMALES

Scale Score	Males F	Males %	Females F	Females %
8	3	1.7	5	1.9
7	8	4.5	19	7.4
6	21	11.9	34	13.2
5	38	21.6	40	15.5
4	44	25.0	62	24.0
3	35	19.9	50	19.4
2	17	9.7	32	12.4
1	4	2.3	8	3.1
0	6	3.4	8	3.1

Table B-28

VAL6 (Leadership) -- Restricted Value Weight

In the Values system students assign weights on a scale from 0 (of no importance) to 8 (of greatest importance) to ten occupational values. After assigning these weights they are required to reweight the values subject to the restriction that the sum of the weights equals 40. The figures below are for the value Leadership.

AGE/SEX GROUP MEANS & STANDARD DEVIATIONS

		AGE			
		18 & under	19-24	25 & over	
SEX	Males $\bar{X}$	3.87	3.18	3.59	3.52
	Males S.D.	1.31	1.69	1.77	1.64
	Females $\bar{X}$	2.93	2.79	3.13	2.95
	Females S.D.	1.66	1.66	1.54	1.63
		3.23	2.96	3.33	
		1.62	1.68	1.66	

FREQUENCY DISTRIBUTIONS FOR MALES & FEMALES

Scale Score	Males F	Males %	Females F	Females %
8	0	0.0	3	1.2
7	4	2.3	2	0.8
6	16	9.1	16	6.2
5	30	17.0	14	5.4
4	44	25.0	58	22.6
3	37	21.0	53	20.6
2	24	13.6	68	26.5
1	11	6.3	28	10.9
0	10	5.7	15	5.8

Table B-29

VAL6 (Interest Field) -- Restricted Value Weight

In the Values system students assign weights on a scale from 0 (of no importance) to 8 (of greatest importance) to ten occupational values. After assigning these weights they are required to reweight the values subject to the restriction that the sum of the weights equals 40. The figures below are for the Value, Work in Major Field of Interest.

AGE/SEX GROUP MEANS & STANDARD DEVIATIONS

SEX		AGE: 18 & under	19-24	25 & over	
Males	$\bar{X}$	5.29	5.18	5.04	5.15
	S.D.	1.48	1.83	1.84	1.75
Females	$\bar{X}$	5.69	5.88	5.26	5.60
	S.D.	1.62	1.86	1.68	1.73
		5.56	5.58	5.16	
		1.59	1.88	1.76	

FREQUENCY DISTRIBUTIONS FOR MALES & FEMALES

Scale Score	Males F	Males %	Females F	Females %
8	18	10.2	40	15.5
7	24	13.6	49	19.0
6	32	18.2	52	20.2
5	42	23.9	50	19.4
4	31	17.6	37	14.3
3	18	10.2	20	7.8
2	6	3.4	6	2.3
1	3	1.7	1	0.4
0	2	1.1	3	1.2

Table B-30

VAL 6 (Leisure) -- Restricted Value Weight

In the Values system students assign weights on a scale from 0 (of no importance) to 8 (of greatest importance) to ten occupational values. After assigning these weights they are required to reweight the values subject to the restriction that the sum of the weights equals 40. The figures below are for the value Leisure.

AGE/SEX GROUP MEANS & STANDARD DEVIATIONS

		AGE			
		18 & under	19-24	25 & over	
SEX Males	$\bar{X}$	3.67	3.75	3.20	3.51
	S.D.	1.34	1.67	1.70	1.62
SEX Females	$\bar{X}$	3.38	3.34	3.43	3.38
	S.D.	1.41	1.53	1.67	1.53
		3.48	3.52	3.33	
		1.39	1.60	1.68	

FREQUENCY DISTRIBUTIONS FOR MALES & FEMALES

Scale Score	Males F	Males %	Females F	Females %
8	1	0.6	2	0.8
7	6	3.4	5	1.9
6	13	7.4	16	6.2
5	26	14.8	28	10.9
4	38	21.6	70	27.2
3	48	27.3	66	25.7
2	26	14.8	41	16.0
1	12	6.8	23	8.9
0	6	3.4	6	2.3

Table B-31

VAL 6 (Early Entry) -- Restricted Value Weight

In the Values system students assign weights on a scale from 0 (of no importance) to 8 (of greatest importance) to ten occupational values. After assigning these weights they are required to reweight the values subject to the restriction that the sum of the weights equals 40. The figures below are for the value Early Entry.

AGE/SEX GROUP MEANS & STANDARD DEVIATIONS

		AGE			
		18 & under	19-24	25 & over	
SEX	Males $\bar{X}$	1.78	1.97	2.31	2.06
	Males S.D.	1.72	1.72	1.88	1.80
	Females $\bar{X}$	2.04	2.60	2.92	2.50
	Females S.D.	1.52	2.01	1.88	1.84
		1.96	2.33	2.65	
		1.59	1.92	1.90	

FREQUENCY DISTRIBUTIONS FOR MALES & FEMALES

Scale Score	Males F	Males %	Females F	Females %
8	1	0.6	3	1.2
7	1	0.6	2	0.8
6	9	5.1	12	4.7
5	6	3.4	21	8.1
4	19	10.8	39	15.1
3	26	14.8	40	15.5
2	40	22.7	52	20.2
1	29	16.5	51	19.8
0	45	25.6	38	14.7

Table B-32

#LOC3--Number of Times Values Are Used to Sift Occupations

In Locate, students can retrieve lists of occupations by selecting five values at a time and specifying a minimum level that they will accept for each value. The values or specifications can be changed to generate new lists of occupations.

#LOC3 is the total number of values/specifications sets that a student has used to screen occupations in Locate.

AGE/SEX GROUP MEANS & STANDARD DEVIATIONS

SEX		AGE: 18 & under	19-24	25 & over	
Males	$\bar{X}$	4.24	4.32	3.92	4.15
	S.D.	4.70	4.47	4.54	4.56
Females	$\bar{X}$	2.96	3.57	3.60	3.36
	S.D.	2.19	3.47	3.81	3.21
		3.38	3.90	3.76	
		3.29	3.96	4.16	

FREQUENCY DISTRIBUTIONS FOR MALES & FEMALES

Score Interval	Males F	Males %	Females F	Females %
21+	4	2.3	1	0.4
19-20	0	0.0	0	0.0
17-18	0	0.0	2	0.8
15-16	3	1.7	1	0.4
13-14	2	1.1	2	0.8
11-12	4	2.2	5	2.0
9-10	11	6.3	3	1.2
7- 8	8	4.5	16	6.2
5- 6	20	11.3	28	10.9
3- 4	37	22.0	63	24.5
1- 2	87	49.5	136	52.9

Table B-33

COMP4 -- Number of Questions Asked About Occupations

In Compare, students can ask up to 28 questions about any set of three occupations at a time. (The list of questions appears in Figure 2, Chapter II. COMP4 is the total number of questions asked in COMPARE.

AGE/SEX GROUP MEANS & STANDARD DEVIATIONS

		AGE			
		18 & under	19-24	25 & over	
SEX					
Males	$\bar{X}$	24.93	18.48	21.50	21.37
	S.D.	22.66	13.02	20.50	19.12
Females		16.05	17.88	19.21	17.66
		9.47	13.37	17.44	13.78
		18.97	18.15	20.24	
		15.70	13.22	18.91	

FREQUENCY DISTRIBUTIONS FOR MALES & FEMALES

	Males		Females	
Score Interval	F	%	F	%
21+	57	32.4	77	30.0
19-20	14	7.9	17	6.6
17-18	5	2.9	11	4.3
15-16	23	13.1	28	10.9
13-14	6	3.4	8	3.1
11-12	11	6.2	18	7.0
9-10	28	15.9	40	15.5
7- 8	4	2.3	11	4.2
5- 6	20	11.3	37	12.1
3- 4	4	2.2	4	1.6
1- 2	4	2.2	6	2.3

Table B-34

#CAT -- Number of Different Categories of Questions Asked

In Compare students are presented with a list of 28 questions, grouped into six categories (see Figure 2, Chapter II) from which they can select to receive information about occupations of interest to them.

#CAT is the number of different categories of questions selected by a student. It has a maximum value of six.

AGE/SEX GROUP MEANS & STANDARD DEVIATION

SEX		AGE: 18 & under	19-24	25 & over	
Males	$\bar{X}$	5.17	5.02	5.13	5.10
	S.D.	1.04	1.16	1.17	1.14
Females	$\bar{X}$	4.82	5.14	4.85	4.93
	S.D.	1.30	1.12	1.30	1.26
		4.94	5.09	4.97	
		1.24	1.14	1.25	

FREQUENCY DISTRIBUTIONS FOR MALES & FEMALES

Scale Score	Males F	Males %	Females F	Females %
6	85	48.3	107	41.5
5	50	28.4	77	29.8
4	25	14.2	41	15.9
3	9	5.1	16	6.2
2	4	2.3	9	3.5
1	3	1.7	7	2.7

Table B-35

#OCC2 -- Number of Occupations About Which Information Is Sought

In Compare, students select occupations about which they can ask up to 28 questions. #OCC2 is the number of different occupations about which questions are asked.

AGE/SEX GROUP MEANS & STANDARD DEVIATIONS

		AGE			
		18 & under	19-24	25 & over	
SEX	Males $\bar{X}$	7.08	6.37	6.70	6.69
	Males S.D.	5.42	3.43	5.62	4.93
	Females $\bar{X}$	5.67	6.09	5.72	5.81
	Females S.D.	3.05	3.82	3.85	3.57
		6.14	6.21	6.16	
		4.04	3.66	4.75	

FREQUENCY DISTRIBUTIONS FOR MALES & FEMALES

Score Interval	Males F	Males %	Females F	Females %
21+	5	2.8	0	0.0
19-20	2	1.2	4	1.6
17-18	3	1.7	2	0.8
15-16	6	3.4	4	1.6
13-14	5	2.8	4	1.6
11-12	11	6.3	14	5.5
9-10	11	6.3	21	8.1
7- 8	18	10.2	22	8.6
5- 6	30	17.1	62	24.1
3- 4	85	48.3	124	48.3
1- 2	0	0.0	0	0.0

Table B-36

PRED2 -- Number of Predictions Requested

In Prediction, students may ask to see a display showing the probabilities they will obtain a grade of A or B, C, & below C in a key course associated with a curriculum at their college. Prior to reviewing this display, they go through a sequence of interactions in which they rate themselves on several factors regarded as important for getting good grades. They also estimate their final grade in the key course for that curriculum. PRED2 is the number of predictions requested by a student.

AGE/SEX GROUP MEANS & STANDARD DEVIATIONS

		AGE			
		18 & under	19-24	25 & over	
SEX Males	$\bar{X}$	4.20	3.52	2.71	3.38
	S.D.	3.96	2.92	2.27	3.06
SEX Females	$\bar{X}$	2.93	2.90	2.64	2.82
	S.D.	2.72	2.74	2.30	2.60
		3.34	3.18	2.67	
		3.24	2.83	2.29	

FREQUENCY DISTRIBUTIONS FOR MALES & FEMALES

	Males		Females	
Score Interval	F	%	F	%
21+	1	0.6	1	0.4
19-20	0	0.0	0	0.0
17-18	0	0.0	0	0.0
15-16	1	0.6	0	0.0
13-14	1	0.6	2	0.8
11-12	3	1.7	2	0.8
9-10	4	2.2	5	2.0
7- 8	12	6.8	9	3.5
5- 6	23	13.1	20	7.7
3- 4	39	22.2	62	24.1
1- 2	92	52.3	156	60.7

Table B-37

PRED11 -- Number of Prediction Questions Asked

In Prediction, students can ask up to five general questions about prediction. (The list of questions is shown in Figure 5, Chapter II.)

PRED11 is the total number of prediction questions asked by a student.

AGE/SEX GROUP MEANS & STANDARD DEVIATIONS

SEX		AGE: 18 & under	AGE: 19-24	AGE: 25 & over	
Males	$\bar{X}$	.74	.45	.57	.57
	S.D.	.94	.59	.77	.77
Females	$\bar{X}$	.65	.64	.52	.60
	S.D.	.82	1.14	.83	.93
		.68	.55	.54	
		.86	.94	.80	

FREQUENCY DISTRIBUTIONS FOR MALES & FEMALES

Score Interval	Males F	Males %	Females F	Females %
5	1	0.6	1	0.4
4	1	0.6	5	1.9
3	0	0.0	5	1.9
2	15	8.5	15	5.8
1	62	35.2	83	32.3
0	97	55.1	148	57.6

Table B-38

NPLN2 -- Number of Occupations for Which Plans Were Sought

In Planning, students select occupations for which they want to see the educational requirements, as well as other entry requirements.

NPLN2 is the total number of occupations for which plans were sought.

AGE/SEX GROUP MEANS & STANDARD DEVIATIONS

SEX		AGE: 18 & under	19-24	25 & over	
Males	$\bar{X}$	2.76	2.27	2.09	2.32
	S.D.	2.13	1.95	1.58	1.88
Females	$\bar{X}$	2.18	2.10	2.03	2.08
	S.D.	1.80	1.62	1.33	1.60
		2.37	2.12	2.06	
		1.93	1.77	1.45	

FREQUENCY DISTRIBUTIONS FOR MALES & FEMALES

Score Interval	Males F	Males %	Females F	Females %
10+	1	0.6	2	0.8
9	1	0.6	0	0.0
8	4	2.3	1	0.4
7	3	1.7	4	1.6
6	6	3.4	7	2.7
5	6	3.4	6	2.3
4	5	2.8	10	3.9
3	27	15.3	33	12.8
2	45	25.6	72	28.0
1	78	44.3	122	47.5

Table B-39

CONSIS - Consistency in Exploring an Occupation in SIGI

CONSIS is scored by adding one point for each of the following:

- Student retrieves the occupation in Locate.
- Student asks questions about the occupation in Compare.
- Student selects the occupation as one of the three to be used in Strategy.

This variable is computed for each occupation explored in Planning. The score retained is the maximum among the computed scores.

AGE/SEX GROUP MEANS & STANDARD DEVIATIONS

SEX		AGE: 18 & under	19-24	25 & over	
Males	$\bar{X}$	2.56	2.38	2.46	2.46
	S.D.	.65	.87	.75	.78
Females	$\bar{X}$	2.61	2.43	2.48	2.51
	S.D.	.66	.84	.73	.74
		2.50	2.41	2.47	
		.65	.86	.74	

FREQUENCY DISTRIBUTIONS FOR MALES & FEMALES

Scale Score	Males F	Males %	Females F	Females %
3	107	60.8	166	64.3
2	48	27.3	63	24.4
1	16	9.1	24	9.3
0	5	2.8	5	1.9

Table B-40

DES1 -- Desirability Level of Occupation Preferred Prior to Calculation of Desirability Sums

In Strategy, students identify three occupations that they would like to consider. Since all the occupations in SIGI have been rated according to their capacity to satisfy each of the ten SIGI values, "desirability sums" are available for these three occupations. (The weight a student assigns to each value is multiplied by the occupation's rating on that value; the sum of these products is the index of desirability.) Conceptually, the desirability sum represents the relationship between what the student wants and what the occupation offers.

The desirability sums of the three occupations used in each pass through Strategy are ranked from high (3) to low (1). Prior to the student's consideration of rewards and risks, the student selects one of the occupations as a preferred choice. DES1 is the rank order of this preferred occupation. In other words, a score of 3 on this variable means that a student has selected the occupation that turned out to have the highest desirability sum of the three under consideration at that time.

AGE/SEX GROUP MEANS & STANDARD DEVIATIONS

SEX			AGE: 18 & under	AGE: 19-24	AGE: 25 & over	
	Males	$\bar{X}$	1.96	1.85	2.11	1.98
		S.D.	.86	.81	.80	.83
	Females	$\bar{X}$	2.04	2.03	2.01	2.03
		S.D.	.84	.79	.78	.81
			2.01	1.95	2.06	
			.85	.80	.79	

FREQUENCY DISTRIBUTIONS FOR MALES & FEMALES

Scale Score	Males F	Males %	Females F	Females %
3	59	33.5	87	33.9
2	55	31.3	90	35.0
1	62	35.2	80	31.1

DES2 -- Desirability Level of Occupation Selected after Calculation of Desirability Sums

In Strategy, students identify three occupations that they would like to consider. Since all the occupations in SIGI have been rated according to their capacity to satisfy each of the ten SIGI values, "desirability sums" are available for these three occupations. (The weight a student assigns to each value is multiplied by the occupation's rating on that value; the sum of these products is the index of desirability.). Conceptually, the desirability sum represents the relationship between what the student wants and what the occupation offers.

The desirability sums of the three occupations used in Strategy are ranked from high (3) to low (1). After a student considers the rewards and risks, the student selects one of the occupations as a preferred choice. DES2 is the rank order of this preferred occupation. In other words, a score of 3 on this variable means that a student has selected the occupation with the highest desirability sum.

AGE/SEX GROUP MEANS & STANDARD DEVIATIONS

		AGE			
		18 & under	19-24	25 & over	
SEX					
Males	$\bar{X}$	2.35	2.22	2.31	2.29
	S.D.	.76	.80	.77	.78
Females	$\bar{X}$	2.23	2.22	2.15	2.20
	S.D.	.79	.72	.76	.79
		2.27	2.22	2.22	
		.78	.81	.76	

FREQUENCY DISTRIBUTIONS FOR MALES & FEMALES

	Males		Females	
Scale Score	F	%	F	%
3	86	48.9	111	43.2
2	55	31.3	87	33.9
1	33	19.9	59	23.0

Table B-42

PROBABILITY Level of Occupation Preferred Before Estimate

In Strategy students estimate the likelihood that they can complete the requirements for entering the three occupations they are considering.

PROB1 is the rank order (3 = highest estimate; 1 = lowest estimate) of the probability estimate assigned to the occupation preferred by a student prior to his considering the rewards and risks associated with the three occupations.

AGE/SEX GROUP MEANS & STANDARD DEVIATIONS

SEX		AGE: 18 & under	19-24	25 & over	
Males	$\bar{X}$	2.43	2.68	2.50	2.55
	S.D.	.80	.56	.67	.68
Females	$\bar{X}$	2.54	2.61	2.64	2.60
	S.D.	.72	.65	.65	.68
		2.51	2.64	2.58	
		.75	.61	.66	

FREQUENCY DISTRIBUTIONS FOR MALES & FEMALES

Scale Score	Males F	Males %	Females F	Females %
3		65.3	181	70.4
2	42	23.9	48	18.7
1	19	10.8	28	10.9

PROB2 -- Probability Level of Occupation Selected After Estimate

In Strategy students estimate the likelihood that they can complete the requirements for entering the three occupations they are considering.

PROB 2 is the rank order (3 = highest; 1 = lowest) of the probability estimate assigned to the occupation selected by a student <u>after</u> he has considered the rewards and risks associated with the three occupations.

AGE/SEX GROUP MEANS AND STANDARD DEVIATIONS

SEX		AGE: 18 & under	19-24	25 & over	
Males	$\bar{X}$	2.46	2.63	2.60	2.57
	S.D.	.77	.58	.60	.64
Females	$\bar{X}$	2.61	2.64	2.71	2.65
	S.D.	.67	.62	.48	.60
		2.56	2.64	2.66	
		.71	.60	.54	

FREQUENCY DISTRIBUTIONS FOR MALES & FEMALES

Scale Score	Males F	Males %	Females F	Females %
3	116	65.9	184	71.6
2	45	25.6	56	21.8
1	15	8.5	17	6.6

Table B-44

UTIL1 -- Expected Utility of Preferred Occupation

In Strategy the desirability and probability of entry of three occupations of interest to a student are obtained. These values can be multiplied to give an expected utility.

