Methodologist's ToolchestTM

for Windows Version 3

USER'S GUIDE AND REFERENCE MANUAL

by Edward Brent Alan Thompson

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1. INTRODUCTION

WHY METHODOLOGIST'S TOOLCHEST IS NEEDED

- Do you need to write a research proposal but don't know where to start?
- Are you unsure which <u>statistical procedure</u> to use? Which <u>data collection</u> procedure is most appropriate? Have you described and justified these procedures well enough to persuade reviewers?
- Do you know how to determine the minimum <u>sample size</u> required to detect the expected effect? Did you adjust for design or comparisons? Have you taken into account <u>response rates</u>, <u>exclusions</u> and <u>experimental mortality</u>? Are you confident you used the correct formula and computed the results correctly?
- When you made a change in the <u>design</u> of your study, did you adjust the <u>measurement</u> procedures to reflect that change? Has a change in <u>sampling</u> procedures made your planned <u>analyses</u> inappropriate? Are you sure you haven't overlooked something?

These are just some of the reasons why you might need to use Methodologist's Toolchest. Methodologist's ToolchestTM is a powerful integrated system of eight different expert systems and a comprehensive dictionary of research terms designed to help you with all aspects of research proposal development. An overview module, the Peer Review Emulator program, guides you through the entire research proposal process, making sure you have addressed all aspects of proposal development, identifying weaknesses and inconsistencies and advising you on the best way to improve the proposal. The remaining expert systems provide detailed advice for critical components of the research process such as selecting the correct statistics or determining the appropriate sample size.

Developing a research proposal is a complex task. There are literally hundreds of elements that must be considered and thousands of relationships in which a change in one component of the research design can make another component in an entirely different section weak or entirely inappropriate. This is why peer review is so important. I've sat on review panels for federally funded proposals and watched as everyone in the room comes to agree a project suffers a fatal flaw that somehow escaped the proposal writer. This happens to even the best and most experienced researchers. It happens precisely because the process of research design is so complex. Often most of the reviewers don't see the problem until one person points it out; but once identified, it becomes obvious that there is a severe problem. If the proposal writer had recognized the problem they probably could have corrected it easily and had a successful proposal. This is the concept behind peer review and the Peer Review Emulator.

Peer Review Emulator takes you step-by-step through the process of writing a research proposal and provides a <u>simulated peer review</u> complete with <u>feedback</u> and

<u>critique</u> at every step. P.R.E. provides a <u>systematic framework</u> to keep you on track, identifying key decisions you must make and important elements that must be addressed. P.R.E. reminds you of <u>linkages</u> where a change in design in one section has implications for other sections, it reminds you which sections of the proposal are completed and which require additional work, and it critiques sections, pointing out <u>overlooked problems</u> and <u>fatal flaws</u> that need to be corrected. From within P.R.E. you can access the other components of the Toolchest for more in-depth advice and help with specific components of the proposal. A built-in editor permits you to draft your proposal while you are guided by P.R.E., or you can use your own favorite word processor.

WHAT'S NEW IN VERSION 2?

Version 2 for Windows added the FirstDraft[™] Editor to the Peer Review Emulator program. This FirstDraft Editor helps researchers draft their research proposal, including automatically generated text describing the proposal based on information provided by the user as they fill in the forms. In addition, the FirstDraft Editor includes recommendations for issues that should be addressed in each section and a critique when particular issues have not been addressed adequately.

WHAT'S NEW IN VERSION 3?

Version 3 of the Methodologist's Toolchest has been extensively revised to include

- Greatly enhanced advice for qualitative research
- Built-in spreadsheet and Gantt chart modules for proposal budgets and schedules
- RTF files for the proposal draft permitting greater control of appearance and annotations
- Over 100 new research references, including many addressing qualitative research issues

GREATLY ENHANCED ADVICE FOR QUALITATIVE RESEARCH

Throughout the Methodologist's Toolchest modules, we have incorporated extensive advice regarding qualitative research strategies. As a result, the Methodologist's Toolchest can now be used to effectively design a complete qualitative research proposal as well as quantitative proposals or proposals combining qualitative and quantitative approaches.

