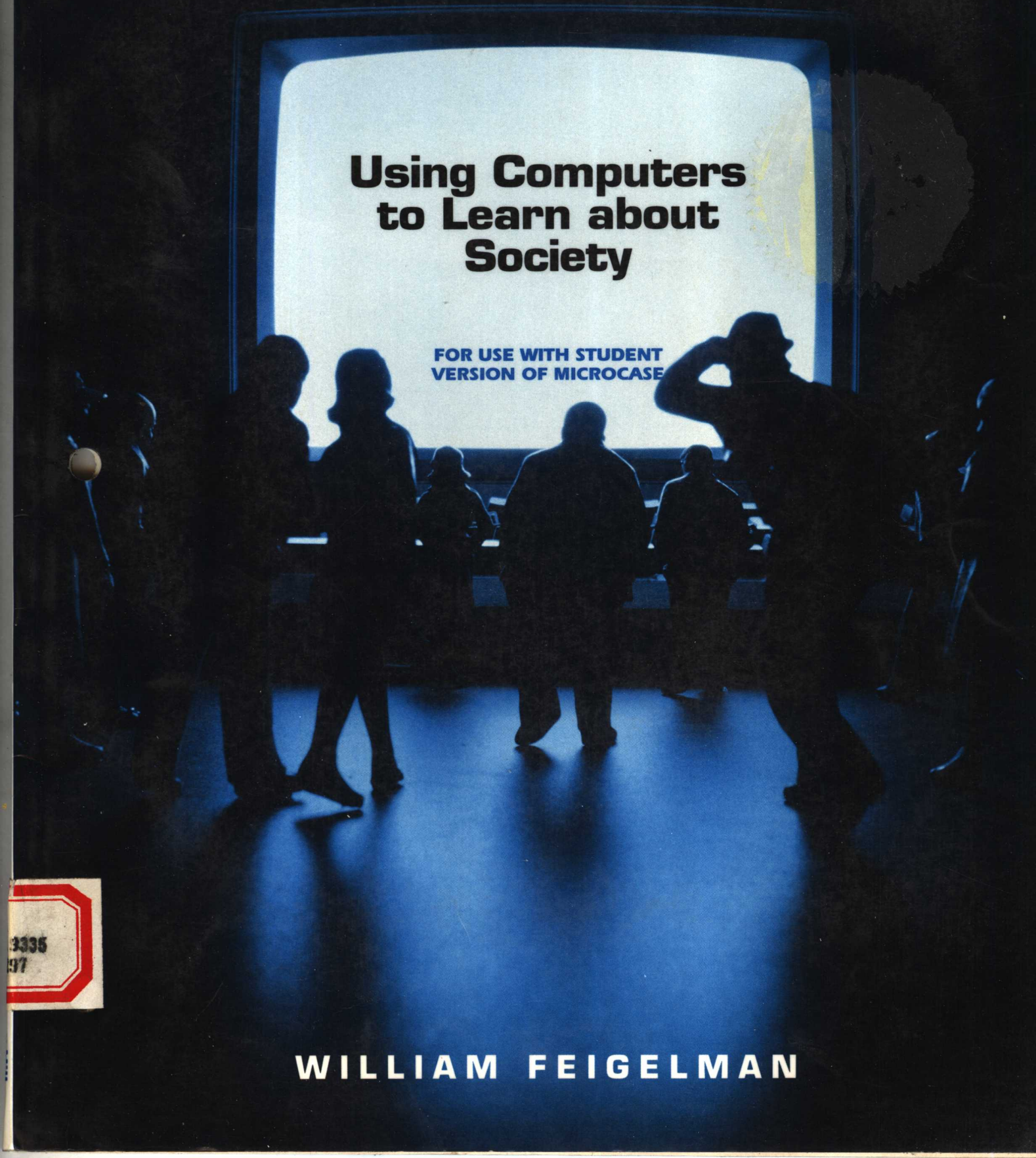
HANDS ON SOCIOLOGY



Using Computers to Learn about Society

FOR USE WITH STUDENT VERSION OF MICROCASE

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HANDS ON SOCIOLOGY

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For Jesse and Ana

Hands On Sociology:
Using Computers to Learn about Society

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Introduction

By now, it is a commonplace to say that we have entered into a computer age. With the advent of low-cost microchips an enormous proliferation of computers has occurred. Today's PCs rival yesterday's mainframes in storage capacities and computational speed; what used to be stored within the recesses of large-scale and remote campus computer centers can now be incorporated within small portable or desktop units weighing less than 20 lbs. and costing less than $2500, effectively bringing the PC within the grasp of practically everyone.