UTIL1 is the rank order (3 = highest value; 1 = lowest value) of the expected utility assigned to the occupation preferred by a student prior to his considering the rewards and risks associated with the three occupations.

AGE/SEX GROUP MEANS & STANDARD DEVIATIONS

SEX		AGE: 18 & under	19-24	25 & over	
Males	$\bar{X}$	2.13	2.37	2.39	2.31
	S.D.	.82	.75	.72	.77
Females	$\bar{X}$	2.34	2.35	2.51	2.40
	S.D.	.79	.75	.66	.74
		2.27	2.36		
		.81	.7		

FREQUENCY DISTRIBUTIONS FOR MALES & FEMALES

Scale Score	Males F	Males %	Females F	Females %
3	88	50.0	143	55.6
2	55	31.3	74	28.8
1	33	18.8	40	15.6

UTIL2 -- Expected Utility of Selected Occupation

In Strategy the desirability and probability of entry of three occupations of interest to a student are obtained. These values can be multiplied to give an expected utility.

UTIL2 is the rank order (3 = highest values; 1 = lowest value) of the expected utility assigned to the occupation selected by a student after he has considered the rewards and risks associated with the three occupations.

AGE/SEX GROUP MEANS & STANDARD DEVIATIONS

SEX		AGE: 18 & under	19-24	25 & over	
Males	$\bar{X}$	2.37	2.53	2.56	2.50
	S.D.	.82	.76	.65	.74
Females	$\bar{X}$	2.44	2.56	2.71	2.56
	S.D.	.72	.72	.61	.68
		2.41	2.55	2.64	
		.7o	.72	.61	

FREQUENCY DISTRIBUTIONS FOR MALES & FEMALES

Scale Score	Males F	Males %	Females F	Females %
3	114	64.8	172	66.9
2	36	20.5	58	22.6
1	26	14.8	27	10.5

Table R-46

STR -- Number of Sets of Occupations Used in STRATEGY

In Strategy, students select three occupations at a time in order to examine their choices in the light of the relative risks and rewards. The risks are based on the student's own estimate of the probability of his/her successfully entering the occupation, whereas the rewards are based on the desirability of the occupation, in terms of the student's value weights.

STR is the number of sets of three occupations considered in Strategy.

AGE/SEX GROUP MEANS & STANDARD DEVIATIONS

SEX		AGE: 18 & under	19-24	25 & over	
Males	$\bar{X}$	1.61	1.28	1.64	1.51
	S.D.	1.11	0.55	1.60	1.22
Females	$\bar{X}$	1.20	1.29	1.17	1.22
	S.D.	0.54	.60	0.38	.51
		1.34	1.28	1.38	
		0.80	.58	1.13	

FREQUENCY DISTRIBUTIONS FOR MALES AND FEMALES

Score Interval	Males F	Males %	Females F	Females %
13.00+	0	0.0	1	0.4
13.00	1	0.6	0	0.0
7.00	1	0.6	0	0.0
4.00	5	2.8	1	0.4
3.00	12	6.8	9	3.5
2.00	33	18.8	35	13.6
1.00	124	70.5	212	82.2

RANK -- High School Rank In Class

In Prediction students are asked to indicate which fifth of their high school class they belong to. The response categories are:

Group 1 -- Highest grade

Group 2 - Next highest grade

Group 3 - Third highest grade

Group 4 - Fourth highest grade

Group 5 - Lowest grade

AGE/SEX GROUP MEANS & STANDARD DEVIATIONS

SEX		AGE: 18 & under	19-24	25 & over	
Males	$\bar{X}$	2.28	2.53	2.73	2.55
	S.D.	1.01	.94	1.03	1.01
Females	$\bar{X}$	2.17	2.47	2.47	2.36
	S.D.	.92	.92	.86	.91
		2.21	2.50	2.58	
		.95	.93	.95	

FREQUENCY DISTRIBUTIONS FOR MALES & FEMALES

Response	Males F	Males %	Females F	Females %
5	6	3.4	3	1:2
4	21	11.9	19	7.4
3	65	36.9	94	36.6
2	55	31.3	92	35.8
1	29	16.5	49	19.1

Table B-48

MATH -- High School Mathematics Grades

In Prediction students are asked to describe their performance in high school mathematics. The four response categories are:

(1) mostly A's
(2) mostly B's
(3) mostly C's
(4) most grades were below C

AGE/SEX GROUP MEANS & STANDARD DEVIATIONS

		AGE			
		18 & under	19-24	25 & over	
SEX	Males $\bar{X}$	2.12	2.55	2.40	2.40
	Males S.D.	.88	.86	.84	.87
	Females $\bar{X}$	2.24	2.58	2.36	2.38
	Females S.D.	.86	.91	.86	.89
		2.24	2.57	2.37	
		.87	.89	.85	

FREQUENCY DISTRIBUTIONS FOR MALES & FEMALES

	Males		Females	
Response	F	%	F	%
(4)	16	9.1	28	10.9
(3)	68	38.6	86	33.3
(2)	63	35.8	101	39.1
(1)	29	16.5	43	16.7

Table B-49

ENG -- High School English Grade

In Prediction students were asked to describe their performance in high school English. The four response categories are:

(1) mostly A's
(2) mostly B's
(3) mostly C's
(4) most grades were below C

AGE/SEX GROUP MEANS & STANDARD DEVIATIONS

SEX		AGE: 18 & under	19-24	25 & over	
Males	$\bar{X}$	2.00	2.25	2.13	2.14
	S.D.	.83	.79	.89	.85
Females	$\bar{X}$	1.72	1.75	1.70	1.72
	S.D.	.71	.67	.73	.70
		1.81	1.97	1.89	
		.76	.76	.84	

FREQUENCY DISTRIBUTIONS FOR MALES & FEMALES

Response	Males F	Males %	Females F	Females %
(4)	10	5.7	2	0.8
(3)	47	26.7	32	12.5
(2)	76	43.2	116	45.1
(1)	43	24.4	107	41.6

Table B-50

VAL3 -- Field of Interest

In the Values system, students select the field of work most interesting to them. Since the response categories are not ordered, means and standard deviations are not presented. Instead, age and sex frequency distributions are used to describe the responses. The six response categories are:

1. SCIENTIFIC - data, knowledge, observations, analysis, mathematics,
   Examples: physicist, botanist, engineer, economist.
2. TECHNOLOGICAL - things, machines, manipulative and mechanical skills.
   Examples: toolmaker, mechanic, technician.
3. ADMINISTRATIVE - business, finance, records, systems.
   Examples: accountant, secretary, bank teller.
4. PERSONAL CONTACT - people, selling, supervising, persuading, teaching.
   Examples: salesman, social worker, stewardess, teacher.
5. VERBAL - words, reading, writing, talking, listening.
   Examples: journalist, teacher, advertising copywriter.
6. AESTHETIC - art, painting, sculpture, design, music, dance.
   Examples: artist, interior designer, musician, architect, TV producer/director.

FREQUENCY DISTRIBUTIONS

AGE

Response	18 & under		19-24		25 & over	
	F	%	F	%	F	%
6	15	10.7	17	12.4	18	11.5
5	23	16.4	22	16.1	26	16.7
4	32	22.9	40	29.2	55	35.3
3	30	21.4	19	13.9	25	16.0
2	9	6.4	14	10.2	7	4.5
1	31	22.1	25	18.2	25	16.0

SEX

Response	Males		Females	
	F	%	F	%
6	17	9.7	33	12.8
5	22	12.5	49	19.1
4	38	21.6	89	34.6
3	34	19.3	40	15.6
2	19	10.8	11	4.3
1	46	26.1	35	13.6

CHAPTER V

FINDINGS--PART 1

For convenience, the findings from this study will be divided into two parts. Part 1 concerns age and sex differences in occupational values and other variables related to the CDM process. Part 2 concerns the formulation and study of sex-typical and sex-atypical groups.

Age/Sex Group Differences

As a first step in examining age and sex differences on CDM variables, separate two-way analyses of covariance were run for variables in each of the five categories previously described: values clarification, information-seeking, prediction, planning, and occupational choice. Each analysis included males and females at three age levels: 18 and under; 19-24; 25 and over.

In each case the covariate was status on the appropriate assessment of prior knowledge variables (INTR7, 8, 9, or 10). (See Tables B-1 through B-4, Chapter IV.)

Some of the variables are highly skewed or restricted at both ends of the distribution, a situation which calls into question the results from the analysis of covariance. To help alleviate the non-normality of these variables, we have re-expressed them and resubmitted them to an analysis of covariance. Following the suggestions of Mosteller and Tukey (1977), we have re-expressed the variables that are amounts or counts as "started logs," i.e., log (constant + count). Variables restricted at both ends have first been re-expressed as counted fractions and then log transformed.

The results of the ANCOVAs are described below. The ANCOVA tables for variables with significant effects are included in Appendix A.

Values clarification. The variables in this category include END5, RATIO, SDI, SDR, SKEWI, SKEWR, and CORRV. (See Tables B-5 through B-11, Chapter IV.) In the ANCOVA for these variables, the covariate was knowledge of values (INTR7).

Summarizing the results from these ANCOVAs we find that:

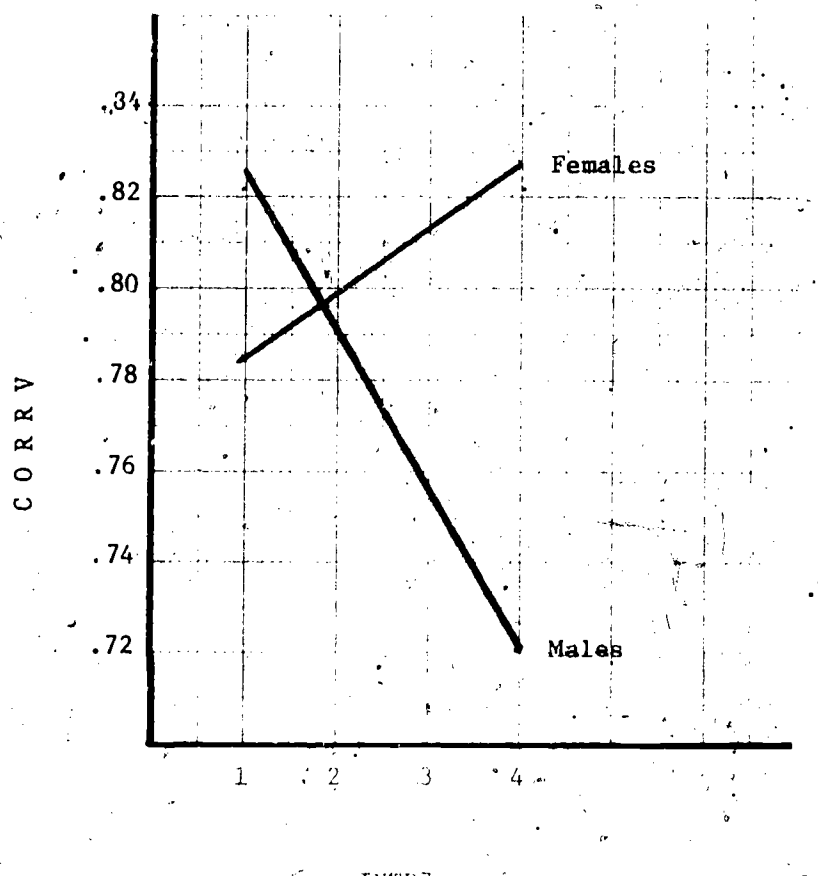
(1) No significant main or interaction effects were found for END5, RATIO, SDI, or SDR.

(2) A main sex effect was found for SKEWI and SKEWR.

For the unrestricted value weights, the skewness is negative for both sexes with males showing a greater preponderance of high weights than females. In the restricted case, the skewness is less pronounced; males evidence a slight negative skew of their value weights and females a slight positive skew.

(3) CORRV has no main effects but has a significant sex X covariate interaction.

The significant sex X covariate interaction indicates that the within sex group slopes are different, a situation which makes the ANCOVA an inappropriate test of the main effect of sex. A rough plot of slopes, drawn below, shows the nature of the sex effect in relation to initial value status (INTR7). For students who have a general idea of their values (INTR7=2), including over half of the males and three-fifths of the females, there is no difference between sexes in the correlation between their unrestricted and restricted value weights. For students who claim to know very little about their values (INTR7=4), there is a large sex difference, with females having a higher CORRV than males. The reverse is true for students who claim to know a lot about their values (INTR7=1): males are higher than females. These slopes represent interesting phenomena. The slope for males is just what would be logically expected. Explication of the reverse slope for females must be only conjectural, especially since only 7% of the females, compared to 16% of the males, said they were ignorant of their values.



Information-seeking. The variables in this category include #LOC3, COMP4, #CAT, and #OCC2. (See Tables B-32 through B-35, Chapter IV.) In the ANCOVA for these variables the covariate was knowledge of occupations (INTR8).

Summarizing these ANCOVAs we find that:

(1) There are no significant main or interactive effects for #CAT. Since the distribution for #CAT is highly skewed (see Table B-34), a log transformation was done and the ANCOVA run on the transformed data. No main or interactive effects are found for the log transformed data.

(2) COMP4 has a significant sex effect. The total number of questions asked in Compare is significantly greater for males than for females.

(3) Since the variables #LOC3 and #OCC2 are both highly skewed (see Tables B-32 and B-35), ANCOVAs were run on the variables and on the log of the variables. For both these variables the ANCOVAs on the untransformed data show a significant main effect for sex and the covariate (INTR8). Males, to a greater extent than females, make changes in their selection of values and specifications for screening occupations and select a greater number of occupations about which to ask questions. The covariate effect is as expected with greater activity from the more poorly informed students. The ANCOVAs for the log transformed data sharpen up the main covariate effect and diminish the sex effect to $p = .06$.

In general, then, it seems justifiable to conclude that males tend to seek more information about occupations than females do.

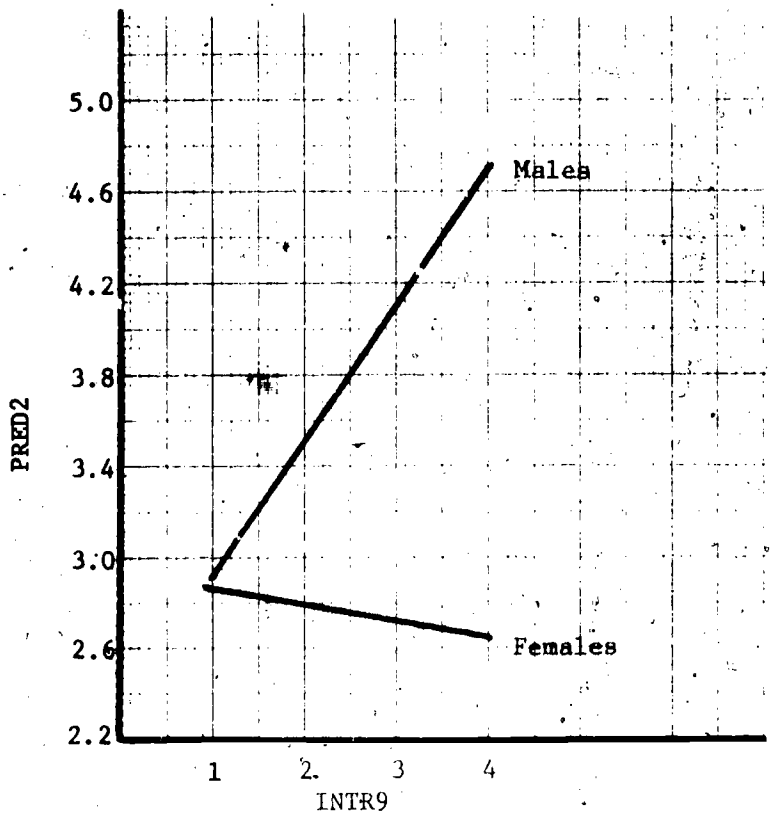
Prediction. The variables in this category include PRED2 and PRED11. (See Tables B-36 and B-37, Chapter IV.) The covariate for the ANCOVA was assessment of ability to predict grades (INTR9).

The results from these ANCOVAs are:

(1) PRED2 has a significant main sex effect and a sex X covariate interaction. An ANCOVA on the log transformed data leaves the sex and sex X covariate interaction much the same and increases the significance level of the age effect from .06 to .03. On the basis of the latter analysis, it appears that older students request fewer predictions than do younger students.

The significant sex X covariate interaction indicates that the within sex group slopes are different, a situation which, as noted before, makes the ANCOVA an inappropriate test of the sex effect.

A rough plot of the slopes for males and females (untransformed data), shown below, indicates that for students who feel that they can predict their grades very well (low values of INTR9), there is little or no sex difference in the number of predictions requested. For students who have difficulty predicting their grades, there is a large sex difference, with males requesting more predictive information than females. Again, the slope for the males is what one would logically expect. It is difficult to explain why females who lacked confidence in their predictions of grades sought relatively few predictions. Perhaps it is merely another manifestation of a generally lower level or narrower range of information-seeking.



(2) PRED11 is also a highly skewed variable (Table B-37). The ANCOVA on the untransformed data shows a significant main covariate effect with a greater number of prediction questions requested by students with limited ability to predict their grades than by students who feel they can accurately predict their grades. Although a log transformation on the data increases the age and sex effects, it diminishes the covariate effect. Consequently, for the log transformation data, no effect is significant.

Planning. The variables in this category include NPLN2 and CONSIS. (See Tables B-38 and B-39, Chapter IV.) The covariates for these ANCOVAs was knowledge of plans (INTR10).

The results from these ANCOVAs are:

(1) NPLN2 has a significant main effect for the covariate for both the raw and log transformed data. Thus, while neither age nor sex seems to affect the number of occupations students plan for, the status of their occupational planning does. That is, more occupations are planned for by students who are uncertain of their preparatory plans and express a need for help than by students who have a clear knowledge of their plans for reaching an occupational goal.

(2) No significant main or interactive effects are found for CONSIS. A log transformation produces a significant main effect for the covariate. On the basis of the analyses on the transformed data, it appears that students who know little about which college program to take have lower CONSIS scores than do students who have a good idea of which program to enroll in.

Occupational choice. The variables in this category include DES1, DES2, PROB1, PROB2, UTIL1, UTIL2, and STR. (See Tables B-40 through B-46, Chapter IV.) The covariate for PROB1 and PROB2 was INTR9, knowledge of predicting grades; the covariate for the other variables was INTR7, knowledge of values.