There are a wide range of approaches to qualitative research, and those approaches vary dramatically in their assumptions and methods. We have sought to be inclusive in the Methodologist's Toolchest, offering to researchers assistance in selecting from among this wide range of alternatives. At the same time, we recognize that much research includes a blend of both qualitative and quantitative approaches. For this reason, it is important to find a reasonable way to offer to researchers both qualitative and quantitative options wherever possible, and to coordinate the presentation of materials so that options addressing similar issues appear together in the program. Methodologist's Toolchest does this by addressing both qualitative and quantitative strategies at each step in the research process.

The Aims section of Peer Review Emulator now asks researchers to identify their research strategy as either quantitative, qualitative, or some combination of the two. Then this information is used throughout the rest of the program to guide them to appropriate procedures and strategies. Data collection procedures in both the Peer Review Emulator and Data Collection Selection programs have been broadened to include the full range of qualitative as well as quantitative procedures. Qualitative data collection procedures include participant observation; the use of available data; focus groups; film, video, or photographs; historical records; projective techniques; unobtrusive measures; face-to-face interviews; and elite interviews.

Measurement strategies have been greatly expanded and reorganized to address issues of data recording and coding; data management; data quality control; concept formation; measuring established concepts; and evaluating measurement. Data recording and coding addresses strategies that are primarily qualitative, including recording field notes, transcribing interviews, and coding qualitative data; quantitative strategies for structured data input, systematic observation, and analog/digital instrumentation; and procedures that may be either qualitative or quantitative, including data capture in routine activity and the use of film, video, or photographs. Coding qualitative data is given particular emphasis, with treatments of open coding, axial coding, selective coding, thick description, and verbatim quotations. Data quality control includes issues of data checking and cleaning, handling missing data, handling outliers, and maintaining coding consistency. Concept formation includes qualitative procedures based on axial coding and quantitative procedures for scaling analysis. Measuring established concepts includes the qualitative procedure of selective coding as well as more traditional quantitative approaches to use existing scales or develop new multi-item scales. Finally, evaluating measurement offers the more qualitative approach of triangulation as well as the more quantitative procedures for assessing reliability and validity.

In the research design section, quantitative procedures for selecting comparison groups, handling timing issues, and assigning cases to groups are supplemented with qualitative procedures for selecting comparisons more suited to exploratory research, including both the constant-comparative method and analytic induction.

Sampling strategies have been expanded, supplementing quantitative strategies of probabilistic, stratified, cluster, and multi-stage samples with qualitative procedures based on theoretical sampling and sampling multiple units of analysis. For qualitative research, the issue of representativeness is raised as opposed to the kind of generalizability traditionally sought in quantitative studies. And the use of power analysis to determine sample size in quantitative approaches is supplemented by the use of theoretical saturation as a basis for deciding sample size in qualitative studies.

Analysis plans have been extensively expanded and reorganized to address the broad analysis issues of organizing, summarizing and finding patterns; testing hypotheses; developing the argument; and considering alternatives and validating conclusions. Organizing, summarizing, and finding patterns in the data now includes not only quantitative approaches for scaling and classification, exploratory data analysis, and univariate descriptive statistics; but also the more qualitative procedures of qualitative coding as analysis, analytic memo writing, identifying patterns in the data, and examining key or focal events. Testing hypotheses now includes qualitative procedures such as the constant-comparative method and the use of templates to compare observations with common forms. Those templates include interpretive methods, cultural analysis, semantic networks or domain analysis, semiotic analysis, historical analysis, life histories, and narratives. Analysis plans for developing the argument have been expanded to include qualitative procedures such as the use of typologies or ideal types and ways of visualizing data. Finally, procedures for considering alternative explanations and validating conclusions include many qualitative approaches, including assessing the credibility of informants, explicating the methods used, bracketing, deconstruction, realism, experiential analysis, member validation, passing as an insider, negative evidence, omissions, triangulation, assessing researcher influence and reactivity, and the issue of representativeness.

SPREADSHEET AND GANTT CHART MODULES

Version 3 of the Methodologist's Toolchest now includes modules for creating a spreadsheet of the proposal budget and a Gantt chart of tasks scheduled for the proposal. These make it unncessary for researchers to use separate spreadsheet and scheduling programs and move Methodologist's Toolchest one step closer to providing a comprehensive solution to proposal development.