Along with the revolution in computer technology there have been spectacular efforts to make today's students more computer literate. Whole new collegiate curriculums in computer studies have been spawned in less than a decade: Programming, computer languages, modeling, software design, databases, desk top publishing are just a few of rapidly expanding knowledge subspecialties within the burgeoning area of computer studies. A trend is now emerging at some select colleges to require new students to bring their own personal computers to campus, anticipating, at the very least, that students will develop proficiency with word processing and telecommunications.

Against the backdrop of these changes it is remarkable that instruction in undergraduate introduction to sociology courses has remained virtually unchanged from what it was 25 years ago. Today's beginning sociology students start studying the discipline much as their parents did, aided by conventional textbooks, anthologies, and paperback monographs. One would expect sociologists, with their reliance on quantitative proof, to sooner employ computers than many other academicians, such as those engaged in language studies or history; it is surprising to find such a limited use of these valuable pedagogical aides as is now observed.

In fairness to my colleagues, considerable efforts are now being made to expand the use of personal computers at the later stages of the undergraduate curriculum. Many instructors feel that unless one has sufficient time, it may be best to leave computers out of the fundamentals courses, introducing them later on in the undergraduate program when students have opportunities to take courses in statistics and research methods, and to pursue more of their own self-directed research.

Nevertheless, I would maintain that the first course provides an excellent opportunity to introduce the use of computers to beginning students. Like some of my colleagues, I would abhor their use if it precluded coverage of basic concepts and theory. But, bringing computers into the introductory course can serve not only to reinforce disciplinary fundamentals, but also to provide a valuable stimulus to broaden interests in the field of sociology.

Computer study can also be useful as an extension to conventional pedagogical approaches; it can be especially helpful to inspire theoretical inventiveness amongst students. Students can let their sociological imaginations run free, and then submit their ideas to rigorous and systematic statistical tests. As I have used computers with beginning students, I have found some simply amazed at the power they held when they could control large databases with a few keyboard

strokes. Others were dazzled by the computer's ability to do complex statistical calculations effortlessly, with almost instantaneous results. Many indicated they found it very pleasurable to be able to manipulate sociological data so easily. For some, the opportunity to test out their intuitive notions about social relationships in a more systematic and precise way represented a most seductive experience.

Computers also provide opportunities for instructors to enlarge students understandings of how sociological research is done, how things may be proven in sociology, and the use of statistics.

With these valuable tools, too, students can understand social relationships more deeply than by learning through texts alone, thus providing a more active educational experience. The student who learns at his or her computer terminal that a certain variable eliminates the effect of another presumed causative factor acquires a far more convincing and enduring object lesson than one who is merely absorbing factual information.

Of course, computers are no instructional panacea; some students are so terrified of them (and of numbers) that they may do far better with books. But, if some of these students begin to lose their computer phobias, they may find that computing can make their academic lives far less laborious and overwhelming; their new familiarity with the machine may invite them to try out some of its other applications as well.

In our present computer-dominated age more instructors are beginning to feel an obligation to advance computer literacy in their classes. Many of today's experienced computer users still find it astonishing, if not very distressing, to witness the hysterical computer-terror among so many of their students. Experienced computer-using faculty know very well that the computer-illiterate students of today are disadvantaged in developing their mathematical and writing skills to fullest potential.

HANDS ON SOCIOLOGY and Earlier Computer Workbooks

The idea of a microcomputer workbook designed for beginning sociology students is by no means a novel one. There have been a fair number of such programs and learning packages created in recent years. Practically every publisher can boast of having at least one such supplement, which it usually offers free to users of its main texts. However, most of the programs and workbooks have remained underutilized, having sunk deep into the paper pile on professors' desks, where they remain, gathering dust.

Unlike some of the many programs built around studying imaginary societies or simulation models, the present book is based upon real social data. It draws from the 1989 and 1990 General Social Surveys. The General Social Surveys, done by National Opinion Research Center, are based on national probability samples of the U.S. adult population (approximately 1500 annually) and offer publication-quality data for students and researchers to analyze. Students working with

this database can experience the satisfaction of knowing they are using an authentic and professionally accepted data source, one which has generated more than 2000 articles, books, dissertations, and other publications. Among social scientists the GSS are well regarded for their timeliness, high quality data, and integration with past survey research.