Summarizing the results from these ANCOVAs we find that:

(1) There are no significant main or interactive effects for DES1, DES2, PROB1, PROB2, and UTIL1. A log transformation of the data produces a significant covariate main effect for UTIL1 and PROB2 in the expected direction: The more confident students were of their ability to predict their grades (INTR9), the more likely they were to select as their informed choice the occupation with the most favorable chances for entry (PROB2); also, the more sure students were about their values (INTR7), the more likely they were to select as their original choice the occupation that turned out to have the best utility (UTIL1). The students high on INTR9 were not necessarily the same as those high on INTR7. The absence of a significant covariate effect for UTIL2 (comparable to that for UTIL1) is not hard to understand. The utility index of an occupation is directly proportional to its desirability sum and the estimated probability. As one might expect, UTIL1, based on the occupation chosen before systematic consideration of desirability sums and probability, is differentially affected by prior knowledge of values. UTIL2, however, is based on the occupation chosen after all the students have been systematically guided through desirabilities, probabilities, and decision rules. This exercise has a leavening effect on utility indices, as can be seen from a comparison between

distributions of UTIL1 and UTIL2 scores: about half of the former but two-thirds of the latter are at the ceiling of the scale. (This is in keeping with the similar increase in the frequency of ceiling scores from DES1 to DES2.)

(2) UTIL2 has a significant age main effect for both the raw data and the log data. Older students select as their informed choice more occupations with high expected utilities than do younger students, although all three groups approach the ceiling.

(3) STR has a significant sex main effect and sex X age interaction. Males examine more occupations in Strategy than do females. Moreover, younger and older males exhibit this behavior, but there is no difference between the sexes in the middle age group.

An ANCOVA on the log transformed data also shows a highly significant main sex effect ($p < .001$) with males showing greater interaction with the SIGI Strategy system than females. The ANCOVA on the log transformed data shows an increase in the covariate main and interactive effects (but not significantly so), and a decrease in the sex X age interaction so that it is no longer significant.

Summary. The findings from the ANCOVAs seem to suggest that age is not nearly as important a factor as sex in seeking to explain career decision-making behavior. Age shows a clear-cut significant main effect for only one variable, UTIL2, a measure which describes the expected utility of the occupation an individual selects after seeing rewards and risks associated with each of three occupations. An age effect is also seen with log transformed data with respect to PRED2, indicating that older students tend to seek fewer predictions than do younger ones. Sex, on the other hand, appears as an important consideration in all but one of the categories of variables included (Planning is the one exception). Furthermore, the amount of information that students have prior to engaging in career exploration appears, as might be expected, to be an important factor affecting further information-seeking activities.

It is also noteworthy that the impact of the system itself--that is, exposure to systematic career decision-making, as in Strategy--tends to have a leavening effect in some indices (e.g., UTIL and DES), pushing scores towards the ceiling and wiping out effects of some differences in status prior to using SIGI.

Value Profiles

What, if any, are the differences in value profiles for males and females? For younger and older students? As a first step in answering this question, a two-way multivariate analysis of variance (MANOVA) was run on the weights that students assigned to the ten values in SIGI. Sex, with two categories, was one factor; age, with three levels (19 and under, 19-24, 25 and over) was the second factor.

The results of the MANOVA on the unrestricted value weights (VAL5) are presented below (Table 1). Since similar results were obtained for the restricted value weights (VAL6) these results are not presented.

Table 1

MANOVA for Age and Sex Differences in 10 Values

Source	#Dep Var.	Hyp D.F.	Approx F Ratio	Probability of Larger F
Mean	10	1	1832.0146	0.0
Age	10	2	2.0662	0.0041
Sex	10	1	9.0089	0.0
Age X Sex	10	2	1.0012	0.4581

As the MANOVA table shows, there are significant age and sex effects with no significant interaction.

Since there are significant age and sex main effects, the value profiles for the two sex groups and the three age groups were examined more closely to determine the nature of the group differences.

Figure 11 presents plots of mean values weights for males and females (ages combined). It gives a quick way to see which values are weighted high and which ones are weighted low. To provide an indication of whether or not the differences in mean values weights for males and females are significant, a t-test was run for each value. The significance levels associated with the obtained t's are indicated by the number of asterisks next to each value. (The absence of asterisks indicates that the probability level is greater than .05).

Referring to Figure 11, then, we see that:

(1) All values, with the exception of Early Entry for males, are considered at least of moderate importance (scale weight=4).

(2) For males, the three top weighted values are Security, Income, and Work in Major Field of Interest; for females, the correspondingly ranked values are Work in Major Field of Interest, Security, and Helping Others.

(3) Large sex differences are noted for the values Helping Others, Early Entry, Leadership, and Income. Females weight Helping Others and Early Entry higher than do males, while the reverse is true for Leadership and Income.

(4) Somewhat smaller, but still significant, sex differences are noted for Work in Major Field of Interest and Independence. Females weight Interest Field higher than males weight it; males weight Independence higher than do females.

(5) No significant sex difference is noted for four of the ten values: Prestige, Security, Variety, and Leisure.

The picture that emerges from differences in values between males and females is consistent with the long-standing sex stereotype of the nurturing female and the striving male. Females rank Helping Others third in importance out of ten occupational values, whereas males rank it eighth; the greater importance to Early Entry for females is likely associated not only with lower aspiration levels attributed to women but also with their primary concern for current or prospective marriage and family. Males, on the other hand, rank Income second in importance, whereas females rank it sixth. This difference can also be seen as a reflection of the males' traditional role as the major provider for the family.

That both sexes regard Security as highly important (ranked first for males and second for females) may be seen as a sign of the economic conditions of our times. As unemployment rises and jobs become harder to find, people generally become more concerned with occupational security.

Although the findings regarding sex differences in values are not surprising, it is interesting to note that while the social revolution of the sixties may have had great impact on some individuals' perceptions of sex roles, values reflecting old sex stereotypes still exist among college students when group means are compared.

Plots are also made of value means for the three age groups considered in this study (sexes combined). These appear in Figure 12. As before, significance tests were run on the value means (F tests) and the results indicated by asterisks.

Referring to Figure 12, we see (1) only two of the values, Early Entry and Independence, have significant age differences, and (2) there is apparently no clear trend in the relationship between age and the value means. Older students valued Independence highest, and students in the middle group weighted it lower than did the other two groups. Early Entry was, however, weighted highest by the oldest, next by the middle, and lowest by the youngest group. Age, then, though a significant factor, seems to exert a smaller influence on occupational values than does sex. It should be recalled, however, that within the framework of this study, age is narrowly defined to cover the range generally encountered in the population of college students. Furthermore, the older students are a biased sample of their age group since they are at about the same educational stage as the younger ones.

As an approach to examining over-all similarity in group profiles, distances between groups were computed. To help clarify the picture, the total distance matrix was divided into two components--the between- and within-group distances. The between-group distances, which are squared differences between over-all group means (i.e., the mean of the ten value weights), can differentiate between groups in elevation level. Potentially, this is an important consideration, since, unlike the restricted case (VAL6), these value weights do not have a fixed sum. As seen from Table 2 (a), however, the between-group distances are very small with a maximum distance of .0435 noted between group 1 (males, age 18 and under) and group 2 (males, age 19-24). This distance represents a difference of only about two points in the average total sum of weights distributed by the two groups.

The within-group differences give a picture of group similarities with the effect of the total number of points that individuals distributed (elevation effect) removed. These distances are computed by subtracting the overall value group mean (V_g) from the means for each of the 10 values within a group (V_{ig}). The discrepancies from the overall value group mean are used to compute within-group differences (D_w) as follows:

$$D_w = \sum_{i=1}^{10} ((V_{ig_1} - V_{g_1}) - (V_{ig_2} - Vg_2))^2$$

Referring to Table 2 (b), we see that there is a definite sex cluster with smaller distances noted between age groups within a sex than those between sex groups within an age division. It may be worth noting here, however, that there is a slight tendency for group 4 (the youngest females) to be less distant from the male groups than the older females are. Can this represent an effect (of changing beliefs, customs, and opportunities) that may be just beginning to take hold?

Table 2

Between- & Within-Group Distances for Value Profiles

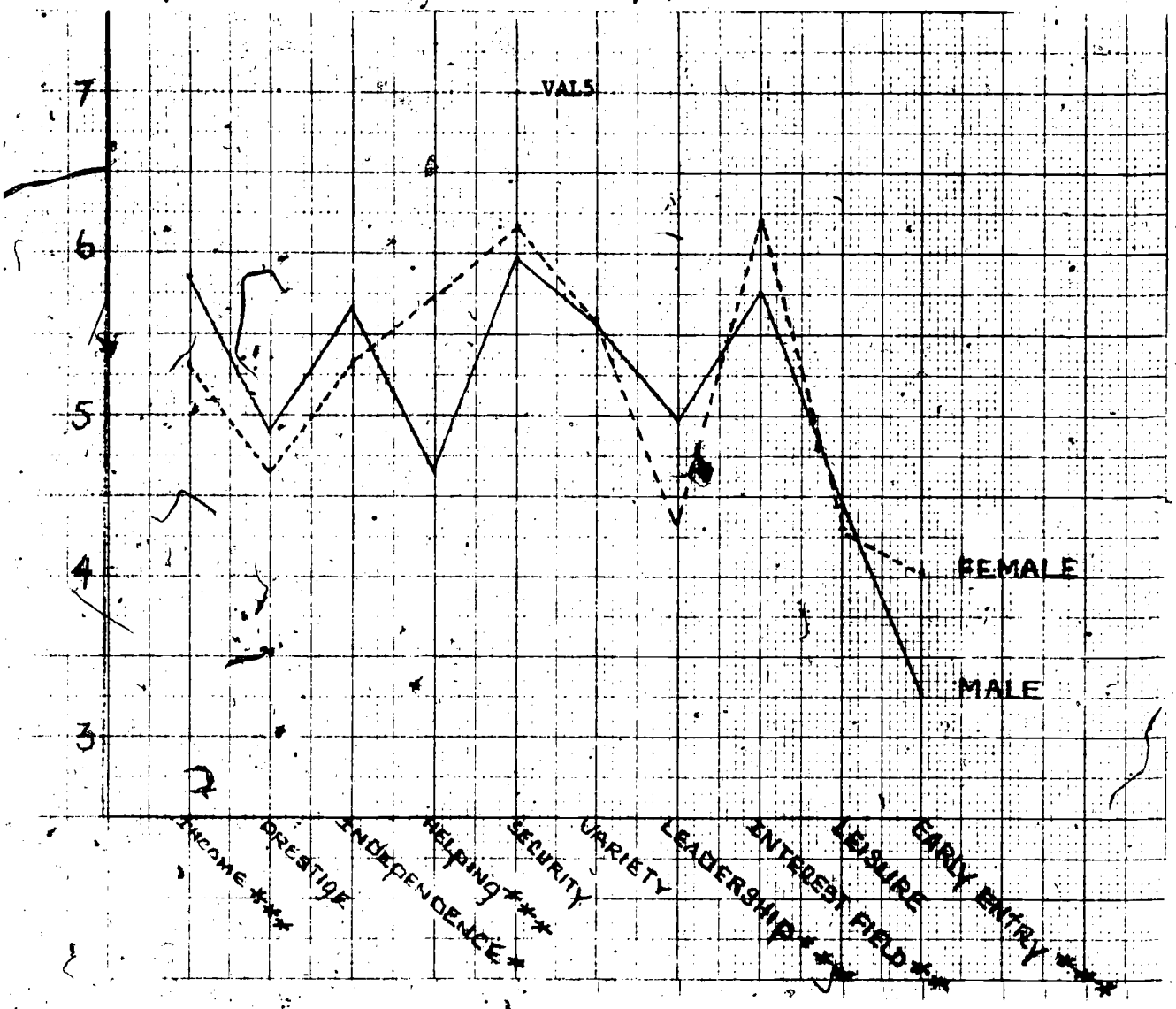
(a) Between-Group Distance Matrix

Group[a]	1	2	3	4	5	6
1	0.0000					
2	0.0435	0.0000				
3	0.0184	0.0053	0.0000			
4	0.0005	0.0344	0.0126	0.0000		
5	0.0110	0.0108	0.0009	0.0067	0.0000	
6	0.0001	0.0391	0.0156	0.0002	0.0089	0.0000

(b) Within-Group Distance Matrix

Group[a]	1	2	3	4	5	6
1	0.0000					
2	0.1342	0.0000				
3	0.2587	0.1447	0.0000			
4	0.4270	0.1956	0.2453	0.0000		
5	0.6388	0.3704	0.4933	0.0641	0.0000	
6	0.6361	0.3398	0.3754	0.0985	0.0674	0.0000

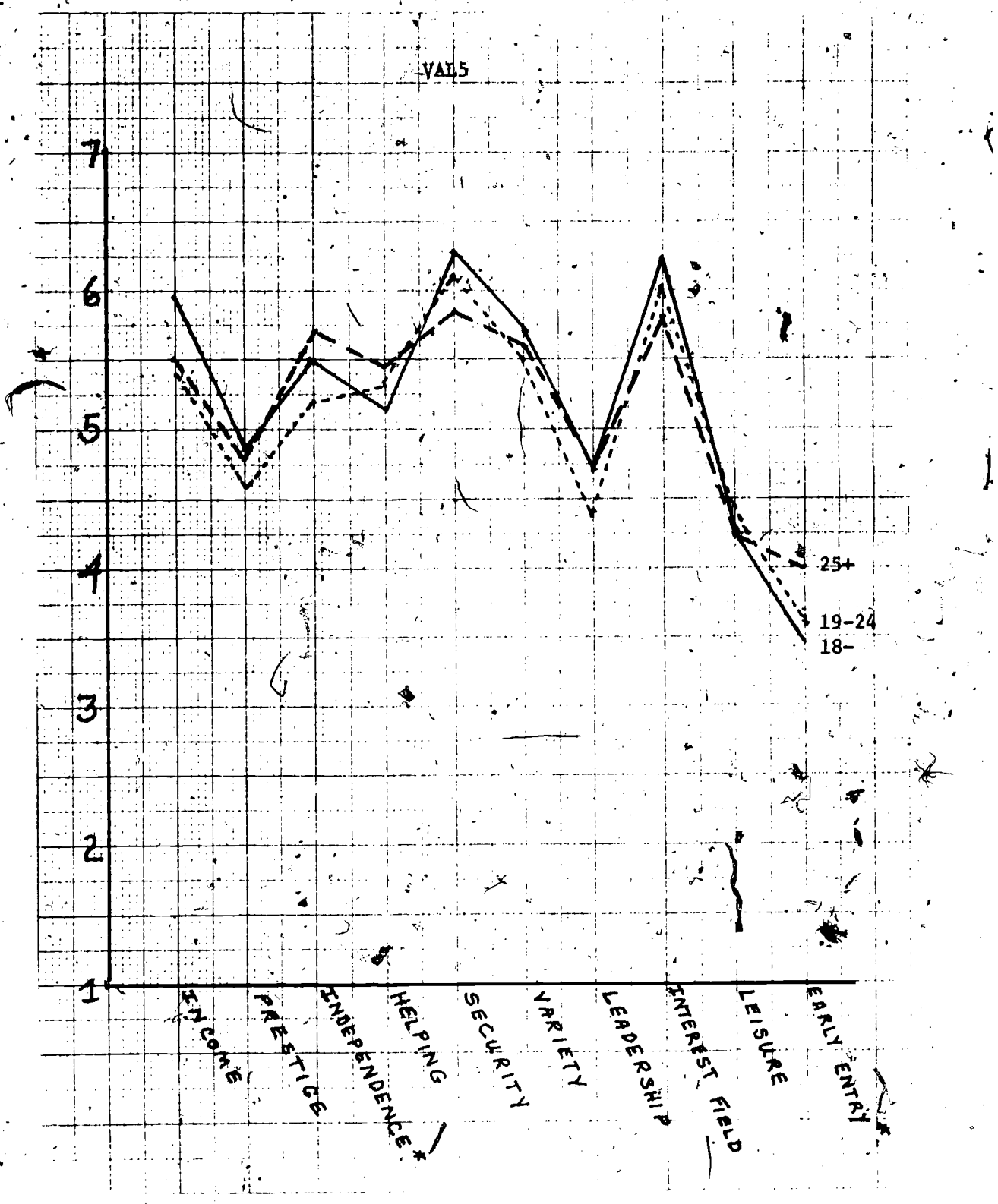
[a] Group 1 = Male; 18 and under
Group 2 = Male; 19-24
Group 3 = Male, 25 and over
Group 4 = Female; 18 and under
Group 5 = Female; 19-24
Group 6 = Female; 25 and over



Probability level associated with differences between groups

* = .05
** = .01
*** = .001

Figure 11. Value profiles for males and females (all ages)



* $p \leq .05$

Figure 12. Value profiles for age groups (sexes combined)

Values As Discriminators of Age/Sex Groups

Discriminant analysis using weights for 10 values. To examine more fully how values discriminate between age/sex groups, a multiple discriminant analysis was carried out on the unrestricted values weights (VAL5).

The first two discriminants were found to account for 87% of the trace (66% and 21%, respectively) and thus served as a good cut-off point for interpretation. Standardized coefficients for these two discriminants are reported in Table 3. Also reported are the total correlations, as well as the between-and within-group portions of the correlations, between the original variables and the discriminant scores. Both the standardized coefficients and the correlations help define the nature of the discriminant functions. The former, like partial coefficients, indicate the unique contribution of each variable to group separation; the latter allow elements that are common among the variables to become apparent.

To further help interpret the discriminant functions, the between-group correlations were plotted for the first two discriminants (see Figure 13). Since these correlations can be treated much like factor loadings on the discriminant functions, the plot shows the extent to which each of the variables is identified with each of the functions. To show the location of the groups in this space, group centroids are also plotted.

Examination of Table 3 and of Figure 13 shows that the first discriminant is defined primarily by four variables, Helping Others and Early Entry versus Leadership and Income. Since the centroids for the three female age groups (groups 4, 5, and 6) lie at the positive side and those for the males (groups 1, 2, and 3) lie at the negative side (the signs of course are arbitrary and are used merely to indicate opposite directions), the first discriminant clearly differentiates the sexes.

The variable contributing most to the second discriminant are Independence, on the one hand, and Security on the other. Since the group centroids for the two oldest age groups (groups 3 and 6) lie on the positive side of the function and the remaining age groups lie on the negative side, the second discriminant provides some differentiation of ages.

It is clear, however, from Figure 13, that there is much better discrimination between the sex groups than between the age groups. The greatest discrimination on the first or sex discriminant is obtained between groups 1 (males, age 18 and under) and 5 (females, age 19-25). The difference in score of about 1.4 indicates an overlap of about 48%. There is greater overlap of all other groups. The greatest discrimination on the second or age discriminant is obtained between groups 1 (males, age 18 and under) and 3 (males, 25 and over). The difference in

score of about .9 indicates an overlap of about 66%. Again we may note, somewhat tentatively, that group 4 (the youngest females) is the closest of the female groups to the male groups along the horizontal axis. (It also appears to be "out of sequence" along the vertical axis.)

The findings from the discriminant analysis are, quite naturally, very close to those reported earlier in the discussion of the values profiles. In the present analysis, however, Security stands out more prominently as a variable contributing to an age contrast then might have been expected from the previous, univariate tests on values following the MANOVA.

The ordering of the group means on the discriminants does, however, reflect that already noted for the single variable "Security" (see Table B16, Chapter IV). For females, the youngest age group falls midway between the two older groups; for males the age groups fall in a chronological ordering. This situation detracts from a nice clean interpretation of the second function as an age contrast.

It should also be noted that the importance attached to Security for younger students probably reflects the relatively high unemployment rates for young people in recent years and is not necessarily associated with youth per se.