RTF FILES FOR THE PROPOSAL DRAFT

The FirstDraft module in Version 3 now uses rtf files rather than ASCII text files for editing. This permits the researcher to paste into the FirstDraft Editor materials taken directly from a word processor file, including bold face, underlining, variable fonts, and other formatting. This reduces the need for transferring the proposal to a word processor for final editing and helps the researcher highlight key issues in the proposal draft. It also permits the critique and recommendations offered by the Peer Review Emulator program to be displayed in a distinctive color and font to distinguish them from the proposal text.

OVER 100 NEW RESEARCH REFERENCES, INCLUDING MANY ADDRESSING QUALITATIVE RESEARCH ISSUES

The qualitative research strategies and concepts integrated into version 3 of the Methodologist's Toolchest program are backed up with extensive descriptions, definitions, explanations, and recommendations, documented with over 100 new references to the methodological literature. Researchers using the program to write research proposals can not only clearly describe and justify their methods, but also document them with appropriate and timely references to the literature.

HOW DOES THE TOOLCHEST WORK?

Methodologist's Toolchest is a thought tool. That is, it is a computer program designed to help researchers design research proposals. Methodologist's Toolchest uses a combination of three important computer science technologies: expert systems, hypertext, and decision support systems.

EXPERT SYSTEM

Methodologist's Toolchest consists of several different expert system programs using artificial intelligence strategies to assist the researcher throughout the process of designing a research proposal. Expert systems represent one of several applications of what computer science calls "artificial intelligence." They use symbolic representation in a variety of ways to make inferences and perform sophisticated tasks once thought possible only for humans.

Expert systems are so named because they are designed to help the user with a specific complex task in much the same way an expert consultant would do if available. In this instance, Methodologist's Toolchest acts as an "expert" for the user seeking advice on various aspects of research design such as determining the appropriate sample size, selecting appropriate statistics and graphs for analyzing data, designing experiments or quasi-experiments, developing measurement scales, selecting data collection procedures,

choosing procedures for the ethical treatment of human subjects, establishing the unique contribution of proposed research, relating the research to past published work, and forming a strong research team.

Like human experts, the Methodologist's Toolchest programs gather information from the user then use that information and their expertise to make recommendations to them. Users fill out forms describing their research problem and, based on the information they provide, the programs identify likely strategies, point out potential problems, and identify inconsistencies among sections. Like human experts, these programs can provide further clarification of terms and questions through hypertext. Unlike human experts, these programs are available at all hours of the day, are always in a good mood, and never overlook an important question to be asked.

HYPERTEXT

Included with all of the Methodologist's Toolchest programs is an extensive hypertext facility. Questions asked of users and key phrases are usually hypertext, permitting users to select those phrases to view a detailed explanation. An extensive glossary of statistical, graphical, and research terms is available from within each program to provide immediate on-line definitions of technical terms. Users can browse among descriptions of statistical techniques, design strategies, data graphs, data collection procedures, measurement strategies, and the rest of the content of these programs using hypertext.

DECISION SUPPORT SYSTEM

Recently, some scholars have been critical of expert systems and their approach because the very term "expert system" implies the program will take control of the thought process and dictate the outcome. Frankly, we think this is a bad model for either a human expert or a computer expert system. We believe the best decisions can be made when the human user of programs such as those in the Methodologist's Toolchest play an active role, using the program to supplement their thinking and assist them in the decision process.

A term often used to describe programs with this goal is "decision support system." Decision support systems typically give the user access to important data bases, but unlike more rigid data base managers, permit the user to examine that data in new and creative ways. Decision support systems provide an array of tools and data to be employed at the user's discretion to help solve a wide range of problems.

Methodologist's Toolchest for Windows combines the expert system and hypertext technologies to provide an interface giving the user control over the decision process. This enhanced user control makes these programs much like a decision support system. The user controls the sequence and flow of the consultation. Users can select which aspects of the research for which they would like help. Users can go back and make changes at any time during the consultation rather than waiting until the end. These programs even help the user take notes of the "consulting" session. Extensive report and editing facilities permit the user to print the information they desire after a consultation, and develop drafts of proposal sections during the consultation.

DESIGN PHILOSOPHY

There are a few elements of the design philosophy behind the Methodologist's Toolchest which should be made clear.