The present workbook is also based upon the popular data analysis software developed by MicroCase Corporation, known as the MicroCase Analysis System. This program is extremely straightforward and easy to use for beginning data analysts. With a minimum of keystrokes students can generate easy-to-understand bar graphs, with accompanying descriptive statistical summary data. This software also provides clear-cut crosstabulation analyses, making it possible to do two- and three-way contingency tests almost instantaneously. MicroCase also compresses large amounts of information within minimal computer disk space. It runs on the most primitive to the most sophisticated IBM and compatible type computers. For these reasons it presented itself as the most appropriate statistical analysis software for beginning sociology students to deal with. This book includes a more simplified, student version of the MicroCase Analysis System.

The accompanying text and exercises provide an overview for doing social science research: formulating hypotheses, using samples, employing significance tests, and applying statistical controls, among other topics. The effort has been to draw students enough into the research process so they can begin to do some their own research, without making them into methodologists. To facilitate use among beginning students, chi-square is the only statistical test presented for evaluating questions of significant differences, the direction of causality, and the strength of causal associations. Instructors using this volume in an undergraduate research methods course should also find this work useful as a beginning point, as they delve more deeply into the variety of research methods, statistical tests, and other methodological issues.

The outline of this volume closely follows the topics covered in introductory sociology courses. Moreover, wherever the GSS has followed up on themes appearing in many introductory texts, an effort has been made to include these subjects here so that students can investigate for themselves how (and whether) these hypotheses are supported. For example, Melvin Kohn's classic work on parental values about child rearing and social class appears in the socialization chapter, and Leo Srole's work on anomia is also found in the chapter on urbanization. At the same time, suggested essay assignments and multiple-choice questions encourage students to think creatively--and try to extend the body of textbook knowledge--about the interrelationships between sociological attributes.

Because of the wide range of subjects presented here, it is possible to consider using this workbook as a supplement in a variety of undergraduate course offerings: American Institutions, Social Problems, Urban Society, Intergroup Relations, The Family, Deviance and Crime, among others.

Obviously, a prime concern in utilizing this approach is the instructor's methodological bent. While students may learn things readily with a "hands on" approach, not every instructor feels

comfortable using computers in the classroom; nor are all inclined to highlight methodological issues. Many, too, prefer to emphasize a review of the accumulated conclusions of past sociological researches. Here, however, the orientation emphasizes a variety of aims: to provide a fuller picture on how sociological knowledge is actually accumulated; to explore the kinds of conclusions that can be drawn from the General Social Survey; and to delve deeply into the process of doing one's own sociological research--guiding students to do their own investigations more expertly.

One of the biggest shortcomings of many computer workbooks and software is the enormous amount of time needed to evaluate students' work. Anyone who has used any of the available workbooks can testify to the huge number of hours spent evaluating students' completed exercises. Only an instructor with a modest number of students or with the resources of a teaching assistant could ever hope to utilize preexisting products to their students' educational advantage.

Hands On Sociology has sought to deal with this difficulty by providing faculty with a computerized scoring program to evaluate much of their students' learning accomplishments. In some academic situations each student may bring a diskette to their instructor which is easily customized (by the instructor) to meet particular pedagogical aims. With these diskettes students can log their answers to multiple-choice questions on what they have learned doing their computer analyses. Alternatively, professors may distribute information kits to students (provided in the accompanying Instructor's Guidebook) so that their students themselves can offload the answering disk software and complete the computerized assignments. With this alternative there is a minimum of work for the instructor. If the instructor deems it more expedient to have the answering disk software installed on the campus network system, this can easily be done. When students complete workbook exercises, they log their answers onto their disks (or onto computer files on the network system); these can be rapidly read and reviewed by their instructor. Instructors wishing to provide immediate feedback to their students, and wishing to use the answering disk primarily in a tutorial capacity, may customize their answering disk software accordingly.

This instructional package challenges students in a variety of ways. For one, it requires them to effectively use a personal computer to run a statistical analysis program (Student MicroCase) and an answering disk program.

For another, this experience sharpens students' methodological skills: It helps them to learn how things are proven in social science; how to interpret statistical tables and trends; and how to identify patterns of relationships between variables.