Table 3

Discriminant Analysis of Ten Values by Age/Sex Groups[a]

(a) First Discriminant

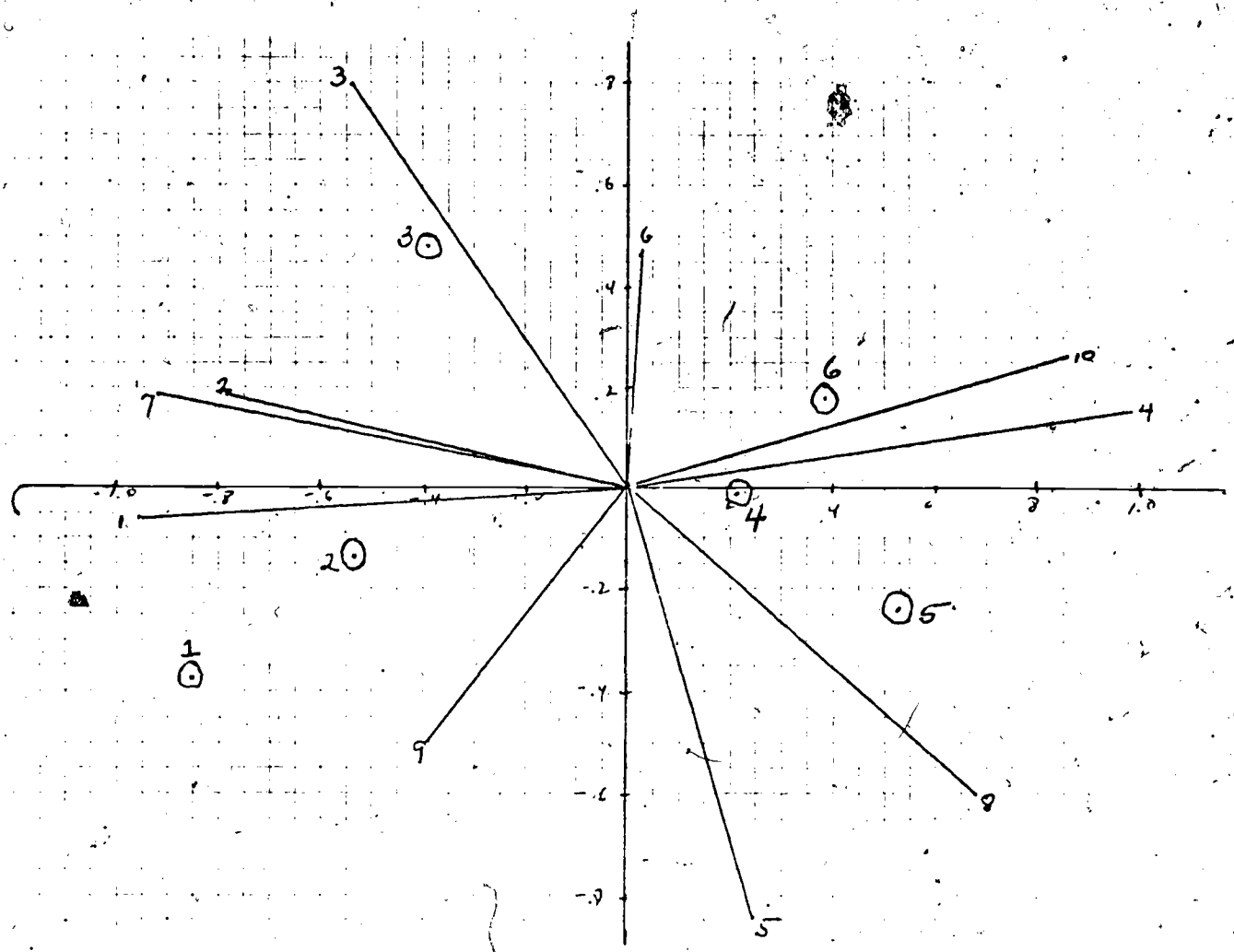
VARIABLES	STANDARDIZED	WITHIN (R)	BETWEEN (R)	TOTAL (R)
1. Income	-0.664625	-0.413429	-0.963279	-0.448247
2. Prestige	-0.130221	-0.172733	-0.786105	-0.190060
3. Independence	-0.227598	-0.203447	-0.542769	-0.221512
4. Helping Others	1.160579	0.579332	0.983185	0.617402
5. Security	0.110258	0.087729	0.243231	0.095560
6. Variety	0.280635	0.003025	0.018078	0.003371
7. Leadership	-0.919398	-0.388860	-0.918700	-0.421804
8. Interest Field	0.308077	0.230041	0.683936	0.251261
9. Leisure	-0.041926	-0.100192	-0.388065	-0.110079
0. Early Entry	0.854383	0.401702	0.875623	0.434337

(b) Second Discriminant

ARIABLES	STANDARDIZED	WITHIN (R)	BETWEEN (R)	TOTAL (R)
1. Income	0.113239	-0.044941	-0.065900	-0.045937
2. Prestige	0.023023	0.069494	0.174858	0.071445
3. Independence	0.907360	0.522000	0.790640	0.532142
4. Helping Others	0.394110	0.151476	0.152831	0.151564
5. Security	-0.939549	-0.531971	-0.842469	-0.543044
6. Variety	0.028716	0.142752	0.457980	0.147313
7. Leadership	0.127876	0.136734	0.178000	0.138548
8. Interest Field	-0.677904	-0.357737	-0.600942	-0.365671
9. Leisure	-0.531440	-0.225745	-0.499007	-0.232142
0. Early Entry	0.616828	0.203937	0.258938	0.206727

[a] Groups

1 = Males; 18 and under
2 = Males; 19-24
3 = Males; 25 and over
4 = Females; 18 and under
5 = Females; 19-24
6 = Females; 25 and over



Horizontal axis is the 1st discriminant function

Figure 13: Discriminant analysis of 10 values: plot of between-groups correlations (from Table 3)

Discriminant analysis using 27 variables. To broaden the description of CDM variables that discriminate age/sex groups more effectively than do values alone, a discriminant analysis was carried out on a subset of 27 variables from the entire variable pool (see Table 4). This variable set included the ten unrestricted value weights (VAL5) used previously in the discriminant analysis, as well as one or more variables from each of the subsystems of SIGI.

As in the previous analysis, the coefficients and correlations are presented in a table (Table 4) and between-group correlations are plotted (Figure 14). Since the first two discriminants are found to account for a high percentage of the trace (56% & 16%, respectively), discussion of results is limited to these two functions.

In examining the standardized coefficients, we find that the first function is defined primarily by four variables, namely English and Leadership on the one hand, and Helping Others and Early Entry on the other. It should be recalled that the variable "English" was coded with high grades receiving low numerical values (A = 1, B = 2, and so on), and must be interpreted accordingly. Thus, low grades in high school English go with high weights for Leadership in defining the first discriminant. The second discriminant is defined primarily by the values Security and Interest, versus Early Entry, Independence, and UTIL2. The location of the group centroids in Figure 14, as before, clearly designates the first and second functions as sex and age contrasts, respectively. In this case, however, high positive scores on the two functions are arbitrarily associated with males and young ages and negative scores with females and older ages.

Looking next at Figure 14, which is a plot of the between-group correlations, we find that many of the original variables are identified with the first discriminant. The variables that have between-group correlations of $r \geq .8$ with the first discriminant are English, Income, #OCC2, Leadership, #LOC3, and STR. Those with $r \leq -.8$ are Helping Others, SKEWI, Early Entry, and Interest Field. (If you allow LOC3 (.787) and STR (.751) on the positive side, you have to allow Interest (-.779) on the negative side.)

The only variable that correlates as highly with the second discriminant, as those mentioned above, with the first, is Security. Dropping the level somewhat we find that those for which $r \geq .6$ are Security, PRED2, Interest, NPLN2, and PRED11. Those that correlate $r \leq -.6$ are UTIL2 and Independence.

Once again, the first function better separates groups than the second. Though the minimum percent overlap is not much increased from that obtained from values alone (46% and 50%, respectively), the logical ordering of the age groups in the discriminant space does help clarify the interpretation of the

second discriminant as an age contrast.

Comparing the previous analysis based on ten values alone with the present one, which incorporates variables from several domains, we see that in the main, the values domain accounts for age/sex group separation. It seems that, with the exception of English grades for the sex contrast, and UTIL2 for the age contrast, the addition of a wide range of process variables provides little increment to values alone in discriminating age/sex groups.

While not substantially changing the nature of the functions, the addition of variables does help broaden our understanding of them. According to the discriminant analysis, it appears that maleness in this population is characterized by Leadership and High Income in the values domain, by low grades in high school English in the academic achievement domain, and by high information-seeking activities (#LOC3, #OCC2, STR) in the CDM domain.

Femaleness is characterized by the values Helping Others and Early Entry, and by a more normal distribution of values weights than that evidenced for males.

Table 4

Discriminant Analyses Using 27 Variables

(a) First Discriminant

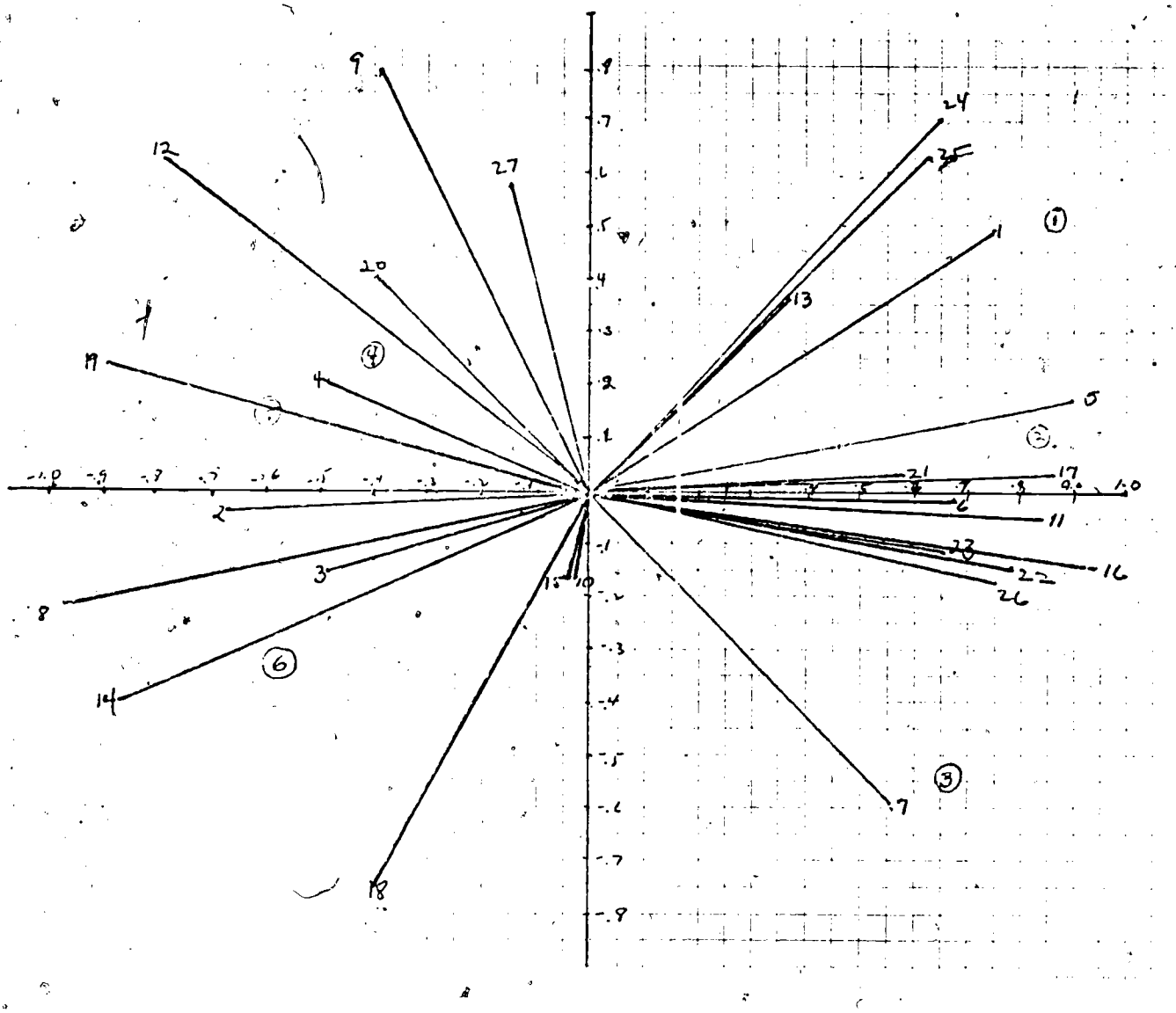
	VARIABLES	STANDARDIZED	WITHIN (R)	BETWEEN (R)	TOTAL (R)
1.	INTR7	0.230233	0.201592	0.736074	0.236387
2.	INTR8	-0.132092	-0.102120	-0.688237	-0.121089
3.	INTR9	-0.019179	-0.089904	-0.476269	-0.106263
4.	INTR10	-0.042787	-0.068503	-0.486296	-0.081278
5.	Income	0.210746	0.278328	0.886096	0.324832
6.	Prestige	0.021537	0.106958	0.665628	0.126702
7.	Independence	0.125299	0.153006	0.560954	0.179560
8.	Helping Others	-0.382348	-0.417083	-0.967105	-0.478463
9.	Security	-0.142222	-0.098919	-0.379553	-0.116321
10.	Variety	-0.158771	-0.003882	-0.029500	-0.004587
11.	Leadership	0.261069	0.260537	0.841791	0.304268
12.	Interest Field	-0.133328	-0.191048	-0.779264	-0.224835
13.	Leisure	0.009427	0.072816	0.383990	0.086051
14.	Early Entry	-0.325255	-0.293596	-0.873996	-0.341675
15.	Math	-0.021410	-0.011133	-0.046086	-0.013051
16.	English	0.479186	0.404158	0.941898	0.463901
17.	#OCC2	0.029778	0.155894	0.855430	0.184396
18.	UTIL2	-0.056344	-0.094745	-0.405048	-0.111487
19.	SKEW1	-0.100622	-0.254042	-0.889006	-0.297575
20.	CORRV	-0.090021	-0.057588	-0.414896	-0.068354
21.	#CAT	0.130819	0.106603	0.577172	0.126071
22.	#LOC3	0.099420	0.150208	0.786892	0.177575
23.	COMP4	0.087818	0.167213	0.657033	0.196504
24.	PRED2	0.086784	0.170978	0.639014	0.200556
25.	NPLN2	-0.119173	0.123275	0.625582	0.145567
26.	STR	0.169110	0.249	0.751825	0.285832
27.	PRED11	-0.163627	-0.0200	-0.133437	-0.023841

Table 4 (continued)

Discriminant Analyses Using 27 Variables

(b) Second Discriminant

	VARIABLES	STANDARDIZED	WITHIN (R)	BETWEEN (R)	TOTAL (R)
1.	INTR7	C.157688	0.256150	C.489C18	0.266250
2.	INTR8	-0.134332	-0.013208	-0.C43369	-C.013782
3.	INTR9	-C.039510	-0.056005	-0.152898	-0.058595
4.	INTR10	C.C42416	0.055166	0.208020	0.058098
5.	Income	0.026397	0.105658	0.170600	0.108964
6.	Prestige	0.031382	-0.000475	-0.007568	-0.000699
7.	Independence	-C.343445	-0.307546	-0.597002	-0.320192
8.	Helping Others	-0.205424	-0.186292	-0.221310	-0.189031
9.	Security	0.455323	0.392302	0.791258	0.408744
10.	Variety	C.060264	-0.038406	-0.155764	-0.040425
11.	Leadership	C.054116	-0.027274	-C.C53C85	-0.028676
12.	Interest Field	C.382808	0.288698	0.624358	0.301482
13.	Leisure	0.241023	0.131671	C.363885	0.137983
14.	Early Entry	-0.377176	-0.255891	-0.396371	-0.263835
15.	Math	-C.049819	-0.073316	-0.159613	-0.076429
16.	English	-0.133217	-0.112415	-0.143099	-0.114879
17.	#OCC2	0.075859	0.010623	0.C25195	0.010937
18.	UTIL2	-0.332887	-0.330405	-0.743726	-0.345038
19.	SKEW1	C.245856	0.124253	0.235427	0.129462
20.	CORRV	0.055923	0.104354	0.398260	0.109892
21.	#CAT	-C.CC2504	0.CC8994	0.022734	0.009323
22.	#LOC3	0.027091	-0.047201	-0.135012	-0.049681
23.	COMP4	-0.133524	-0.056383	-0.122136	-0.059060
24.	PRED2	0.153104	0.356558	0.698938	0.370956
25.	NPLN2	0.162871	0.232845	0.618597	0.243822
26.	STR	-C.265554	-0.109C07	-C.181C38	-0.113018
27.	PRED11	C.2C2783	0.167192	0.580113	0.175791



Horizontal axis is the 1st discriminant function

Figure 14. Discriminant analysis of 27 variables: plot of the between-group correlations (from Table 4)

Field of Interest, Occupation Planned for, and Occupation Preferred

In the Values system, students indicate in which one of six interest fields they prefer to work. Later, as they explore and consider a variety of occupations in the course of going through SIGI, they select an occupation (in the Planning section) to study the roads to entry, and eventually (in the section called Strategy), they designate an occupation that they prefer. It is useful to examine the persistence or consistency with which students pursue an early-stated choice of interest field as they go on to make plans and express preferences.

Figures 15 and 16 show the percentages of male and female students, respectively, who chose occupations which were consistent or inconsistent with the interest field they had selected previously. The figures are presented in the form of a "tree," with branches that trace consistencies and inconsistencies across the three columns (labeled "Field of Interest," "Occupation Planned for," and "Occupation Chosen in Strategy"). Each branch of the tree gives the percentage of students entering from the prior branch. Thus, it is the conditional probability of a choice, given the previous choice made, that is presented at each branch.

The variable in the first column, Field of Interest (VAL3), refers to the response in the Values section, where a student selects a field of work most interesting to him/her. The number of students choosing the field is shown in parentheses; the corresponding percentage is given as a decimal. In Figure 15, for example, of all males in the sample, 26% (46) chose the Scientific field of interest.

The second variable, Occupation Planned for, represents the first occupation chosen by students in the Planning section when they investigate educational and training requirements for entry. The figures show the numbers and percentages of male (Figure 15) and female (Figure 16) students, who selected an occupation classified either in the same field of interest chosen in VALUES, or in a different field.[1]

[1] An occupation may be classified in as many as three fields of interest. In order for the student's response to be coded as 'Same,' the preferred interest field must be one of the fields in which the chosen occupation is classified and the occupation must rate high (3 or 4 on a scale extending from 1 to 4) on the degree to which its activities are appropriate to that field.

The last variable, Occupation Chosen in Strategy, represents the occupation for which the student indicates a preference (in STRATEGY), after having received information about the desirability (in terms of the student's values)[1] of three different occupations and having estimated the probability of entering them. In the third column, each branch shows the number and the corresponding percentage of students from the previous branch who chose an occupation in STRATEGY that was either in the same or different field of interest as that originally chosen in VALUES. In Figure 15, for example, we find that of the total number of males (175), 26% (46) chose the Scientific field of interest in VALUES. Of this group, 80% (37) planned for a Scientific occupation in PLANNING. Of these 37 males, 95% (35) again chose a Scientific occupation in STRATEGY, while 5% (2) chose a non-Scientific occupation. Similarly, of the 9 males from the Scientific field of interest group who planned for a non-Scientific occupation in PLANNING, 11% (1) chose a Scientific occupation in STRATEGY, while 89% (8) again chose a non-Scientific occupation.