A SUPPLEMENT TO EXPERTS, NOT A REPLACEMENT

First, we do not intend Methodologist's Toolchest to replace advice from a competent researcher or statistician. Rather, we hope it can supplement that advice. These programs can be used by researchers who do not have ready access to expert consultants. It can also be used for initial screening of problems. During that initial screening it may be clear that the analysis task is straightforward and there is no need for additional consultation. If consultation is warranted, information from the programs can help the user quickly convey the problems to experts for their help.

ENABLING THOUGHT, NOT AVOIDING IT

We believe the appropriate role for the Methodologist's Toolchest is to help researchers think through their analysis problems, not to help them avoid having to think. For this reason, these programs try to expose the complexity, the inherent contradictions, and the tradeoffs in various aspects of research design rather than glossing over those difficulties. We attempt to make the research process as visible as possible to the user so that informed users can judge its adequacy and less experienced users can learn a systematic approach to this problem. Our ultimate goal is to assist users in making more informed decisions, helping them to increase their own understanding and ability in this area, and making them less dependent on the program over time rather than more dependent.

TIPS FOR USING METHODOLOGIST'S TOOLCHEST

Individual programs in Methodologist's Toolchest can be used either alone or in conjunction with one another. To use any of these programs alone, simply select the program from the program list within the Methodologist's Toolchest list of programs.

The Peer Review Emulator program is designed to be the integrating program linking the rest of the programs in Methodologist's Toolchest. Under most circumstances, you are well advised to begin considering your problem by entering the P.R.E. program and then branching out to the other programs in the Methodologist's Toolchest as they are needed. This manual gives you an overview of the Methodologist's Toolchest. However, we are sure that you will agree with us when we say that there is far more to these programs than can be displayed in a brief manual. We encourage you to use the manual to help you get started with each program. Then you will want to explore each individual program on your own to find out how it can help you with your own research projects. Thank you for having enough faith in us to try these programs. We are quite sure you will not be disappointed. In fact, you may quickly wonder how you ever got along without these programs.

2. GETTING STARTED

INSTALLATION

Insert the CD into the CD caddie and close the door. The CD comes with an "AUTORUN.INF" file which if the autorun capabilities are turned on in your computer will automatically call the "INSTALLME1ST" program each time the CD is placed in the drive or when you click on the drive icon in the "My Computer" window. If the autorun feature is not active then from your Windows Desktop, select the My Computer icon and then double-click the left mouse button on the drive icon that represents your CD-ROM drive. Now double click on the "INSTALLME1ST" icon to begin the installation program. You will be prompted for a location on your hard disk to install the program. The default location will be on the first drive that has enough free space and in the directory "MTOOLS". You may change this location to any valid drive or directory with sufficient free space.

NOTE: If you have an older version of the Methodologist's Toolchest installed on your computer in the MTOOLS directory, you may wish to install the new version in a different directory (files from older versions are not compatible with version 3). Just to be safe you should also backup all files in the old MTOOLS directory before installing the new version.

To uninstall the Methodologist's Toolchest programs, double-click on the "UNINSTALL" icon in the folder in which you installed the Toolchest ("c:\Mtool" is the default). You should not simply drop the Toolchest folder in the "Recycle Bin" as this will not properly uninstall the Toolchest programs (read the "uninstall.txt" file in the Mtools folder).

FORETHOUGHT TUTORIAL

The Methodologist's Toolchest programs were created using the ForeThought[™] Authoring System. Each program will have a customized interface, but all ForeThought programs share a number of basic characteristics. This Tutorial is to familiarize you with the general capabilities of a ForeThought program.

RUNNING A PROGRAM

The installation program will create a "MTOOLS" entry in the "PROGRAM" item of the "START" button of the "Windows" desktop. Select the "Start" button then "Programs" and then the "Mtools" menu item. Some of the Methodologist's Toolchest programs are large and may require 30-45 seconds to load. If the program does not run, turn to the **Trouble-shooting** section of this manual.