Another dimension to students' learning involves their sociological understanding of actual data: American society and the distinctive behavior patterns of various American subgroups: regional, class, race, religious, and age groups. Even though students' databases only include a narrow time frame of two GSS survey years--1989 and 1990--as comparisons are made between

differing age cohort groups, students can explore a multiplicity of questions about social change, as well. With over a hundred variables in their personal database, students can investigate an enormous variety of social interrelationships.

Overall, the research exercises encourage students to develop their critical thinking skills and to become inventive theoreticians and careful and systematic analysts of patterns of social relationships. A variety of multiple-choice and essay questions are presented to students evaluating their ability to analyze and interpret sociological data.

Obviously, answering the essay questions provides the best opportunity for learning the material presented in the workbook and software. Yet, instructors with large classes may be unable to use most of these questions. Faculty members with large classes might want to consider assigning some of the essays as supplementary learning activities to those of their students seeking further sociological enlightenment.

Most instructors with large classes and no TA's will find the battery of multiple-choice questions sufficient for serving their pedagogical aims. The questions emphasize the acquisition of skills in data interpretation and the recognition of American social patterns. The questions gauge students' command of an extensive body of knowledge about social interrelationships and their methodological acumen.

The accompanying answering disk software provides a distinct advantage over preceding computer workbooks. With it, instructors will be able to read and review each student's responses to the various groups of multiple-choice questions. With this software an instructor can expect to spend about 10 to 15 minutes performing the task of reading and recording the responses of a class of 30 to a given test, and thus to be able to assess at a glance each student's test performance.

Alternative options--which can be set onto the students' answering disks--include giving students correct answers after they answer each question. This option enables students to immediately review their work at the computer, making their experience of answering the multiple-choice questions into a self-directed tutorial activity.

The EZquiz student answering disk software and related EZquiz Manager utility program for the customization of answering disks and ready review of test results are easy to use, requiring minimal computer sophistication. The Instructor's Guidebook provides instructors with a simple and straightforward set of instructions for designing the student disks to meet their particular pedagogical needs and to quickly review students' completed assignments.

Implementation

Campuses vary in how much access they provide to personal computers. Instructors at campuses with ample personal computer resources--where it may be possible to schedule class in a room filled with rows of personal computers--probably have the ideal situation for using this

product. This will afford students with direct access to computers while in the company of their instructor. One to three class visits to such a facility should be sufficient to complete the entire indoctrination process: introducing students to using a personal computer, the MicroCase software, and their answering disks, reading summary statistical tables, and making interpretations of chi-square tests. Thereafter, students should be able to complete the remaining exercises independently with their own personal computers or at their campus's microcomputer center.

Having a classroom with a computer for every student is not essential to using this product successfully. Instructors without such readily available resources but with a PC on a movable cart, a projection panel, and an overhead projector, will be able to demonstrate the programs in their regular classrooms on one to three occasions. (Those with computers and TV sets will find another low-cost alternative by using an ordinary TV set as a computer monitor. To do this will require replacing your computer's graphics board with a special computer card emitting a VGA-to-video signal, which will project the computer monitor's image through a TV receiver.) For those lacking such campus computer resources, a set of overhead projection transparencies can be provided, to enable instructors to demonstrate how the programs work in class.

Once the instructor has devoted one to three classes to demonstrating computer and software use, to reading tables and making interpretations of statistical test results, students should be able to do the workbook's exercises independently.

The Plan of This Book

Hands On Sociology begins by offering students a framework for interpreting sociological data. Chapter 1, a methodological overview, covers the following subjects: hypothesis testing in social science, applying the scientific method to human behavior, doing survey research, sampling, employing descriptive statistics and tests of statistical significance, and the use of chi-square. Chapter 2 guides students to operate a computer, also demonstrating the use of their Student versions of MicroCase and Answering Disk software.

Chapter 3 presents a preliminary data analysis exercise, focusing narrowly upon the social correlates of abortion attitudes. Chapter 4 covers some of the finer points of crosstabulation: the use of delta values to distinguish between the strength and direction of causal influences and three-way crosstabulations and their utility to identify spuriousness and to specify the effects of multifold causal influences. Chapter 5, on Culture, is somewhat more elementary than most of the later data analysis chapters. It examines students' familiarity with univariate distributions and to a limited degree with bivariate associations. The remaining chapters all require similar levels of analytic mastery and familiarity with both bivariate and trivariate relationships. Therefore, these later chapters can be assigned in almost any order depending upon the instructor's overall topical agenda. Each data analysis exercise consists of a variety of multiple-choice and essay questions for students to answer, usually with their computers.