To determine the probability of a series of choices made, the conditional probabilities along each branch of the path followed must be multiplied. Using the above example for the topmost branch of the tree in Figure 15, the probability of a male choosing the Scientific field of interest in VALUES (.26), and planning for a Scientific occupation (.80), and then choosing a Scientific occupation in STRATEGY (.95) is .26 x .80 x .95= .20 or 20%. In other words, of the total number of males (175), 20% (35) were interested in the Scientific field and twice made occupational choices consistent with their interests.

An examination of the percentages of students preferring each of the six interest fields (the first column in Figures 15 and 16) indicates that (1) there is a significant relationship between sex and choice of field of interest (chi-square significant at .001 level); (2) more male students chose the Scientific field (26%) than any other field; (3) females chose the field of Personal Contact (35%) more frequently than any other field; (4) preference for Scientific, Technological, and Administrative fields was greater among males than females (differences in percentages are 13, 7, and 3, respectively); (5) preference for Personal Contact, Verbal, and Aesthetic fields was greater among females than males (differences in percentages are 13, 6, and 4, respectively). Thus, the greatest differences in preference are found in the Scientific and Personal Contact fields, with males preferring the former and females the latter.

[1] The terms 'desirability' and 'probability' are discussed on pages 103 (Table B-40) and 105 (Table B-42). See also p. 143.

In examining the percentages of the second column in each figure, it is seen that large percentages of students planned for occupations that are consistent ("same") with a field of interest indicated earlier in VALUES. Only small differences, however, are noted between males and females in the frequency with which they made consistent or inconsistent choices. For four of the six interest fields (the exceptions being the Verbal and Aesthetic fields), at least 72% of the choices are consistent with previously indicated interest field selections. A factor contributing to the smaller percentages of consistent choices for the Verbal and Aesthetic fields may be the small number of occupations in SIGI for these fields. At the time of this study, 21% of the occupations in SIGI were classified in the Verbal field (i.e., given a rating of either 3 or 4 for this interest field) and only 12% were classified in the Aesthetic field. The percentages for the other fields were Scientific (36%), Technological (37%), Administrative (27%), and Personal Contact (45%). In addition to base rate considerations, it is quite likely that factors other than major field of interest were affecting students with a preference for the Verbal and Aesthetic fields. For example, they may have perceived the market for jobs in these fields as particularly unfavorable.

A quick scan of the percentages in column 3 indicates that there is a strong relationship between the consistency of the interest field of occupations chosen in PLANNING and those chosen in STRATEGY--even for the Verbal and Aesthetic fields. Students who selected occupations in PLANNING that are consistent with their original interest field choices also tended to select occupations in STRATEGY that are consistent with the same field of interest; students who planned for occupations in different interest fields tended also to select, in STRATEGY, occupations that are in interest fields different from their early stated interest preference. This tendency in persistence of interest field choice does not appear to be related to sex. That is, a chi-square computed on a decomposition into male and female components of the contingency table of the frequency of "same" and "different" choices made in PLANNING and STRATEGY is found not to reach significance ($p > .05$).

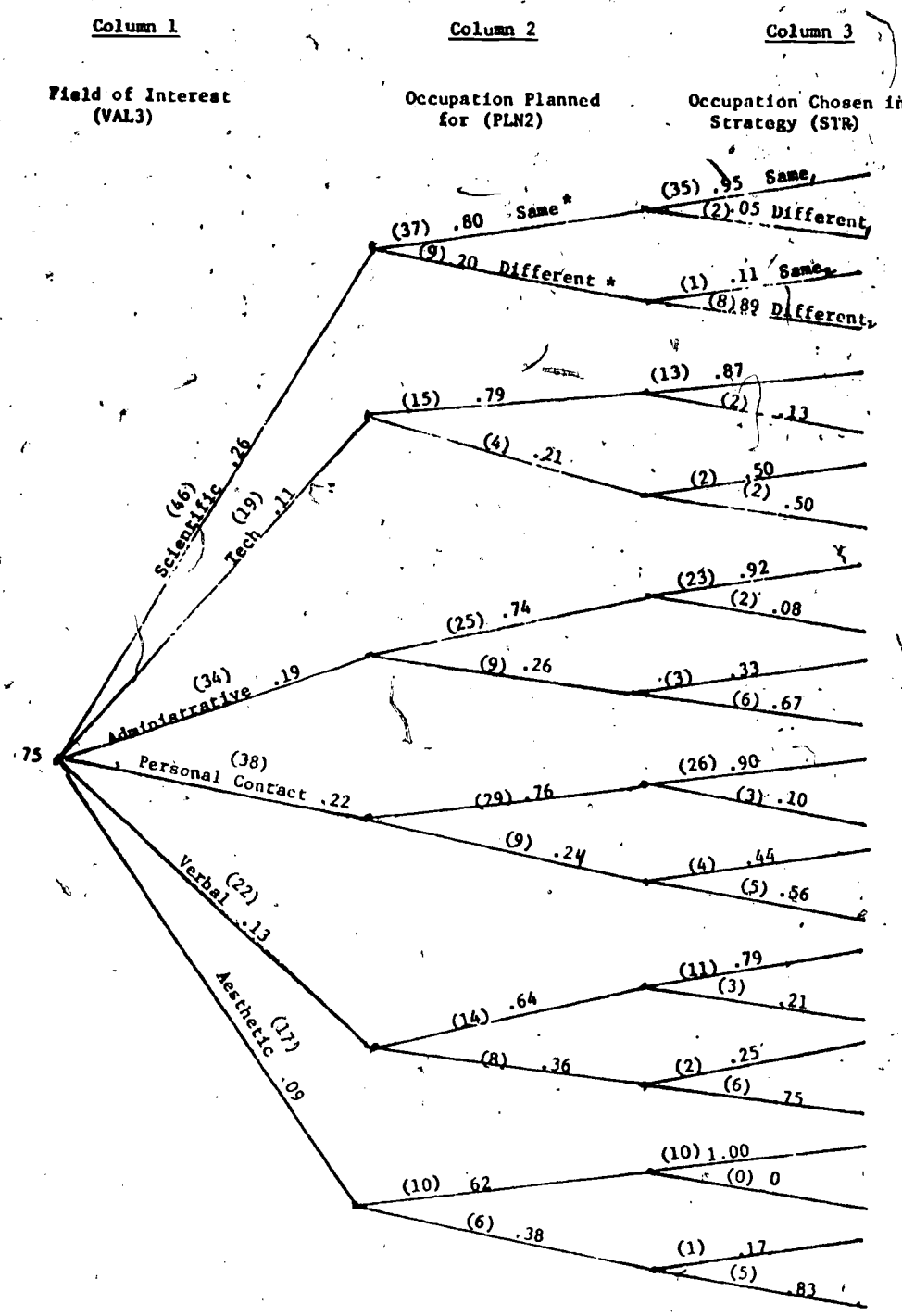
A chi-square test of interest field and sex differences in the choice of occupations selected in STRATEGY (column 3 of Figures 15 and 16) shows that (1) there is no relationship between sex and the selection of "same" and "different" occupations in STRATEGY (independent of the choice made in PLANNING); and (2) for both males and females, separately, there is no relationship between interest field and the selection of "same" and "different" occupations in STRATEGY.

A closer look at the percentages in column 3 does, however, reveal an interesting point. If the interest fields most preferred by both sexes--Scientific for the males and Personal Contact for the females--are viewed separately, we find that, for

females but not males, there is a significant relationship between preference for one of these two interest fields and the selection of occupations in STRATEGY. (Strictly speaking, a chi-square test on a part of the "tree," particularly a part selected after viewing the data, is not appropriate.) Thus, females who prefer the Personal Contact field of interest are more likely to choose, in STRATEGY, an occupation which is consistent with their interest field choice than are females who prefer the Scientific interest field.

One explanation to account for this behavior on the part of females, and only females, is related to the degree of commitment involved at the three stages of choice. In Values, students expressed a preference for a given field of interest. In Planning, they investigated in considerable detail the educational requirements and other steps for entry into a specified occupation. Since the occupations in the Scientific interest field seem likely to require a heavier concentration of courses in the technical, scientific, and mathematical fields than do occupations in the Personal Contact interest field, females may have tended to be deterred by the prospect of actually enrolling in such courses. The preference in Strategy may also have reflected the impact of other values besides interest. An additional point is that many of the occupations in the Scientific field (30%) require a Ph.D for entry. That this may have been a greater drawback for [illegible] is consistent with what we [illegible] in values. A higher weight was attached to the value Early Entry by females than males.

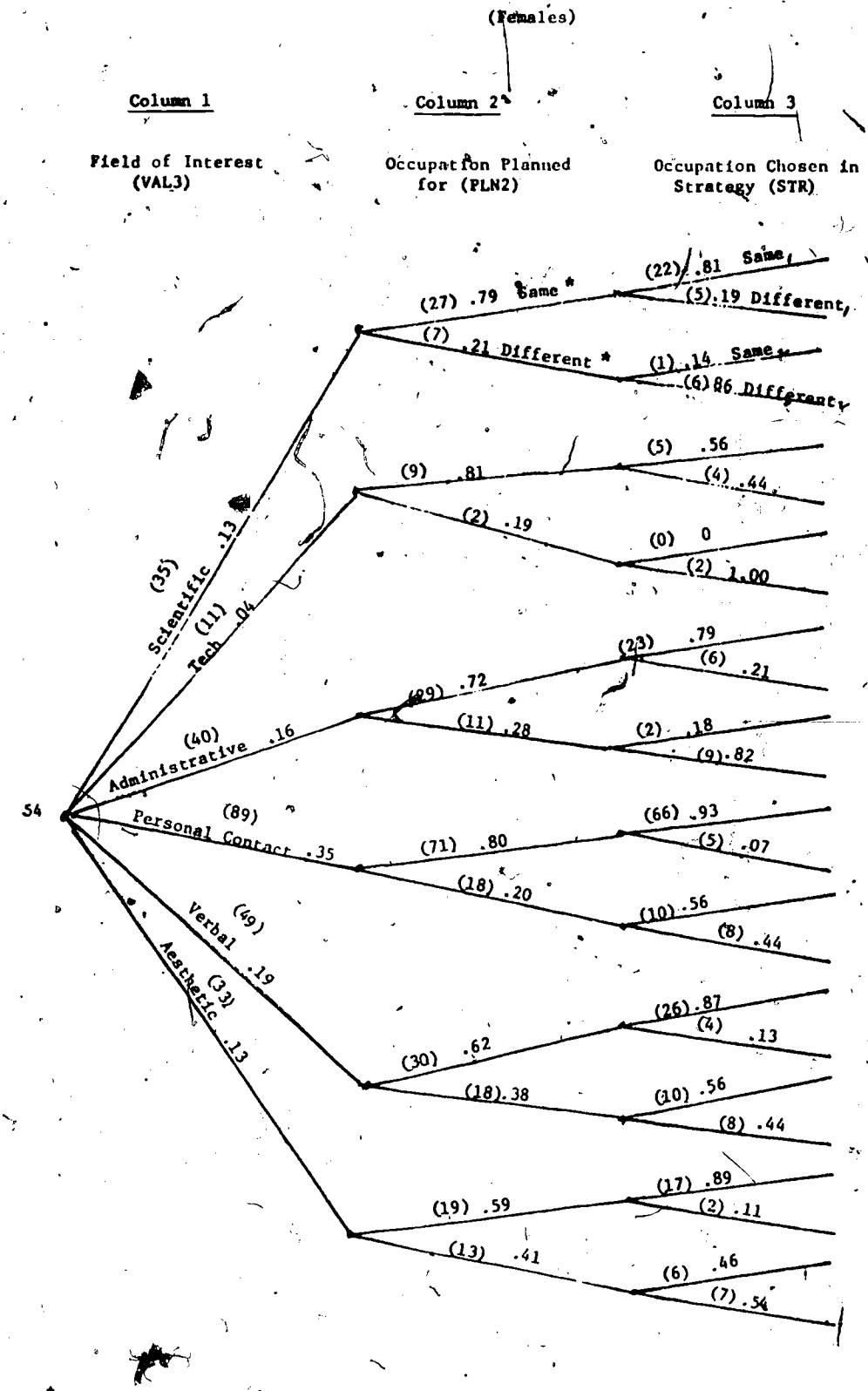
(Males)



* 'Same' and 'Different,' in Columns 2 and 3, are used to identify students whose choice of occupation is consistent or inconsistent with their preferred Field of Interest. To avoid crowding, these labels are filled in only for the branches in the Scientific field. They should be understood, following the same order braoch by branch, for each of the other fields.

Figure 15: Probability tree for field of interest, occupation planned for in Planning, and occupation preferred in Strategy

(Females)



* 'Same' and 'Different,' in Columns 2 and 3, are used to identify students whose choice of occupation is consistent or inconsistent with their preferred Field of Interest. To avoid crowding, these labels are filled in only for the branches in the Scientific field. They should be understood, following the same order branch by branch, for each of the other fields.

Figure 16: Probability tree for field of interest, occupation planned for in Planning, and occupation preferred in Strategy

It might be hypothesized that students who choose occupations consistent with their preferred interest field would give a higher weight to the value Interest than students who are not consistent in their choices. As can be seen from the pattern of Interest means below, by and large this hypothesis appears to be confirmed. As can be seen in Table 5, students who choose an occupation in STRATEGY that is consistent with their preferred interest field do indeed tend to assign a higher weight to Interest than do students whose choice in STRATEGY is inconsistent with their preferred interest field ($p < .05$).

This finding is true for both males and females considered separately.

Table 5

Interest Field Group Means

for Students with Consistent and Inconsistent Choices in

	PLANNING		STRATEGY	
	Consistent	Inconsistent	Consistent	Inconsistent
Males	5.84	5.44	5.92	5.20
Females	6.30	6.00	6.36	5.86

Though the pattern of means is the same for PLANNING as it is for STRATEGY, the differences between group means are smaller and not statistically significant ($p > .05$). This is not surprising, since the occupation chosen in STRATEGY represents a more considered and analytical preference than the occupation selected in PLANNING.

Desirability Sums

As another way of comparing "Male" vs. "Female" occupations, Desirability Sums for all SIGI occupations were computed for an average male values profile and a female values profile. (See Tables B-12 through B-31 for a description of these values.)

A "Desirability Sum" is arrived at in the following way: The occupations in SIGI have been rated in accordance with their capacity to satisfy each of the ten values. This rating is expressed as a number ranging from 1 (low) to 4 (high)--except for Income, which ranges from 1 to 5. For example, at the time of the study, X-ray Technologist carried a rating of 2 on Income (median income of $8000-$10,999 per year) and a rating of 3 (more than average) on Prestige. Mathematician had ratings of 5 (more than $20,000 per year) and 4 (a great amount) on these two values. When a student's restricted value weight is multiplied by the occupation's rating on that value and the resulting products for all ten values are summed, the result is a "Desirability Sum" that expresses numerically the relationship between what the student wants and what the occupation offers.

For present purposes, for all the SIGI occupations, Desirability Sums were computed using average male and average female value weights. In computing Desirability Sums, only nine of the ten values were used. Interest Field was excluded because its rating in SIGI is associated with a particular field. Table 6 shows the ten highest and the ten lowerst sums when the value weights were restricted to a total of 40 points (VAL6). Corresponding sums using the unrestricted value weights (VAL5) are not presented since they closely resembled those in Table 6.

With the above mentioned exclusion of differences in weights assigned to Work in Major Field of Interest, the ten occupations with the highest Desirability Sums are found to be the same for both the average male and the average female and their rank orders are the same. The ten least desirable occupations are also the same for the average male and the average female, although their rank order is slightly different. Keypunch Operator and Model were the least desirable for both the sexes, followed for the average male by Stenographer, Typist, Avionics Technician, Library Technician, Computer Operator, Medical Lab Technician, Receptionist, and Accounting Clerk, in that order. For the average female Library Technician was third least desirable, Stenographer fourth, Typist fifth, Avionics Technician sixth. The rest were ranked the same as for the average male.

It is interesting that for the most desirable occupations, Desirability Sums are consistently higher for the average male than for the average female, with differences that range from 3.4 to 5.1 points. For the least desirable occupations, however, differences in Desirability Sums for males and females tend to be much smaller (.1 to 1.1 points) and for four occupations the sums are slightly higher for the average female than for the

average male (Keypunch Operator, Computer Operator, Stenographer, and Accounting Clerk). The differences in Desirability Sums for the average male and female can, in large, be explained by the fact that occupations with high sums tend to have high ratings for the characteristically male value of High Income and low ratings for the characteristically female value of Early Entry. The reverse situation is true for occupations at the lower end of the desirability scale.

In short, when interests are excluded, the ten differences between average values weights assigned by males and those assigned by females have relatively little effect on the designation of occupations at the extremes of the Desirability scale. Those occupations that would be rated as most desirable for the "average" male configuration of values would also be rated as most desirable for the "average" female configuration of values.

Table 6

Comparison of the Desirability Sums for the Average Male and Average Female

Occupations with the 10 Highest Desirability Sums

Occupation	Average Male	Average Female
Lawyer	131.6	126.5
Physician	131.6	126.5
Psychologist	130.2	125.1
Dentist	128.0	123.5
Teacher, Voc/Tech	126.1	122.8
Teacher, Ele/Sec	125.5	121.2
Political Scientist	123.6	119.9
Teacher, Spec. Ed.	123.4	118.7
Veterinarian	120.3	115.3
Speech Pathologist	117.5	113.2

Occupations with the 10 Lowest Desirability Sums

Occupation	Average Male	Average Female
Keypunch Operator	50.2	51.2
Model	60.1	59.3
Stenographer	62.5	62.8
Typist	63.5	63.3
Avionics Technician	63.5	63.4
Library Technician	63.5	62.6
Computer Operator	63.8	64.1
Medical Lab Technician	65.7	65.0
Receptionist	67.1	66.7
Accounting Clerk	67.4	67.5

Formation of Sex-Typical and Sex-Atypical Groups

The first part of the study examined age and sex differences in occupational values and in a wide variety of variables related to the CDM process. In that part of the study we found that the values profiles for males and females show considerable differences and that there are sex differences for several variables other than values, namely high school English grades and counts of the number of times students interact with various components of SIGI. These differences make it possible to formulate sex-typical and sex-atypical groups.

The general approach followed in the development of sex-typical and sex-atypical groups was to run a regression analysis in which sex, scored dichotomously, was the dependent variable, and variables previously found to show sex differences were the predictors. A separate analysis was run for values and for the count variables. From the regression analysis, predicted sex "scores" were computed. The distribution of predicted sex scores was then cut to match the actual sex distribution (41% males, 59% females). Scores above the cutoff point were designated "predicted male" and those below "predicted female." Students for whom the predicted and actual sex agreed were classified as sex-typical; those for whom there was disagreement were classified as sex-atypical. Four groups were formed as shown below.

Predicted Sex	Actual Sex: Male	Actual Sex: Female
Male	Male Sex-Typical (MT)	Female Sex-Atypical (FA)
Female	Male Sex-Atypical (MA)	Female Sex-Typical (FT)

Separate classifications into groups were made on the basis of each analysis, i.e., using values and counts of interactions with SIGI. A more detailed discussion of each of these classification procedures follows.