You can create an icon on your desktop for quick access to the Methodologist's Toolchest. First, click the right mouse button on an empty area of your desktop. A menu will pop up, select the "New" and then "Shortcut" menu items. The "Create Shortcup" window will appear. In the command line input area type in the path to the "Ftwr.exe" which is in the folder in which you installed the Toolchest. By default this is the "C:\Mtools" folder. The entire command line string should look similar to the following: "C:\MTOOLS\FTWR.EXE MT" where "MT" is an argument pass to the "Ftwr.exe" program. Now select the "Next" button and fill in the Title of the shortcut, it is the text that will appear under the icon. Select "Ok" when you are done and the new icon will appear on your desktop.

The Methodologist's Toolchest program begins with a version number screen with the Methodologist's Toolchest emblem. Select the "Begin" button to go to the following screen.

Methodologist's Toolchest v. 3.0			
Exit Debug Help	< Back Overview Next >		
💋 Main Menu			
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Mothodologist's	Peer Review Emulator		
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	Measurement & Scaling Strategist		
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	<u>WhichGraph</u>		
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To run o chocific program, coloct ito	ETHX		
hypertext link, Or select the "Next >" button	<u>References</u>		
from the ment to step through the defito.	Internet Update		

This is the central Methodologist's Toolchest screen for selecting to view a demonstration of the programs, to run a specific program, or to check the Internet for upgrades. When you are in a specific program a button at the top labeled "MT" will allow you to return to this screen and select another option.

Select the "Internet Update" hypertext term to view the next screen. Updates to the current version's knowledgebases can be obtained from this screen. You can also automatically go to our web site. at http://www.ideaworks.com, by pressing the "Visit Us" button. We suggest that you visit our site periodically to check for new information regarding the Methodologist's Toolchest and related products. NOTE: In order for these buttons to work properly, you must already be on a

network or have established a dial-in connection to your Internet provider.



We have included with this version of the Toolchest, the demonstration program that is freely available for download from our Internet site. We encourage new users to step through this demonstration of the overall Methodologist's Toolchest before learning the individual programs. The demonstration is also an easy way for you to point out the features of the Toolchest to your colleagues or students.

Use the "Back", "Overview", and "Next" buttons at the top of the screen to move through the demonstration. You can also use the hypertext on each screen to see the related topics, and the buttons can then bring you back to the main path. When you return from viewing a section, such as "PRE", to the demonstration's main screen (shown below), the associated checkbox will be checked to remind you which paths you have taken. Return to the Methodologist's Toolchest main screen by selecting the "Back" button.



EXITING A PROGRAM

ForeThought programs like most WINDOWS programs require that you exit or quit the program in a graceful manner. You should not turn off your computer while a ForeThought program is still running. When the program shuts down in a normal fashion some cleanup work is done before the program stops. This cleanup can include closing open files and saving information for the next run of the program. Files can become damaged if they are not closed properly. To exit the program you can select the "EXIT" button on the button bar of the main menu at the top of the screen or from the "FILE" menu and then "EXIT". You will be prompted as to whether or not you wish to save your work (see Save/Retrieve a Project).

MOVING FILES

The files needed to run your program were installed either in the default directory such as "C:\MTOOLS" or the drive and directory you entered. You can move these files and any file in subdirectories to any new location you wish. You MUST, however, follow some rules when moving files. The "FTWR.EXE" and "FTWR.INI" files must be in the same directory. All the property settings for each of the icons in the MTOOLS window group must be changed to point to the new location of the "FTWR.EXE" file. The working directory for all ForeThought programs must be the same directory where the "FTWR.EXE" file is located. To change the property settings for an icon, highlight the icon by tabbing to it or clicking once on the icon. Now select the "FILE" and the "PROPERTIES" items from the windows menu. A dialog box will appear showing the current settings for each icon. Change these settings to reflect the new locations. Reinstalling the Methodologist's Toolchest from the CD to a new location will be easier for most users than moving the files yourself.

If you move the database files from the "DBASES" subdirectory to another location you must also modify the "FTWR.INI" file to point to the new location or the program will not run. To change the "FTWR.INI" file, open the file

with a text word processor such as NOTEPAD. Find the section that represents the program you are moving (e.g. "BEGIN SNP" for Statistical Navigator). Now modify the line that begins "[DATABASE] = " to read the complete path to where the database files have been moved, e.g. "[DATABASE] = F:\NEWBASES\".