Over the last three semesters, extensive pretesting of this text and computer software with my Nassau Community College students has demonstrated that this particular progression of assignments works well pedagogically. Yet, other instructors may find it more to their liking to have students plunge directly into the data analysis exercises before reviewing any preparatory materials. There is no set formula for the successful use of this text and software. Instructors will find that many of the modules offered here--in conjunction with other supplements--will be of value toward advancing a variety of their academic sociological goals.

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HANDS ON SOCIOLOGY--USING COMPUTERS TO LEARN ABOUT SOCIETY

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CHAPTER 1

Doing Sociological Research and Using Survey Data

This book is intended to complement your other sociology textbooks. It is designed to increase your competence in doing sociological analysis. The skills introduced also apply to other realms of scientific inquiry, and especially, to the social sciences. In fact, this work should be relevant to those pursuing practically any field where numbers are important for establishing knowledge--business, journalism, law, among many others.

The aim of this instructional program is to enhance your understanding of how computers are used in social science by actually evaluating sociological data with them. Also, a fundamental goal of these learning activities is to increase your understanding of the ways that scientists acquire and accumulate knowledge and the manner by which scientific conclusions are made. A further aim of these exercises is to explore, reinforce, and extend your knowledge of American society.

After doing these exercises most readers should become more discerning critics and capable judges of the persuasiveness of scientific evidence. Probably only a minority of this book's readers will want to carry out their own sociological studies. Yet, those inclined to do their own researches afterwards will be better equipped to do so. After doing these activities you should also be more comfortable using microcomputers, more informed of their many uses, and more aware of their advantages for facilitating certain kinds of sociological and other scientific research.

In this first, very crucial, chapter you will encounter many unfamiliar terms and possibly some intimidating numerical concepts (especially if mathematics is not among your stronger subjects). Yet, all of the issues discussed here are essential, if you are to proceed intelligently and appropriately in making your own interpretations of scientific data. Therefore, it will probably be important to reread this chapter.

It is recommended to read this chapter first, then the material on using your computer in Chapter 2, next. Many who are confronting computers for the first time will need to follow that discussion very carefully, while those having some acquaintance with computers can read Chapter 2 more casually. The next procedure will be to do the preliminary data interpretation exercises in Chapter 3, "Getting Started." It is suggested that Chapter 1 be reread after doing those exercises. Then, readers should feel more confident as they proceed with the remainder of this book.

Our first task will be to explore what it means to know anything in science or in sociology. The most fundamental of all scientific statements is a **hypothesis, a statement of presumed relationship between two or more things**. An example of a hypothesis would be a statement claiming that a community's crime rate is related to its rate of residential turnover. Usually, when we think of a hypothesis we think of it as a statement of relationship between two or more **variables. (A variable is simply something that can change or vary.)** A crime rate is a good example of a variable; one community's crime rate may be higher than another's, or higher or lower than at another point in time.

Scientists also talk about **causation**--how independent variables influence dependent variables. **Independent variables--are the things that precede or influence other things.** Independent variables make things happen. **Dependent variables are the scientific problems of study, the results, or the effects of the independent variables.** Sometimes the path of scientific causation is clear. If we consider the hypothesis that the age people marry (considered as an independent variable) affects the stability of their marriages (considered as a dependent variable) we can discern a clear temporal sequence of events: people have to get married before they can get divorced.

Very often in social science, the path of causation is blurry. For example, it is a relatively well established finding that people living in integrated communities are more likely to have interracial and intercultural friendships, compared to people residing in more racially and culturally homogeneous settings. Does living in an integrated community cause one to make more friendships with others from different groups? Or does the possession of friendships with others from different groups make one more receptive to living in an integrated community? Probably there is some truth to both hypotheses, but which one is most accurate or important often can remain obscured or uncertain.

In science it is often a worthy enough enterprise simply to establish that two variables are clearly associated. (In scientific jargon this is known as the proof of **concomitant variation**.) Of course, it is always desirable, whenever possible, to distinguish "causes" from "effects." Your statistical analysis program will force you to define an independent (causal) variable from a dependent (effect) variable. But, you should remember that in many cases this may be an arbitrary and premature distinction.