Classification into Groups by Values

The results from a stepwise regression using the ten unrestricted value weights (VAL5) as the pool of predictors and sex as the dependent variable are reported below.

Two variables

Sex = .067 (Helping) -.053 (Lead.) + 1.483

Multiple R = .32

Three variables

Sex = .065 (Helping) -.052 (Lead) + .037 (Early Entry) + 1.347

Multiple R = .36

Four variables

Sex = .068 (Helping) -.046 (Lead) + .040 (Early Entry) -.040 (Income)

Multiple R = .38

The four variable solution was found to be the highest order solution for which all beta weights are significant. This equation was used to compute predicted sex scores. The variables included in this equation are, as expected, those showing greatest sex differences in the first part of the study.

The number of students classified into each of the sex-typical and atypical groups is shown below.

	Male	Female
Sex-Typical	(MT) 104	(FT) 184
Sex-Atypical	(MA) 72	(FA) 73

There is a slight bias in this procedure as evidenced by the higher percentage of females classified as sex-typical than males so classified (72% & 60%, respectively). This bias is, at least in part, due to the disproportionate number of females in the sample and therefore their over-representation in the regression analysis.

Classification by Activity Level Variables

A stepwise regression was run using twelve variables, which are counts of interaction with different components of SIGI, as the predictor pool. These activity level variables are: #LOC3, #OCC2, COMP4, #CAT, NPLN2, STR, C1, C2, C3, C4, C5, and C6. The last six variables, C1 through C6, are counts of the number of questions asked in each of the six categories used in the Compare system (see Figure 2). Results from this analysis are shown below.

Two variables

Sex = .024 (C3) - .066 (STR) + 1.755

R = .22

Three variables

Sex = .047 (C3) - .076 (STR) + .006 (COMP4) + 1.731

R = .24

Four variables

Sex = .052 (C3) - .077 (STR) + .010 (COMP4) - .022 (C5) + 1.726

R = .25

Five variables

Sex = .067 (C3) - .081 (STR) + .022 (COMP4) - .040 (C5) - .032 (C2) + 1.729

R = .27

The five variable solution was used to compute predicted sex scores since it was the highest order solution for which all variables have significant beta weights. The number of students classified into each of the sex-typical and sex-atypical groups is shown below.

	Males	Females
Sex-Typical	(MT) 92	(FT) 173
Sex-Atypical	(MA) 84	(FA) 84

This procedure, like the previous one, is somewhat biased with 67% of the females designated sex-typical and only 52% of the males so classified. The two methods of classification overlap considerably, as would be expected. Analyses using the two methods are often quite similar. Since, in general, the values-based classification has a higher multiple R based on fewer variables, produces sharper results, and is in many ways more interesting, we have usually reported only the analyses based on the value classification in the pages that follow.

Interest Field Choices for Sex-Typical Groups

In an earlier discussion of sex differences in preferred interest fields (see p. 137), it was noted that there is a significant relationship between a student's actual sex and the interest field that he/she prefers to work in. Largest sex differences, in the expected direction, were noted for the Scientific and Personal Contact fields. Now the question arises as to whether interest field differences can be further explained in terms of sex-related career decision-making variables, such as values and activity levels.

Table 7 gives distributions of interest field preferences for males and females classified as sex-typical or -atypical using the values classification procedure described above.

Partitioned chi squares were computed on the frequencies in these tables and the results set out below in Table 8. The findings from Tables 7 and 8 are summarized below.

(1) As discussed previously, there is a relationship between students' sex and their interest field preferences. What Table 7 shows, however, is that this relationship is largely due to the sex-typical groups (MT & FT). A relationship generally noted between the interest field preferences and sex for

sex-typical students often does not hold for sex-atypical students. Thus, the over-all difference in interest preferences is significant at the .001 level between typical males and typical females. The differences between MA and FA and between MA and FT, however, are not significant.

(2) Typicality is related to the over-all distribution of interest field preferences for males but not for females.

(3) Distinctions in typicality are most useful when focus is on selected interest field preferences on which the sexes tend to be most sharply differentiated. For the two groups of male students, i.e., MT & MA, we find differences that parallel those noted between males and females. That is the largest differences between typical and atypical males in Table 7 are evidenced in their preferences for the Scientific, Personal Contact, and Aesthetic fields, with typical males preferring the Scientific field (33% vs. 17%) and atypical males preferring the Personal Contact field (31% vs. 15%) and the Aesthetic Field (15% vs. 6%). Similar differences are found between typical and atypical females, with a larger proportion of atypical females preferring the Scientific field (19% vs. 11%) and a larger proportion of typical females preferring the Personal Contact field (38% vs. 27%).

Table 7

Preferred Interest Fields for Sex-Typical and -Atypical Groups Formed Using Values

(Numbers in Parentheses are Percents of Columns)

	MT	MA	FT	FA
Scientific	34(32.7)	12(16.7)	21(11.4)	14(19.2)
Technological	10(9.6)	9(12.5)	9(4.9)	2(2.7)
Administrative	24(23.1)	10(13.9)	27(14.7)	13(17.8)
Personal Contact	16(15.4)	22(30.6)	69(37.5)	20(27.4)
Verbal	14(13.5)	8(11.1)	34(18.5)	15(20.6)
Aesthetic	6(5.7)	11(15.2)	24(13.0)	9(12.3)

Table 8

Partitioned Chi-Squares From Table 7

Partition	Chi-Square (df=5)	Significance Level
Male/Female	25.7	.001
Typical/Atypical	1.4	n.s.
MT/MA	15.0	.01
FT/FA	6.3	n.s.
MA/FT	8.0	n.s.
MT/FA	13.0	.05
MT/FT	36.0	.001
MA/FA	7.4	n.s.

Information-Seeking

In the SIGI subsystem called COMPARE, students may select questions from among a list of 28 and seek answers to these questions about occupations of interest to them. These questions, as shown in Figure 2, are grouped into six categories.

Table 9 shows the mean number of questions in each of the six categories asked by males and females classified as sex-typical or -atypical on the basis of values. (Corresponding figures for sex-typical or -atypical groups formed on the basis of activities were not computed since one component of this classification procedure is the number of questions asked in COMPARE). As the means in the table show, the most popular categories of questions asked, by all groups, are Definition and Description; Education, Training and Other Requirements; and Opportunities and Outlook. The least popular category is Personal Satisfactions. It should not be inferred that the relatively few questions asked by students about personal satisfactions reflects a lack of concern with these kinds of data. Rather, this behavior is probably a result of having already covered much of this category in a preceding subsystem of SIGI called LOCATE. In LOCATE, students select values for retrieving occupations and specify a minimum return they would like on each value. Thus, as they inspect the occupations retrieved for them in LOCATE, they learn much about the personal satisfactions the occupations offer. It is likely that they carry this information into COMPARE and therefore ask few additional questions of this nature.

Although the rank ordering of the within-group means in Table 9 are quite similar, there are significant differences between the groups. Two-way ANOVAs (sex by typicality), run

separately for each category of questions, showed significant sex differences for three of the six categories--Income, Conditions of Work, and Opportunities and Outlook. Having learned previously that males asked more questions about occupations, we can now expand that finding to include areas of information-seeking: (1) Males, more than females, ask questions about Income, Conditions of Work, and Opportunities and Outlook; (2) no sex difference is noted in the number of questions asked about Definitions and Descriptions; Education, Training and Other Requirements; and Personal Satisfactions.

Table 9

Mean Number of Questions Asked in 6 Categories Used in COMPARE

(Sex-Typical Groups Formed Using Values)

Category of Questions in COMPARE	Group Means			
	MT	MA	FT	FA
Definition and Description	4.1	4.4	3.8	4.2
Education, Training, & Other Requirements	4.0	4.6	3.7	4.3
Income	3.0	3.6	2.5	2.5
Personal Satisfactions	1.5	1.2	1.4	1.5
Conditions of Work	2.8	3.2	2.5	3.1
Opportunities & Outlook	4.1	3.7	3.2	3.1

Value Profiles for Occupations Selected in PLANNING

A question of some importance is whether the occupations students plan for are consistent with their occupational values and whether the degree of consistency varies with sex and/or typicality. To provide the data necessary to examine this issue, mean value ratings of occupations selected by students in PLANNING were computed. Comparisons were then made between these means and the value profiles of students.

The ratings of occupations come directly from SIGI. Every occupation in SIGI is rated on ten values dimensions: High Income, Prestige, Independence, Helping Others, Security, Variety,

Leadership, Interest Field, Leisure, and Early Entry. A rating indicates the opportunity an occupation provides for the kind of satisfaction represented by each value. Ratings were made on a scale from 1 to 5 for "Income" and 1 to 4 for all other values. (Method of rating is described, and precise scale demarcations are defined and illustrated in Pears & Weber, 1976.)

Table 10 shows the mean rating on each value of occupations selected in PLANNING by male and female students classified as sex-typical and sex-atypical on the basis of values. (The value "Interest" is omitted since its categories are not ordered. It is discussed in the section headed, "Interest Field Choices for Sex-Typical Groups.") Results of an F test run on the group means are indicated by asterisks or by the absence of asterisks near each value. In comparing the nine value ratings within each group, the Income mean should be considered as four-fifths its size to put it on the same scale as the other ratings.

It is useful here to introduce some statistics which describe the pool of occupations from which these selections were drawn: Tables 11a and 11b give the means, standard deviations, and intercorrelations among the value ratings for the entire pool of 155 occupations that were currently in SIGI. While these statistics are interesting in themselves, they are not the subject of the present study and are presented here mainly as a background against which the group profiles can be interpreted. Obviously, it would be difficult to draw conclusions from the rank orders of mean values down the columns of Table 10 without taking some account of the effects of the means presented in Table 11. Thus, we may note in Table 10 that the males and the atypical females plan for occupations that have highest ratings on Variety, Income, Prestige, and Independence and lowest ratings on Early Entry, Leisure, and Helping Others. With the exception of Early Entry, this rank order seems consistent with the "base rate" in Table 11a. Typical females, however, plan for occupations with highest ratings on Variety, Helping Others, and Early Entry; Leisure and Income (rescaled) have the lowest ratings. Occupations chosen in Planning by all four groups have highest ratings on Variety, which is the only one of the above-mentioned value dimensions that does not show significant group differences. For each of the value dimensions which do exhibit significant group differences, it is the two typical groups (MT & FT) that have the extreme mean ratings. The progression tends to run consistently in the order MT, FA, MA, FT. Thus, in this manifestation of CDM behavior, atypical females tend to be "closer" to typical males than to typical females. The two atypical groups match each other rather closely, and the two typical groups are the farthest apart.

How well do these ratings of occupations match with self-expressed value needs? As previously discussed, one of the procedures for classifying students into sex-typical and sex-atypical groups uses value weights assigned to four values,

namely Helping Others, Early Entry, Leadership, and Income. The first two values are associated with females and the last two with males. The value weight profiles for these groups, presented in Table 12, show the results of the classification procedure.

If, as we expect, students' values are reflected in their occupational choices, the mean value ratings of occupations chosen by each of the four groups should show a pattern similar to the pattern of mean value weights of the respective groups. From Tables 10 and 12, we can see that on three of the four values dimensions used in classifying students there is a close correspondence between the patterns of value ratings and weights.

Specifically, we find that:

(1) The occupations planned for by typical males and atypical females offer very significantly ($p < .001$) greater opportunities for high income than do the occupations selected by typical females and atypical males.

(2) Typical females, to a greater extent than other groups of students, plan for occupations that offer an opportunity for helping others; atypical males, when compared to typical males, can also be seen to pursue occupations that are oriented toward helping others. In view of the relatively high value weights assigned to this dimension by atypical males (it is the top ranked value along with Interest), one might expect the occupations they select in Planning to have an even higher ranked group mean rating for Helping Others. The statistics for the entire pool of occupations show that this apparent anomaly is probably an artifact of the "base rate." Note in Table 11 that the occupations in SIGI have their lowest mean ratings for Helping Others.

(3) Typical females comprise the only group who plan for occupations with a high mean rating for Early Entry.

(4) The mean value ratings for Leadership show little difference across groups. Why typical males and atypical females fail to plan for occupations that have high opportunities for leadership, as their values weights would suggest, is not known. It may be noted that the mean rating for Leadership in Table 11 is next lowest in rank to that for Helping Others. A further clue from interviews is that, in assessing the importance of this occupational value, many students consider a moderate amount rather than a great amount of opportunity for leadership as highly desirable. (The definition of Leadership includes "responsibility.")

(5) The value dimension, Prestige, shows significant group differences in mean ratings even though the group differences in mean values weights are not significant. This phenomenon may

be a result of the intercorrelation of Prestige with Early Entry, Independence, and Income (Table 11b). Prestige has a high negative correlation with Early Entry (-.79) and also quite high positive correlations with Independence and Income.

(6) In addition to Leadership, the mean value ratings for Variety and Security also fail to show differences in group means. In part, these mean value ratings are consistent with the value weights. From Table 12 we see that the mean value weights for all four groups do not show significant differences on either of these dimensions. What is surprising, however, is the consistent difference noted for all the groups between the rank order of the mean weights and ratings for Security. All groups assign Security a high weight, while the occupations that they plan for have ratings for this dimension that have a rank order of 5 or 6. This situation does not appear to be an outgrowth of the interdependence of the ratings themselves, but again may reflect the "base rate" (security ranks 15th in Table 11). In general, the ratings for Security are independent of the ratings for the other dimensions. The one notable exception is for Helping Others, which has a moderate correlation with Security (.45). Leisure, on the other hand, which does not show a significant sex difference for value weights, does have a somewhat higher mean rating for the occupations planned for by typical females than it does for the other groups.

Table 10

Mean Value Ratings of Occupations Planned for by Sex-Typical Groups [a]

	MT	FA	MA	FT
*** Income	4.2	4.0	3.6	3.1
*** Prestige	3.2	3.0	2.9	2.6
*** Independence	3.0	3.0	2.9	2.6
*** Helping	2.1	2.5	2.5	2.9
Security	2.6	2.6	2.6	2.6
Variety	3.2	3.3	3.2	3.1
Leadership	2.6	2.7	2.7	2.6
*** Leisure	2.0	2.2	2.2	2.5
*** Early Entry	2.2	2.2	2.3	2.7

[a] Sex-Typical groups formed using values.

*** $p \leq .001$

Table 11

Summary Statistics for Ratings of SIGI Occupations

(a) Means and Standard Deviations

Rated Value	Mean	S.D.
Income	3.35	1.11
Prestige	2.53	.97
Independence	2.63	.90
Helping Others	2.19	1.19
Security	2.53	1.02
Variety	2.95	.89
Leadership	2.29	1.02
Leisure	2.29	.94
Early Entry	2.80	1.10

(b) Intercorrelations

(1)	Income	1.00								
(2)	Prestige	.56	1.00							
(3)	Independence	.68	.61	1.00						
(4)	Helping Others	-.22	.10	.10	1.00					
(5)	Security	-.09	.14	.08	.45	1.00				
(6)	Variety	.34	.43	.63	.42	.09	1.00			
(7)	Leadership	.30	.47	.54	.62	.28	.65	1.00		
(8)	Leisure	-.26	-.06	-.19	.24	.12	.06	.06	1.00	
(9)	Early Entry	-.58	-.79	-.67	-.27	-.28	-.47	-.53	-.02	1.00

Table 12

Value Weight Profiles for Sex-Typical Groups

	Mean Value Weights			
	MT	FA	MA	FT
***Income	6.2	6.0	5.4	5.1
Prestige	5.0	5.0	4.7	4.6
**Independence	5.7	5.8	5.6	5.2
***Helping	3.8	4.3	5.9	6.3
Security	6.1	6.0	5.7	6.2
Variety	5.6	5.8	5.5	5.5
***Leadership	5.5	5.2	4.3	4.0
*Interest	5.6	6.1	5.9	6.3
Leisure	4.6	4.6	4.2	4.2
***Easy Entry	2.6	2.8	4.1	4.5

* $p = <.05$
** $p = <.01$
*** $p = <.001$

Predominant Sex Membership of Occupations Chosen by Sex-Typical and Atypical Groups

It is of interest to note the kinds of occupations chosen by the four groups that have been defined and classified as sex-typical or -atypical. For purposes of this section, "chosen" is defined as the first occupation selected in Planning. "Kinds of occupations" are represented by a three-way classification according to predominant sex membership in each SIGI occupation. (Data in SIGI include percentage of women in each occupation.) More specifically, occupations with 66% or more women were designated Predominantly Female; 33% or fewer women, Predominantly Male; between 33% and 66% women, Neutral.

According to these demarcation points, 60% of the 155 occupations in SIGI at the time of the study were found to be Predominantly Male (M), 22% Predominantly Female (F), and 18% Neutral (N).

Table 13 shows these percentages as the "base" for each of the three occupational classifications. As a rough indicator of an expected distribution, this "base" provides a context for reading the frequency of choice of each kind of occupation (M, F, or N) by each of the four groups, when the groups are formed on the basis of values, as described previously in the first section of Findings, Part 2.

It is clear from Table 13 that there are notable differences in the kinds of occupations (classified by sex membership) chosen by the four groups (classified by values profiles). These differences are in the direction that would be anticipated. For example, typical males overwhelmingly plan for occupations that are Predominantly Male, 83% of them making this choice, compared with a "base" of 60%. They tend to ignore occupations that are Predominantly Female (6%). Typical Females, on the other hand, tend to choose Predominantly Female occupations--41% compared with a base of 22%. The choices of the other two groups, atypical males and females tend toward more closely matching the base.

Summarizing other major between-group differences, we find that: (1) typical males plan for more M and fewer N occupations than atypical males do; (2) typical females plan for more occupations that are F and fewer occupations that are M than do atypical females; (3) the distributions for atypical males and atypical females are quite similar, with distributions for each group showing movement away from the extreme position of other "typical" counterpart toward the "base" distribution; (4) the difference between the two female groups in choosing F occupations (41%-18%= 23%) is greater than the difference between the two male groups in choosing M occupations (83% - 65% = 18%). (Bear in mind that the base is 22% for the F occupations and 60% for M occupations.); and (5) females with atypical values profiles exceed typical females in tendency to choose M occupations by a rather wide margin

(54% vs. 30%). The two male groups do not differ so noticeably in choosing F occupations (10% vs. 6%), but atypical males are quite a bit more likely than typical males to choose N occupations (25% vs. 11%).

Table 14 gives a listing of the occupations corresponding to the numbers presented in Table 13.