Some Methodologist's Toolchest programs require project directories that contains files used in a single project. Over time, these project files may grow to fill the current disk drive. You can free up disk space by copying old projects to a backup storage and then erase the project directory and all it's files. You can also move a project to another drive that may have more free space. When you move a project you must move all the files in the project directory to the new location. You do not need to modify the "FTWR.INI" file. Rather, when you start a program that uses a project directory, you will be allowed to browse through your hard disk(s) to tell the program where the project is located.

FORETHOUGHT WINDOWS

ForeThought presents you with 4 different types of windows, the Main Window, two types of frames windows, and non-frame windows. The Main Window contains the menu bar, the button bar, and the status panel at the top of the screen. The lower portion of this window is ordinarily blank and is where other windows may appear. The image of the Main Window below contains an MDI frame in the lower portion titled "Research Proposal Summary Status Report". A non-MDI frame can appear outside of the Main window's lower portion but both the MDI and non-MDI windows behave the same otherwise. Non-Frame windows are designed to relay messages or allow simple responses. The Glossary, Project, and Close Query windows are nonframe windows.



CLOSING WINDOWS

Forethought windows can be closed by pressing the "Esc" key or by using the mouse to select the "< Back" item in the menu bar at the top of the screen.

GETTING AROUND

ForeThought provides several methods for getting around in the program. This annotated screen points out many of these methods. See also: ForeThought Glossary, History List, ForeThought Tasks

Click on hypertext phrase to jump to another screen	Jump to the Fi	Use this to close the previ	button or this scree ous one	the [Esc] n and retu	key rn to
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Research Strategy					
Area of Contribution					
Unique Contribution					
Plausibility					
Testability/Falsifiability					
Importance					
			ORE:		
Builds on Past Research		<u></u>	<u>SOILL</u>		
Critiques Past Work					
Quality of Lit Review					
Importance to study (based on rhetoric	al goals)				
Quality/Completeness					•

FORETHOUGHT GLOSSARY

The Glossary, also called Topics, list contains a partial or complete list of the objects in the current program's databases. This list allows you to quickly search for an item in the databases and jump to that object. If you know the name of a frame and it does not scroll up as you type, the frame may still be in the database even though it is not in the list, just press the "ENTER" key when you are done typing.



HISTORY LIST

The HISTORY LIST is maintained by the ForeThought program and contains a list of every frame you have selected in the order that you selected them. This list can be helpful for finding a frame that you have already seen but may have closed. To view the history list select "WINDOW" from the main menu and then select "History List", and the history list box will appear. With your mouse scroll through the list until you find the frame you want. Double-click the left mouse button over the list item you are interested in and ForeThought will go find that frame.

REPORTS

GENERATING REPORTS

After you have worked awhile, you might want to generate a report of your work. You may wish to include your report in another document or print it. There are three types of reports commonly available in most of the Toolchest programs: select, standard, and comprehensive.

NOTE: In addition to these reports, the Peer Review Emulator program can also produce a draft of the research proposal itself. For more information on that draft, see the chapter on the Peer Review Emulator program.

A Select report requires you to indicate which frames you want included in your report. To add a frame to the Select Report List, the frame window you want to add must be the top (active) window. Select the "REPORT" item on the main menu and then "ADD TO SELECT" item. When you have added all the frames you want, then from the "REPORT" menu select "SELECT" report. Your report will be written to an "RTF" file that can be read into any word processor capable of viewing rich text format (rtf) files. The RTF file format was designed to allow complex files to be between word processors including passed WORDPERFECT, WORD, WORD PRO, and DESCRIBE.

A Standard report is a report that was designed by the author of your program. It could be only a single summary frame or a limited set of all the frames you have looked at. It is also written to the same RTF file. A type of standard report may be the Short or Long report. The difference between short and long forms depends on the specific program. For the program Ex-Sample, for instance, a long report includes all summary and critique frames, while the short report only includes the summary frames.

The Comprehensive Report will add nearly all the frames you have looked at to the report file. This may produce a very large file and take a long time to generate, so it is not generally recommended.

SAVING REPORTS

When you generate a report, it is always written to the same RTF file. If you want to save your report so that it is not overwritten you must rename the file. To save a report select "REPORT" from the main menu and then "SAVE REPORT". You will be prompted to give a file name. The last generated report will then be renamed to the new file name.