You may have heard that in science the different types of scientific statements like facts, laws, theories, postulates, and so on, possess differing degrees of scientific certitude. While this may be true, it should be understood that all scientific formulations are ultimately hypotheses--statements of presumed relationship--that must be empirically established to be considered valid. **Empirical proofs are ones that are directly observable**; they can be verified by anyone. You do not have to be a wizard or a genius to use the scientific method. You must be willing to use your senses; scientific knowledge

must persuade the senses. In the last analysis all scientific knowledge has to be experiential, involving the measurement of directly observable things.

Also, experimentation is pivotal to science. Ideally, the scientist wants to employ **the classical experimental design. With this, the scientist has available two similar groups, one designated as an experimental group, the other known as the control. Both groups are measured; then, the experimental group is influenced in some way; in contrast, the control group is not manipulated; then, both groups are remeasured to assess whether the manipulation of the experimental group has distinguished it from its pre-manipulated state, and from the control group.**

The work of Rosenthal and Jacobson (1968) provides a good example of the classical experimental design. They did a study on what is known as the phenomenon of the self fulfilling prophesy: how people's beliefs come to produce real social consequences. Selecting one school as the site of their experiment, they told the teachers there that certain students in their classes were "potential intellectual bloomers" who would be likely to undergo dramatic intellectual growth. In reality, potential bloomers were chosen randomly. This was the independent variable.

The dependent variable in the experiment was each child's standardized IQ test score. First and second graders were tested, and then retested a year later. The researchers expected that so-called "intellectual bloomer" students would experience IQ test gains because of various advantages afforded them and special encouragement from being regarded as gifted (compared to so-called "ordinary students," the control group). Comparing both groups test and retest scores, the researchers found that designations of intellectual bloomers did produce significant IQ test gains in the experimental group, and no appreciable changes occurred in the IQ test scores of controls.

Of course, in social science the opportunities to do real-life and laboratory experimentation are not as numerous as they may be in physical science. People's lives are not as readily available for scientific manipulation as chemical compounds, plants, or rocks may be. Yet, there are some limited possibilities for resourceful and inventive researchers to conduct laboratory and real-life experiments with people. If this social experimentation is socially responsible, it will take account of the ethical issues associated with doing the research, and it will avoid doing any harm to its research subjects.

It is imperative to try to approximate the classical experimental design (with before and after conditions and control groups) whenever possible. Very often, in doing social research analysts do what is known as **correlational analysis**, examining data to find whether change in the amount of one variable is accompanied by comparable change in the amount of another. Such comparative analysis approximates the classical experiment to some extent, comparing those with and without the experimental condition along some dimension. Much of your analyses with the computer program will be of this type, which

is a well established mode of scientific research.

Besides direct experimental interventions, behavioral scientists establish knowledge through a variety of modes; observational studies, surveys, documentary analysis, and content analysis are most important in sociology. Your accompanying texts discuss each of these modes in greater detail.

Surveys--whether by interview or questionnaire--are one of the most commonly used methods for gathering sociological data. In the accompanying set of exercises you will work with survey data that was taken from a representative cross-section of adult Americans. You will use the 1989 and 1990 datasets from the General Social Survey. This survey has been conducted in practically every year since 1972 by the National Opinion Research Center (NORC); each year it draws on a different respondent population of approximately 1500 adults from across the country. The GSS is a very reliable and professionally reputable data source; using the GSS, many social scientists have written books and articles discussing Americans' behavior. (See T. W. Smith and B. J. Arnold, An Annotated Bibliography of Papers Using the General Social Surveys, 8th Edition, National Opinion Research Center: Inter-university Consortium for Political and Social Research, 1990) for a very helpful list of most of the 2000 or more studies based upon this data.

Today, most researchers doing surveys use samples of the populations they study. Interviewing or getting questionnaires from everyone in the population is often neither necessary nor feasible. The most representative sample to have for almost any study would be a random sample. **In a random sample all units in the total population have an equal chance of being included.** The GSS uses a multistage probability sample based on a random selection of respondents. In the complex selection process, random assignment is used within each of the various geographical units included--states, counties, census tracts, blocks, and residential units--to arrive at the projected total size of approximately 1500 households.

Your analysis program known as MicroCase (Student Version) will give you various descriptive statistics about the population of American households for each of the variables in the dataset. It will provide the following: **the mean--the average of all responses; the median--the midpoint of all responses; the mode--the most frequently appearing response; the range--the difference between minimum and maximum values; the variance--the sum of squared differences around the mean divided by the total number of cases minus one; and the standard deviation--another measure of dispersion from the mean, in this case the square root of the variance.** Each of these pieces of information is useful for understanding the response of the group as a whole, or of some subpopulation within the total. You may be interested in making comparisons between different subgroups, and these statistics are useful to describe your group's (or

subgroup's) central tendencies.