Table 13

Kinds of Occupations Selected in PLANNING
by Four Groups Classified by Values

(Numbers in parentheses are percents of column totals)

Sex Membership of Occupation	Group MT	TA	MA	FT	
Predominantly Male (Base=60%)	86 (83)	39 (54)	47 (65)	54 (30)	227 (52)
Predominantly Female (Base=22%)	6 (6)	13 (18)	7 (10)	76 (41)	102 (24)
Neutral (Base=18%)	12 (11)	20 (28)	18 (25)	54 (29)	103 (24)
	104	72	72	184	432

Table 14

GROUP=MT
PREDOMINANTLY MALE
- ACCOUNTANT(8)
- ACTUARY
- ADVERTISING COPYWRT.
- ARCHITECT(3)
- AVIONICS TECH.(2)
- BANK OFFICER(3)
- BOTANIST
- CHEMICAL ENGINEER(4)
- CIVIL ENGINEER(2)
- CLERGY
- COMPUTER PROGRAMMER
- DENTIST(3)
- ELECTRICAL/ELECTRONICS(3)
- ELECTRONICS TECH.(2)
- FIREFIGHTER
- FLIGHT ENGINEER
- FORESTER(2)
- GEOGRAPHER
- GEOLOGIST
- HOSPITAL ADMIN.
- INDUSTRIAL ENGINEER
- LABOR RELATIONS SPEC.
- LAWYER(8)
- MECHANICAL ENGINEER(3)
- MUSICIAN/MUSIC TEACHER
- OCEANOGRAPHER
- PHYSICIAN (4)
- PHYSICIAN ASST.
- PILOT
- POLICE OFFICER
- POLITICAL SCIENTIST
- PRODUCTION MANAGER
- PHYSICIST (2)
- RADIO/TV ANNOUNCER
- REAL ESTATE AGENT
- RETAIL STORE MANAGER
- SECURITIES BROKER(4)
- SOIL CONSERVATIONIST
- SYSTEMS ANALYST(2)
- TELEVISION PRODUCER/DIR
- URBAN PLANNER
- WELDER
- ZOOLOGIST

PREDOMINANTLY FEMALE
- LEGAL ASST.(2)
- PHYSICAL THERAPIST
- SECRETARY
- TEACHER,BUSINESS
- TEACHER,ELEM.SCHOOL

NEUTRAL
- ACTOR/ACTRESS
- COMPUTER OPERATOR
- HOTEL/MOTEL MANAGER
- INDUSTRIAL DESIGNER
- INTERIOR DESIGNER/DEC.(2)
- NEWSPAPER REPORTER
- PSYCHOLOGIST(3)
- TEACHER,INDUSTRIAL ARTS
- TEACHER,PHYS.ED.(2)

GROUP=FA
PREDOMINANTLY MALE
- ACCOUNTANT(2)
- ACTUARY(3)
- ADVERTISING COPYWRT.
- BANK OFFICER
- BOTANIST
- CIVIL ENGINEER
- DRAFTER
- ECONOMIST
- ELECTRICAL/ELECTRONICS
- ELECTRONICS TECH.
- FORESTER
- INDUSTRIAL DESIGNER
- INDUSTRIAL ENGINEER
- LAWYER(5)
- LABOR RELATIONS SPEC. (2)
- OCEANOGRAPHER(2)
- OPTOMETRIST
- PERSONNEL INTERVIEWER
- PHOTOGRAPHER
- PHYSICIAN (2)
- POLICE OFFICER
- POLITICAL SCIENTIST
- PRODUCTION MANAGER
- PUBLIC HEALTH SPEC.
- PUBLIC RELATIONS WORKER
- PURCHASING AGENT
- RETAIL STORE MANAGER (2)
- VETERINARIAN
- ZOOLOLOGIST(2)

PREDOMINANTLY FEMALE
- DENTAL HYGIENIST(2)
- FLIGHT ATTENDANT(2)
- LEGAL ASST.
- MEDICAL RECORDS ADMIN.
- MODEL
- NURSE, REGISTERED(2)
- OCCUPATIONAL THERAPIST
- PHYSICAL THERAPIST
- TEACHER,SPEC.ED.
- TEACHER,BUSINESS

NEUTRAL
- ACTOR/ACTRESS
- COMMERCIAL ARTIST
- HOTEL/MOTEL MANAGER
- INTERIOR DESIGNER/DEC.
- INTERPRETER/TRANSLATOR(2)
- MEDICAL TECHNOLOGIST
- NEWSPAPER REPORTER
- PSYCHOLOGIST(5)
- REHAB. COUNSELOR(2)
- SCHOOL COUNSELOR (3)

GROUP = MA
PREDOMINANTLY MALE
ACTUARY(2)
ACCOUNTANT(4)
ARCHITECT(2)
ARCH. DRAFTER/TECH.
CIVIL ENGINEER (4)
CLERGY(5)
COMPUTER PROGRAMME(2)
CORRECTION OFFICER(2)
ELECTRONICS TECH.(2)
FIREFIGHTER
FLIGHT ENGINEER
FOOD SCIENTIST/TECHNOL.
FORESTER(3)
FUNERAL DIRECTOR
LAWYER
OCEANOGRAPHER
OPTOMETRIST
PERSONNEL INTERVIEWER(2)
PHOTOGRAPHER(3)
PHYSICIAN(2)
PHYSICIST
PILOT
RETAIL STORE MANAGER
TEACHER,HIST/SOC.STUD.
TELEVISION PRODUCER/DIR
VETERINARIAN
PREDOMINANTLY FEMALE
HOME ECONOMIST(2)
LEGAL ASST.
MODEL(2)
NURSING ASSISTANT
TEACHER,PRESCHOOL
NEUTRAL
ACTOR/ACTRESS
CHEF/COOK
COMPUTER OPERATOR
INTERPRETER/TRANSLATOR
PSYCHOLOGIST(6)
REHAB. COUNSELOR
SCHOOL COUNSELOR(4)
SOCIAL WORKER
TEACHER,INDUSTRIAL ARTS
TEACHER,VOC./TECH.
SOCIAL WORKER

GROUP=FT
PREDOMINANTLY MALE
ACCOUNTANT(4)
ACTUARY(2)
ADVERTISING COPYWRT.
AUTO MECHANIC
BANK OFFICER
CHEMICAL ENGINEER
CLERGY
COMPUTER PROGRAMMER
CORRECTION OFFICER(3)
DENTIST(2)
FOOD SCIENTIST/TECHNOL.
FORESTER(2)
INSURANCE AGENT
LANDSCAPE ARCHITECT
LAWYER(4)
MACHINIST
MARKET RESEARCHER
NURSERYMAN/LANDSCAPER
OPTICIAN
PERSONNEL INTERVIEWER(2)
PHOTOGRAPHER(5)
PHYSICIAN(2)
PHYSICIAN ASST.(4)
POLICE OFFICER
POLITICAL SCIENTIST
PUBLIC RELATIONS WORKER
PURCHASING AGENT(2)
RETAIL STORE MANAGER(2)
SOIL CONSERVATIONIST
TELEVISION PRODUCER/DIR(2)
VETERINARIAN(2)
PREDOMINANTLY FEMALE
ACCOUNTING CLERK
BANK TELLER
DANCER/DANCING TEACHER
DENTAL ASSISTANT(2)
DENTAL HYGIENIST(4)
DIETITIAN
EEG TECHNOLOGIST(2)
FLIGHT ATTENDANT(5)
HOME ECONOMIST
LEGAL ASST.(7)
MEDICAL LAB. TECH.(2)
MEDICAL RECORDS ADMIN.
NURSE,LICENSED PRAC.
NURSE, REGISTERED (9)
OCCUPATIONAL THERAPIST(5)
PHYSICAL THERAPIST
RECEPTIONIST(3)
SECIAL SERVICE AIDE(3)
SECRETARY(6)
SPEECH PATH./AUDIOL.(2)
TEACHER,ELEM.SCHOOL(5)
TEACHER,ENGLISH/LANG.
TEACHER,FOREIGN LANG.
TEACHER,PRESCHOOL(5)
TEACHER,SPEC.ED.(6)

Table 14 (cont.)

GROUP = FT

NEUTRAL

CLOTHING DESIGNER
COMPUTER OPERATOR
FINE ARTIST/PVTART TEACH(2)
FLORIST/FLORAL DES.
HOTEL/MOTEL MANAGER(2)
INTERIOR DESIGNER/DEC.(6)
INTERPRETER/TRANSLATOR(2)
MEDICAL TECHNOLOGIST(2)
OPERATING ROOM TECH.(7)
PSYCHOLOGIST(7)
RECREATION WORKER
REHAB. COUNSELOR(5)
SCHOOL COUNSELOR(7)
SOCIAL WORKER(3)
TEACHER,ART(2)
TEACHER,MATH.
TEACHER,PHYS.ED.
X-RAY TECHNOLOGIST(2)

CHAPTER VI

SUMMARY OF FINDINGS

In this chapter, at the risk of some sacrifice in understanding of context, each discrete finding has been classified, numbered consecutively, and stated as concisely as possible. These numbers will serve as short hand references in the concluding discussion, Chapter VII.

Findings from Two-Way ANCOVAs

Values. 1. No significant main or interaction effects were found for the number of Values Games played (END5), the ratio of inconsistent to consistent value ratings as manifest in the game (RATIO), or in the standard deviation of the initial value weights and the restricted value weights (SDI and SDR),

2. A main sex effect was found in the degree to which both the unrestricted and restricted distribution of value weights were skewed (SKEWI and SKEWR). In the unrestricted case, skewness is negative for both sexes, but males show a greater preponderance of high weights than do females; in the restricted case, males evidence a slight negative skew and females a slight positive skew.

3. There is a significant sex X covariate interaction in the correlation between the unrestricted and restricted value weights (CORRV). (The covariate is the student's assessment of his or her initial value status--INTR7.) There are no differences in the correlations for students who indicate that they have a general knowledge of their values. But there are large sex differences in the correlations of students who claim to have very little knowledge of their values with the correlation of females higher than that for males; the reverse is true if the students claim to have a good knowledge of their values.

Information-seeking. 4. There were no significant main or interactive effects with respect to the number of different categories of questions asked by the two sexes in COMPARE (#CAT).

5. The total number of questions asked in COMPARE is significantly greater for males than for females (COMP4).

6. Males make more changes than do females in their selection of values and specifications for screening occupations in LOCATE (LOC3).

7. Males select a greater number of occupations for examination in COMPARE (#OCC2). The covariate effect (INTR8, assessment of knowledge of occupations) is as expected for findings 6 & 7 with greater activity on the part of poorly informed students.

Prediction. 8. There is a significant main sex effect in the number of predictions asked for (PRED2). Males ask for more predictions than do females.

9. There is also a sex X covariate interaction for PRED2, where the covariate is assessment of ability to predict grades (INTR9): There is little difference between the sexes among students who think they can predict their grades well. For students who cannot predict well, however, there is a large sex difference, with males requesting more predictive information than either females or males who can predict well; females who cannot predict well ask for fewer predictions than females who can predict well.

10. There is also a significant age effect for PRED2: Older students request fewer predictions than do younger students.

11. There were no significant effects with respect to the number of questions asked about the prediction process (PRED11). A significant main covariate effect was found with untransformed data, which is highly skewed and inappropriate for ANCOVA. Students with limited ability to predict ask more questions than students who can predict better. This effect, however, drops below the level of significance for the log transformed data.

Planning. 12. Neither age nor sex has a significant main effect with respect to the number of occupations for which plans are sought (NPLN2). There is, however, a main covariate effect, the covariate being students' assessment of their knowledge of plans (INTR10). Students who are uncertain of their preparation plans and need help select more occupations in Planning than do students who have clear knowledge of their plans for preparing to enter an occupation.

13. Students who are unsure about their plans are significantly less consistent (i.e., they have lower CONSIS scores) in exploring occupations in the SIGI subsystems than students who are more sure of their plans.

Occupational choice. 14. The more confident students were of their ability to predict their grades (INTR9, the covariate), the more likely they were to select as their informed choice in STRATEGY the occupation with the most favorable chances for entry (PROB2).

15. The more confident students were about their values (INTR7, the covariate), the more likely they were to select as their original choice in STRATEGY the occupation that turned out to have the best utility (UTIL1)--that is, the largest product when the desirability of a selected occupation is multiplied by its probability for successful entry.

(Findings 14 and 15 are for log-transformed data.)

16. There were no significant main or interactive effects for DES1 and DES2 (the desirability sums of the original choice and informed choice occupations in STRATEGY), or PROB1 (the probability associated with the original-choice occupation).

17. The utility of the informed choice occupation (UTIL2) had a significant age main effect: Older students select as their informed choice more occupations with high expected utilities than do younger students.

18. There are consistent increases in frequency of high scores (at ceiling of scale) from DES1 to DES2 and from UTIL1 to UTIL2.

19. The number of sets of occupations used in STRATEGY (STR) has a significant sex main effect and a sex X age interaction. Males examine more occupations in STRATEGY than females do; younger and older males exhibit this behavior, but there is no difference between the sexes in the middle age group.

Findings on Values Profiles from MANOVA

20. A two-way multivariate analysis of variance indicated that there are significant age and sex effects in both the unrestricted and restricted value profiles (VAL5 and VAL6), but no significant interaction.

21. All values (except Early Entry for males) were considered to be of at least moderate importance, having been assigned a mean weight of 4 or more in the unrestricted case (VAL5).

22. For males, the three top-weighted values were Security, Income, and Work in a Major Field of Interest; for females, they were Work in a Major Field of Interest, Security, and Helping Others.

23. Large sex differences were found for Helping Others, Early Entry, Leadership, and Income. Females weighted Helping Others and Early Entry higher than males weighted them; the reverse was true for Leadership and Income.

24. Somewhat smaller but still significant differences were found for Work in a Major Field of Interest and Independence. Females weighted Interest Field higher and Independence lower than males weighted them.

25. No significant sex differences were found for Prestige, Security, Variety, and Leisure.

26. Only Early Entry and Independence have significant age differences. Older students weighted Independence highest, and the middle group weighted it lower than did either of the other two groups. Mean weights by age group for Early Entry, on the other hand, were linear; it was weighted highest by the oldest students, next by the middle group, and lowest by the youngest group.

27. Except for Independence and Early Entry, there is no clear trend between age and value means. Age, though a significant factor, seems to exert a smaller influence on occupational values than does sex.

28. Between-group distances (i.e., the squared differences between over-all group means of the 10 value weights in the unrestricted case (VAI5)) were very small for six age-sex groupings. The sex groups are (1) male 18 and under, (2) male 19-24, (3) male 25 and over, (4) female 18 and under, (5) female 19-24, and (6) female 25 and over.

29. When within-group distances are computed by removing the effect of the total number of points that individuals distributed, a definite sex cluster emerges. Smaller distances appeared between age groups within a sex than between sex groups within an age category. The youngest females (Group 4), however, were less distant from the male groups than the older females were.

Discriminant Analysis of Values

30. A discriminant analysis using the 10 value weights reveals two discriminants that account for most of the trace--66% for the first and 21% for the second. The first consists chiefly of Helping Others and Early Entry versus Leadership and Income. This discriminant clearly differentiates the sexes.

31. The main contributors to the second discriminant are Independence versus Security, which differentiates the 25-and-over age groups from the younger age groups. There is, however, much better discrimination between the sexes than between the age groups.

32. The greatest discrimination on the sex discriminant is between Group 1 (males 18 and under) and Group 5 (females 19-25), with an overlap of about 48%. The greatest discrimination on the age descriminant is between Group 1 (males 18 and under) and Group 3 (males 25 and over), with an overlap of about 66%. The youngest female group is the closest of the female groups to the male groups.

33. In the discriminant analysis, Security appears more prominent as a contributor to age contrast than might have been expected from the univariate tests on values following the MANOVA.

34. Security is not as clear-cut a discriminator of age for females as for males. If the age groups for a sex are ranked by the weight they assigned to Security, the order for males would be youngest, middle, oldest, with the youngest giving the highest weight. For females, however, the order would be middle, youngest, oldest.

35. When the discriminant analysis is extended to 27 variables (including the 10 value weights), again two discriminants emerge that account for a large portion of the trace (56% for the first discriminant, 16% for the second). The first, which differentiates sex, consists of low grades in high school English and high weights on Leadership, on the one hand, and Helping Others and Early Entry on the other. The second discriminant, which tends to differentiate age, consists of the values Security and Interest Field versus Early Entry, Independence, and UTIL2 (the utility or combined desirability-probability of the informed-choice occupation designated in STRATEGY).

36. Comparison of the two discriminant analyses reveals that in general the values domain accounts for age/sex group separation. The addition of English grades helps discriminate sex and the addition of UTIL2 helps discriminate age, but the other variables do not contribute much.

37. Maleness seems to be characterized by Leadership and High Income in the values domain, low grades in high school English in the academic domain, and high information-seeking activities (#LOC3, #OGC2, and STR) in the CDM domain.

38. Femaleness seems to be characterized by the values Helping Others and Early Entry and by a more normal distribution of value weights than that evidenced by the males.

Interests and Consistency of Occupational Plans

39. There is a significant relationship between sex and choice of interest field (VAL3). More males chose the Scientific field (26%) than any other field; females chose the Personal Contact field (35%) more frequently than any other field. Preference for the Scientific, Technological, and Administrative fields is stronger among males than females. Preference for Personal Contact, Verbal, and Aesthetic fields is stronger among females than males. The greatest sex differences are in the Scientific and Personal Contact fields, with males preferring the former and females the latter.

40. For both sexes, large percentages of students selected in PLANNING and STRATEGY occupations that were in the field of interest originally designated in VALUES. The degree of consistency fell off for the Verbal and Aesthetic fields, perhaps in part because SIGI contains a smaller proportion of occupations in those fields than in the others and perhaps in part because of the relatively poor job market in those fields.

41. For all fields, there is a strong consistency in the selection of interest field for PLANNING and for STRATEGY. If students abandoned in PLANNING the field originally chosen in VALUES, they also tended to depart from it in STRATEGY; if they were consistent in PLANNING, they continued the consistency into STRATEGY. This tendency is apparently unrelated to sex.

42. There is no significant relationship between sex and the selection of "same" or "different" occupations in STRATEGY (independent of the choice made in PLANNING).

43. For both males and females, separately, there is no relationship between interest field and the selection of "same" or "different" occupations in STRATEGY.

44. If the interest fields most preferred by the two sexes (Scientific for males and Personal Contact for females) are viewed separately, it is apparent that for females, but not males, there is a significant relationship between preference for one of these two interest fields and the selection of occupation in STRATEGY. Females who prefer the Personal Contact field are more likely to choose an occupation in STRATEGY that is consistent with their interest field choice than are females who prefer the Scientific interest field.

45. Students who choose an occupation in STRATEGY that lies within their designated interest field had tended to weight the value Interest Field higher than did students who choose an inconsistent occupation in STRATEGY. This finding applies to both sexes.

Desirability of Occupations

46. If desirability sums are computed for all the occupations in SIGI using, first, the mean value weights for males and, second, the mean value weights for females, the 10 occupations with the highest sums are the same for both sexes and rank in the same order. (The value Interest Field is excluded from the computation because its rating is associated with a particular field.) The 10 least desirable occupations are also the same for the average male and the average female, although their rank order is slightly different. The most desirable occupations, starting with the highest, are lawyer, physician, psychologist, dentist, teacher vocational/technical, teacher elementary/secondary, political scientist, teacher special education, veterinarian, and speech pathologist. The least desirable, in order of male ranking with the lowest first, are keypunch operator, model, stenographer, typist, avionics technician, library technician, computer operator, medical laboratory technician, receptionist, and accounting clerk.

47. For the most desirable occupations, desirability sums for the average male were consistently higher than those for the average female (3.4 to 5.1 points). For the least desirable occupations the differences tended to be much smaller (0.1 to 1.1 points), and for four occupations the sums for the average female were slightly higher than those for the average male. These differences are due to the fact that the most desirable occupations rate high on Income, and low on Early Entry, whereas the least desirable occupations rate low on Income and high on Early Entry. Since males tend to weight Income higher and Early Entry lower than do females, these differences are expected. It is apparent that when interests are excluded, the differences between average value weights for the two sexes have relatively little effect on which occupations fall at the extremes of the desirability scale.