VIEWING REPORTS

As noted above, in order to view your report you must have an RTF-compatible word processor. Start your word processor, select file open, and select your report from the open file dialog box that usually appears. The default report file will be "FTPF.RTF" current project folder on your hard disk. (The "FTPF" stands for "Forethought print file" and was chosen to avoid conflicts with likely names of your files such as "report.rtf".)

MANAGING PROJECTS

ForeThought programs require special directories to store your work between sessions. When these programs start up you are asked to create a new project directory or select an already existing one. This directory will contain the saved project with all your work. When you select an existing project directory the program will automatically return you to the last frame you viewed and restore all the variable values you have entered in previous sessions.

NOTE: Version 3 of Methodologist's Toolchest cannot read old projects developed using Versions 1 or 2. There were too many new additions to the program to make it possible to keep the same file structure. Do not open a project created with an old version using Version 3 or you might write over the old files and lose your work.

CREATING A PROJECT DIRECTORY:

The directory for your project should be on a disk drive that has enough space for your project to grow over time. Eight MegaBytes should be enough for most projects. When you type in the project name the file extension ".prj" will be added.



NOTE: Just as with a word processor, spreadsheet, or database management program, you should frequently back up the work files you create with the Methodologist's Toolchest. Since an entire directory containing several different files is created for these programs, you should make a copy of the complete directory and all its files as your backup.

SAVING A PROJECT

At any point while running a ForeThought program there will have been some frames opened, maybe some closed, global variables created, and program variables set. When you save a project, you are saving the current state of the program. Opening a previously created project changes the current state to match that of the state of the previously saved program. At the end of a session when you exit a program you will be prompted to save the project. If you select not to save, the changes you have made since the last save will be lost. For most ForeThought programs saving a project or saving a report will be the only way of storing your work.

MOVING A PROJECT

You can move a project to another drive or along another path on the current drive. When moving the project you should create a new directory that also ends in the ".prj" suffix. Copy all files from the old project directory into the new one. This can be helpful if a project becomes too large for the current drive and you have another drive with more free disk space.

DELETING A PROJECT

When a project is no longer needed you can delete all the files in the project directory and then delete the directory itself, or drag and drop the project folder into the recycle bin on your desktop).

COMPUTATIONS AND INPUT LINES

Some windows have rules attached that change the value of variables in the program or perform actions like opening and closing windows based on variable values. You can see some of the variable values in the purple color output text. The white input lines allow you to type in values for the variables associated with the input lines. The triggers to firing the rules are user-events such as typing a value into an input line and pressing the enter key. Rules also fire when a window receives the focus as when you click the mouse on a window in the background and it pops up on top.

You, the user, generally do not need to

worry about when rules fire. They are built into the program by the program's creators. The only exception is when there are white input lines in a window. In order for the rules to fire you must fill in all of the blank input lines. Note: what you type into an input line is not passed to the program until you press the <ENTER> key or change to focus to another control on the window. Thereafter, the rules will fire immediately every time you change an input value. This is important when you open a window that represents a function needed to reach the overall goals of the program. **You must fill in all of the input lines for a window to compute and thus perform it's function.**

NOTE: A ForeThought tutorial is also available on-line by selecting the "Help" menu at the top of the screen when no context-sensitive help is active. As you step through the tutorials in the following chapters for each program, you may notice variations in how specific programs behave. These variations should be minor and obvious.

This completes the information you need to know to install the Methodologist's Toolchest and run it. Next you should pick out one or more of the specific programs and use the corresponding chapter in the manual to become acquainted with that program.

3. PEER REVIEW EMULATORTM

INTRODUCTION

WHY PEER REVIEW EMULATOR IS NEEDED

Writing research proposals to successfully obtain funding is an incredibly difficult task. Even top-rate researchers often find their proposals rejected by review panels. sometimes for relatively trivial issues they overlooked or failed to explain clearly. Peer Review Emulator is an expert system providing comprehensive advice throughout the research process. P.R.E. covers the full content of the typical research proposal, providing advice and information to you regarding the research aims, background and significance, research design, ethics, and management. P.R.E. can draw upon each of the other programs in the Methodologist's Toolchest for more detailed advice on specific aspects of research. P.R.E. offers assistance for all kinds of research projects--qualitative and quantitative, applied and basic.