For example, in the General Social Survey all respondents were asked their ages. Figure 1.1 shows the 1989 sample distribution of 1537 adult American respondents. Four respondents didn't know or wouldn't answer the age question. The average or mean age of respondents was 45.44 years. The median or midpoint response of all 1533 answers was 42.00 years. The most frequently appearing, or modal, response was 28 years; 47 respondents were 28 years. (In Figure 1.1 the longest bar is shown at age 28). The range went from a low of 18 years to a high of 89 and older. (The rules of the survey stipulated that to be a survey participant one had to be at least 18 years of age.)

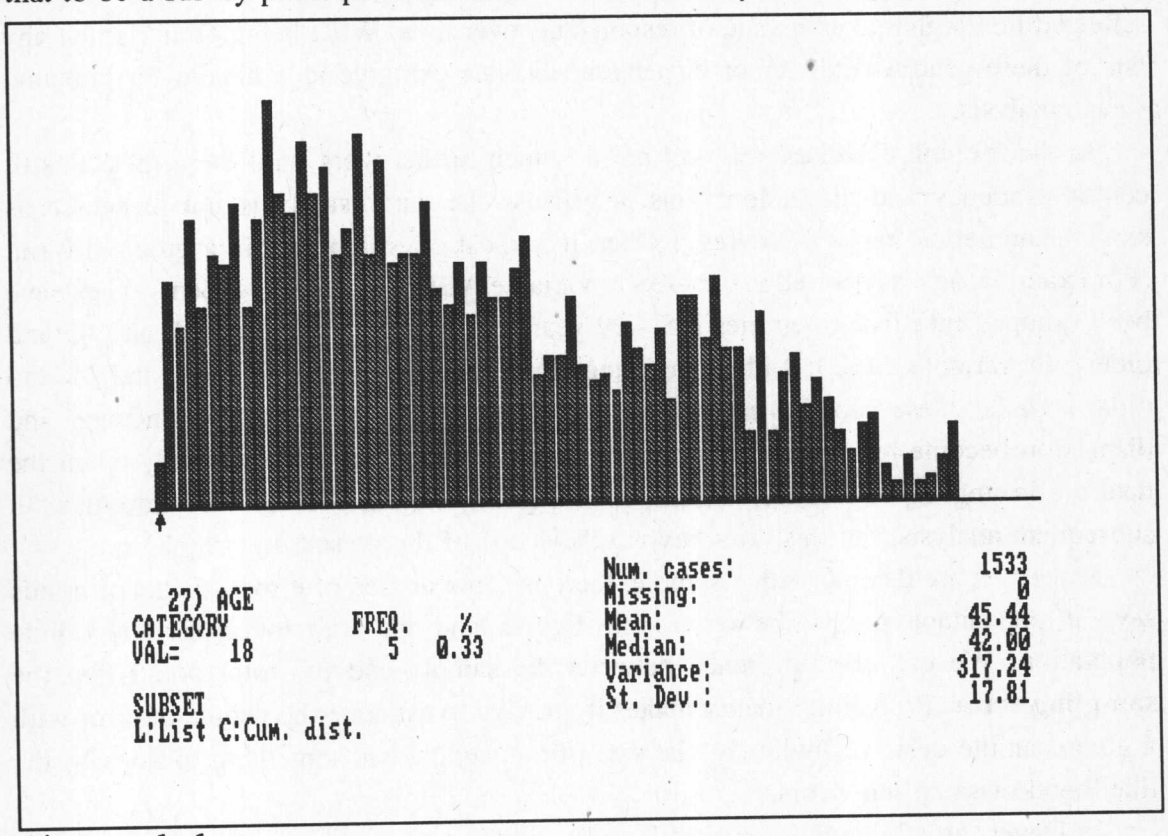

Figure 1.1

According to the formulas given, the variance and standard deviation were, respectively, 317.24 and 17.81. The variance and standard deviation are measures of dispersion based on the mean. On some occasions central tendency measures like the mean or mode may fool us and keep us from recognizing important differences about groups. At those times measures of dispersion like the standard deviation may be the only way that such differences can be identified. As an example, think of two clinics that showed similar mean levels of use. In one, use patterns fluctuated closely around the mean. In the other, frequent use patterns of some users were offset by sparse use patterns