Sex-Typical and Sex-Atypical Groups

48. Since the sexes differed in their responses to many of the variables in the study, it was possible to use these variables as predictors of sex typicality and to divide the sample into four groups, male-typical (MT), male-atypical (MA), female-typical (FT), and female-atypical (FA). When the division is based upon values Helping Others, Leadership, Early Entry, and Income as the predictors, 72% of the females and 60% of the males fall into their sex-typical category. When the division is based upon 5 out of 12 activity variables as predictors, 67% of the females and 52% of the males fall into their sex-typical category.

Interests. 49. Differences between the sexes with respect to choice of interest field (males prefer Scientific, females Personal Contact) are largely due to the sex-typical groups (MT and FT). Relationships between sex and interest field that hold true for the sex-typical groups often do not hold for the sex-atypical groups. For example, while the over-all difference between MT and FT in interest preferences is very significant, there are no significant differences between MA and FA and between MA and FT.

50. Typicality is related to the over-all distribution of interest field preferences for males but not for females.

51. Distributions in typicality are most useful when focused on the interest field preferences that most sharply differentiate the sexes. The difference between the MT and MA groups tends to parallel the differences between the sexes. The larger differences are in preferences for Scientific, Personal Contact, and Aesthetic fields, with MT preferring the Scientific, and MA the Personal Contact and Aesthetic. Similar differences are found between the FT and FA groups, with a larger proportion of atypical females preferring the Scientific field and a larger proportion of typical females the Personal Contact.

Information-seeking. 52. The categories of questions asked in COMPARE had similar ranks in popularity across all four groups.

53. Significant differences are found, nevertheless, between the sexes with regard to the categories of questions selected for occupational information in COMPARE. Males, more than females, ask questions about Income, Conditions of Work, and Opportunities and Outlook. There were no significant sex differences in the number of questions asked about Definition and Description; Education, Training, and Other Requirements; or Personal Satisfactions.

Values for occupations selected. 54. When the mean value ratings (exclusive of Interest Field) are computed for the occupations that students choose in PLANNING, Highly significant differences between the four groups (MT, MA, FA, and FT) are found on Income, Prestige, Independence, Helping Others, Leisure, and Early Entry. No significant differences are found on the mean ratings of

Security; Variety, and Leadership. Males and atypical females plan for occupations with highest ratings on Variety, Income, Prestige, and Independence and lowest ratings on Early Entry, Leisure, and Helping Others. Typical females plan for occupations with highest ratings on Variety, Helping Others, and Early Entry; Leisure and Income have the lowest ratings. For each of the six value dimensions that exhibit significant group differences, the two typical groups (MT and FT) have the extreme mean ratings. The progression tends to run MT, FA, MA, FT, with the two atypical groups tending to be "closer" to typical males than to typical females, and with the two typical groups farthest apart.

55. For three of the four values dimensions used in classifying for typicality (Helping Others and Early Entry, associated with females; Leadership and High Income, associated with males), there is a close correspondence between the patterns of value ratings of occupations chosen in PLANNING and value weights assigned by the four groups. (a) Occupations planned for by typical males and atypical females offer very significantly greater opportunity for Income than do occupations planned for by typical females and atypical males. (b) Typical females, to a greater extent than students in the other groups, plan for occupations that offer opportunity for helping others; atypical males, as compared with typical males, also tend to pursue occupations rated high on Helping Others. (c) Typical females are the only group who plan for occupations with a high mean rating on Early Entry. (d) The mean value ratings for the fourth value, Leadership, however, show little difference across groups. The reasons for this anomaly are not entirely clear.

56. The mean value ratings for Prestige show significant group differences even though the groups did not differ in the weight they assigned to that value in the Values system. This phenomenon may be the result of the intercorrelation of Prestige with Early Entry (where the correlation is high negative), and with Income and Independence (where the correlations are high positive).

57. The mean value ratings of the planned-for occupations on Variety and Security also fail to show differences in the four group means, a phenomenon that is consistent with the mean value weights of the groups. Even though all groups assigned Security a high weight, however, they did not select occupations for planning with high ratings on that value. Leisure, on the other hand, which does not show a significant sex difference on value weights, does have a significantly higher mean rating for the occupations planned for by typical females than it does for the other groups.

Sex membership of occupations selected.

58. Typical males overwhelmingly choose as their first selection in PLANNING occupations that are classified as predominantly male on the basis of the proportion of workers in the occupation who are males. Although 60% of the occupations in SIGI are classified predominantly male, 83% of the MT group chose such occupations.

Only 6% of the MT group chose a predominantly female occupation, although 22% of the SIGI occupations are so classified. Typical females tend to choose predominantly female occupations, 41 % of them making that choice, whereas only 20% chose predominantly male occupations.

59. Typical males plan for more predominantly male and fewer sexually neutral occupations than atypical males do.

60. Typical females plan for more predominantly female and fewer predominantly male occupations than atypical females do.

61. The distributions for the two atypical groups are quite similar, with distributions for each group showing movement away from the extreme positions of the "typical" groups and toward the "base rate" distribution of occupations in SIGI with respect to sex membership.

62. The difference (in percentage points) between the two female groups in choosing predominantly female occupations (41% - 18% = 23%) is greater than the difference between the two male groups in choosing predominantly male occupations (83% - 65% = 18%). This finding must be viewed in the context that only 22% of the occupations in SIGI (the pool from which selection is made) are classed as predominantly female whereas 60% are classed as predominantly male.

63. Females with atypical values profiles exceed typical females in tendency to choose predominantly male occupations by a rather wide margin (54% vs. 30%). The two male groups do not differ so noticeably in choosing predominantly female occupations (10% vs. 6%), but atypical males are considerably more likely than typical males to choose sexually neutral occupations (25% vs. 11%).

CHAPTER VII

DISCUSSION

An important point to bear in mind is that the findings in this study are based on college students observed in the act of making career decisions. These observations are not to be confused with responses derived from surveys of people who may or may not be actively engaged in career decision-making (CDM) at the time they are questioned. The data were collected unobstrusively--indeed, automatically, by the computer in the course of students' interaction with SIGI. Thus, our observations have been made through a window in the CDM process. The variables are elements in that process, not made-up answers to questions that may or may not have been salient to the respondent.

Among the variables are values profiles, interest preferences and behaviors involved in information-seeking, predicting, planning, and using decision rules to evaluate occupations for choice. The study is descriptive rather than an experimental testing of hypotheses. It controls for initial status of individuals as they embark on a formal, systematic CDM process. It compares age and sex groups on a large number of variables, describing similarities and differences. In addition, sex-typical and sex-atypical groups are defined for each sex. These derived-group comparisons help to illuminate a number of the sex differences and similarities found. Before dealing with sex differences, however, it may be useful to comment briefly on inter-group similarities, effects of initial status, and age differences. Not every finding will be discussed here. Since findings have been described and enumerated in the two previous chapters, it would be redundant merely to reiterate them and tedious to expatiate on those that are not important enough to warrant further discussion.

Inter-Group Similarities and Overlap

A major conclusion which might be overlooked just because it is so obvious warrants mention first. Since this study focuses on age and sex differences, it would be easy to lose sight of the many similarities between groups in CDM, reflected in a large number of the findings (1, 4, 11, 12, 13, 14, 15, 16, 18, 21, 25, 27, 28, 36, 40, 41, 42, 45, 46, 47, 52, 55, 57*). The main point of these findings is to justify "sex-blind" guidance. Notwithstanding significant sex differences that were found, students from every age-sex group found the structure and process of CDM embodied in SIGI quite relevant and congenial. Their interactions with various subsystems were not strikingly distinctive. Both sexes showed similar consistencies between interests and occupations chosen; tended to select occupations of equal desirability, probability, and utility; and the profile of mean values weights for each sex

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*Numbers refer to correspondingly numbered "Findings" in Chapter VI.

(excluding the weights for Work in Major Field of Interest) would identify the same lists of ten "most desirable" and ten "least desirable" occupations. Thus, there is no apparent justification for routing males and females to distinctive guidance "treatments" on the basis of sex.

CDM is a highly individualistic enterprise, and individual differences are ubiquitous. But these variations are often independent of group membership. Even when significant differences are found between groups, there is always considerable overlap. Thus, college students of different ages and sex are not making career decisions in grossly different ways. Some members of each age-sex group resemble some members of other groups in the CDM process.

In some instances, similarities may be attributed to development of understandings and competencies that generally result from use of SIGI. For example, the consistent increase in frequency of high scores from DES1 to DES2 and from UTIL1 to UTIL2 (finding 18) is clearly a function of systematic consideration of desirabilities, probabilities, and decision rules associated with a set of occupations. The exercise that intervenes between the first and second score in each instance has had a leavening effect. All students have been helped to discover the extent to which each occupation provides the configuration of rewards and satisfactions that best fit their individual profile of values and have learned to balance rewards and risks. Consequently, there is a notable gain in the number of "ceiling" scores for all students regardless of age or sex. (Obviously, large numbers of scores at the "ceiling" of a scale tend to constrain findings of differences between groups.)

Effects of Initial Status

As would be expected, covariate effects were sometimes found in the absence of age or sex effects. This simply means that in certain respects initial status vis-a-vis CDM may affect CDM behaviors regardless of age or sex. For example, students who regarded themselves as poorly informed about occupations when they entered the interaction with SIGI engaged in more information-seeking activity than students who felt well informed (7). Those who did not initially know how to predict grades asked more questions about prediction than those who did (11), and those who were at the outset uncertain of plans explored a greater number and variety of occupations in Planning (12, 13). By the same token, the students who were relatively confident of their ability to predict grades were more likely to choose in STRATEGY the occupation with the most favorable chances for entry (14). Those who felt that they knew their values well were more likely to select as their initial choice in STRATEGY the occupation with the highest utility (15). This effect did not carry over to the final choice (UTIL2) because of the "ceiling" effect mentioned above (about two thirds of all students scored at the "ceiling" on UTIL2). This ceiling phenomenon, as pointed out above, is attributable to the treatment, and tends to wash out effects of initial status.

Age Differences

In general, interpretations of findings on age differences and similarities must be handled in such gingerly fashion that they are probably not worth the space and trouble to discuss.

One limitation may be the classification system used. Students classified themselves in one of three categories by age: 18 and under, 19 to 24; and 25 and over. Perhaps a larger sample and further breakdowns of the third category would have provided additional findings of age differences. Furthermore, it must not be forgotten that the sample consisted of students at community colleges. Thus, the older students do not represent people of their age generally--only those at about the same educational stage as the younger ones.

Given these reservations, it comes as no surprise that age differences in CDM are relatively few, not of great magnitude, and sometimes quite difficult to interpret. For example, it does not seem particularly fruitful to speculate on why older students request fewer predictions and select more occupations with high utilities than do younger students (10, 17).

An occasional age effect is straightforward enough to interpret. The fact that Early Entry was weighted highest by the oldest group, next by the middle group, and lowest by the youngest group is what we would expect (26). Older students tend to feel they have less time to devote to prolonged schooling; they want to move into occupations as soon as possible. Sometimes, however, age effects are not linear--that is, the 19-25 group is "out of sequence" with the younger and older students. For example, the oldest group weighted Independence higher than the youngest did, but the middle group weighted it lower than did either of the other two groups (26). Sometimes interactions with sex muddy age distinctions. For example, Security discriminates age for males, but not for females (33, 34). So age, though a statistically significant factor in values (20), does not always seem particularly important or readily interpretable. Smaller distances in values profiles appear between age groups for each sex than between sex groups for each age category (29, 31, 32).

It may, however, be of interest to note that there is a slight tendency for the youngest females to be less distant from the male groups than the older females are (29, 32). Perhaps changing beliefs, customs, and opportunities have begun to exert greater effect on the youngest group in breaking down stereotypes and in liberating females from traditional perceptions of sex roles. We will want to see whether this tendency becomes more marked with successive cohorts of young college students.

Sex Differences

Having previously emphasized inter-group similarities, we can now turn, without fear of being misunderstood, to the sex

differences that did appear. Straightforward comparisons between the sexes seem to confirm many prevalent stereotypes of sex roles and behaviors.

In general, males were more active and positive than females in their CDM behaviors. They tended to give higher weights to values (2), engaged in more occupational information-seeking (5, 6, 7, 37), asked for more predictions (8), evaluated more occupations in STRATEGY (19, 37), and sometimes appeared to act more logically in respect to their initial status (3, 9).

The main differences between sexes in the values domain--emphasizing higher weights on Leadership and Income for males and on Helping Others and Early Entry for females (20, 21, 23, 24, 30, 37, 38)--are consistent with the stereotype of the striving male and the nurturant female.

Interest preferences were also in accord with longstanding cultural expectations: the Scientific field was the one most frequently chosen by males, and the Personal Contact field by females. Technological and Administrative fields were also more popular among males than among females, and the Verbal and Aesthetic fields were preferred more often by females than by males (39). Adherence to the stereotype extended beyond expressions of preference and into behavior: Although a high proportion of all students tended to choose occupations in PLANNING and in STRATEGY that were consistent with their interest field preferences (40), females who preferred the Personal Contact field were more likely than females who preferred the Scientific field to choose an occupation in STRATEGY that was consistent with their interest field preference (44).

It is not surprising to see these corroborations and supplementations of previous findings of sex differences (as summarized in Chapter III). Again, however, we must not fail to call attention to the preponderance of similarities found between the sexes in CDM variables. Given the considerable degree of overlap, we sought to clarify the similarities and the differentiations by further classification of each sex into two groups.

Sex-Typical and Sex-Atypical Groups

We reasoned that if sex stereotypes are in the process of breaking down, clearly the change would not affect all members of each sex equally and simultaneously. Some males and some females would respond rather quickly to the new influences, others more slowly, and still others not at all. The question then was one of choosing variables for classification of sub-groups to be compared successively on other variables. Having often emphasized the primacy of the values domain in CDM, our preference was to try sorting first on values. Since an empirical test proved this to be more efficient and more valid than use of "activity" variables, we followed the procedure of regressing sex on values, as described on

pp. 146-147, to identify those members of each sex whose values we called, for lack of better words, "typical" or "atypical" of their sex. These sub-groups based on a composite of four values dimensions provide a key to sex differences and similarities on a substantial array of other variables.

The two "typical" groups turn out to account for many of the sex differences found, and differences between the "typical" and "atypical" sub-groups within each sex often parallel those between the sexes. For example, sex differences in choice of interest field are largely attributable to differences between "typical" males (MT) and "typical" females (FT). There are no significant differences in interest preferences between the "atypical" groups (MA and FA) or between MA and FT (49). Focus on the interest fields that most sharply differentiate the sexes (39)--Scientific, Personal Contact, and Aesthetic--shows parallel differences between the "typical" and "atypical" male groups, with MT preferring the Scientific field and MA the Personal Contact and Aesthetic fields (51). There is an analogous differentiation between "typical" and "atypical" females, with more FA preferring the Scientific field and more FT preferring the Personal Contact field (51).

Classification of sex-typical and -atypical groups on the basis of values is enlightening not only in respect to preferences for interests but also in respect to further actions in CDM, such as the characteristics of occupations chosen in PLANNING. When mean ratings (exclusive of Interest Field) are computed for those occupations selected in PLANNING by members of each of the four groups, highly significant differences are found on Income, Prestige, Independence, Helping Others, Leisure, and Early Entry (54). The two "typical" groups (MT and FT) choose occupations with the extreme mean ratings on these six values dimensions, and the progression tends to run MT, FA, MA, FT, with the two "atypical" groups closer to MT than to FT (54). Thus, we see an interlocking or alternation of sex groups, with "atypical" females positioned between "typical" and "atypical" males, and "atypical" males between "typical" and "atypical" females.

In short, the sub-classification of each sex by "typicality" is not merely academic. All four groups act consistently with their values in an important aspect of CDM--the choice of occupations to plan for. Sex per se does not appear to be a major barrier to selecting occupations that will be instrumental in providing the satisfactions and rewards that are deemed important by each group. Thus, "atypical" females, like "typical" males, engage in planning for occupations that offer good opportunities for high income, prestige, and independence. While "typical" females lead all other groups in planning for occupations that offer good opportunities to help others, such occupations are as popular with MA as with FA (55).

Having established that groupings based on values, rather than sex alone, provide finer differentiations on interest preferences and on selection of occupations according to instrumentality, we

next looked at occupational choices classified on a highly objective, external criterion of predominant sex membership (see p. 159 for the method used). Again, the kinds of occupations chosen by the four groups are consistent with the characterization of each group. "Typical" males overwhelmingly chose occupations with predominantly male membership and rarely chose either of the other two categories. The occupations with predominantly male membership were also most popular with "atypical" females. The distributions for the two "atypical" groups are quite similar, each showing movement away from the "typical" group of the same sex and toward the "base rate" distribution of occupations in SIGI with respect to sex membership. All but the MT group tended to choose occupations in the middle category (with a roughly balanced proportion of males and females) more frequently than the "base rate" might suggest. The occupations with predominantly female membership were most popular only with the "typical" females (58, 59, 60, 61, 62, 63). So here again we see the widest gap between the MT and FT groups, with the FA and MA groups occupying the middle ground.

A Concluding Word

All these findings of similarities and differences among groups are essentially liberating. They show there is a precedent for people of either sex who want to escape from sex-role stereotypes and seek career satisfactions in terms of their own values. There is ample demonstration that people are not locked into sex roles but are capable of entertaining and acting on self concepts that reflect various gradations of sexual identification.

The remaining question is, granted the crucial importance of values that is confirmed in this study, are people equally free to develop value systems that are not sex-bound? Certainly, we can not ignore the statistically significant differences between means of value weights assigned by males and females on six of the ten values dimensions. But we have also noted the great degree of overlap between distributions for the sexes and the high standard deviations on every dimension. We know very little about the ways in which values are introcepted except in general terms. Clearly, an individual's values come from family, from the culture at large, and from specific environments. But these sources may diminish in importance with maturation. Their impact in formative years can be acknowledged, but we can also recognize that there is considerable space for conscious, intentional development and even change in values: one can "take thought" about where one's values have come from and where they are taking one (Katz, 1963, p. 22). This is consistent with the maturational trend in the attainment of autonomy. As people progress through various stages toward maturity, their behavior

> "seems capable of variation up to the limits established by preceding stages. Thus, within whatever constraints are allowed by being a member of the human species, hav-

ing inherited a given set of genes, being brought up in a certain culture, and being subjected to selected arrays of reinforcements, most young men and women seem to want to become as independent as possible. They seem to want to use as much space as is left them for making their own decisions, for determining their own behavior--even those who decide to become behaviorists. We have not yet progressed, if that is the word, entirely 'beyond freedom and dignity.'

"It is to this striving for individual freedom in decision-making that our computer-based System of Interactive Guidance and Information (SIGI) addresses itself, specifically in the area of career decision-making. But freedom without competence may be frustrating. We have set out to enhance the freedom of the decision-maker[s] by helping [them] to increase [their] competence in the process of making informed and rational decisions." (Katz, 1973, pp. 44-45).

The evidence in this study of age and sex differences in the career decision-making process speaks strongly to the effect that neither age nor sex is a necessary deterrent to realization of the ideals of freedom and competence in CDM that we have attempted to implement in SIGI.

REFERENCES IN THIS CHAPTER

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