P.R.E. provides an organizational framework for research, identifying key decisions that must be made and assuring that important elements of the research proposal are addressed. P.R.E. keeps track of links between the components of research, reminding you of the need to address issues raised by other components, encouraging you to consider how your sampling plan affects your analysis, how data collection procedures affect measurement, and so on.

P.R.E. provides a simulated peer review with interactive feedback and critique throughout the process. Unlike static printed texts, P.R.E. relates the broad principles of research to a specific project using input from you, the researcher to address <u>your project</u> and topics relevant to you. As you specify your project, P.R.E. uses information you provide to identify contradictions, suggest concerns you should address, assess how well sections meet research standards, and provide an overview of the proposal's current status, indicating sections that remain to be completed. A built-in editor permits you to revise components of the research proposal based upon P.R.E. advice from within the program, or you can use your favorite word processor in a separate window.

WHO SHOULD USE PRE?

Peer Review Emulator is designed to take users through the entire process of designing a research proposal from start to finish. It is useful for researchers writing proposals for funding, students developing masters theses and doctoral dissertations, and scientific staff developing inhouse research projects. For researchers having modest design background, Peer Review Emulator provides crucial assistance, combining a comprehensive overview with specific detailed help for different design components. For more experienced researchers, Peer Review Emulator makes the proposal-writing process more efficient, providing a reassuring check of their logic, insuring that important options are not overlooked, reminding the researcher of links between different components of the research, and providing a useful summary report to document their decisions.

TEACHING APPLICATIONS

Peer Review Emulator provides a comprehensive computer program that can be used throughout a course in research methods. It can serve as a supplement to the lectures, permitting students to try their hand at designing various aspects of the research proposal as they discuss those aspects in the course, then using the Peer Review Emulator program to check their judgment. The program could free up much of the time now required of the instructor and teaching assistants, permitting them to focus on other aspects of research design such as the actual computation of results and their interpretation. Students could use the program several times for initial problems to help them understand the logic of research design. The program may be particularly helpful for use outside the classroom for individualized self-study.

TUTORIAL

Peer Review Emulator is far too complex to do justice to in a brief tutorial. However, it is worthwhile to point out some of the most important screens, show you how to get around in the program, and explain its general operation. In approximately 30 minutes this lesson can demonstrate to you what it's like to use Peer Review Emulator to develop a study. In addition, you can learn about several features of the program that may make it much easier for you to use.

BEGINNING A PEER REVIEW EMULATOR SESSION

Double-click the left mouse button on the "MTOOLS" icon on your desktop (see the "Getting Started" chapter on how to create a desktop icon). For WINDOWS 95 users, select the "Start" button, then the "Programs" menu item, then the "MTOOLS" menu item and then the "MTOOLS" option. The Methodologist's Toolchest version screen will appear. Click on the "Begin" to view the "Introduction" screen. Now click the left mouse button on the "PRE" hypertext. This will start the program running.

STARTING A PROJECT

Next you will see a pop-up screen like the following. You must create a new project or open an existing project file before you begin. The purpose of this is to permit you to be developing multiple proposals on different topics at the same time on your computer. You can open the P.R.E. program and work on any of those projects whenever you wish. The information for those projects will be saved in separate project sub-directories. This prevents information from one project inadvertently being placed in files for another project.

Type a name for your project in the field at the top left of this screen. Call it "test" or anything else suitable for a file name and press [Enter] when you have entered the name.



The program has now created a sub-directory for this project. When you reopen P.R.E. the next time, one option available to you will be to reopen this project and continue where you were when you last quit the program. REMEMBER: PRE can only open projects that were previously saved by the PRE program. (See "Working with Projects" in Chapter Two.)

The Peer Review Emulator logo screen is the next window you interact with. This screen has four buttons, "BEGIN". "EXIT". "ABOUT PRE". and "INSTRUCTIONS." "BEGIN" will take you to the main "EXIT" exits the program. "ABOUT PRE" menu screen. takes you to a screen showing the authors and copyright "INSTRUCTIONS" will take you to a tutorial notice. similar to the one you are now reading. Select the "BEGIN" button.

RESEARCH PROPOSAL SUMMARY STATUS REPORT

Now you are ready to begin developing your research proposal. The screen you see at this time is the main screen for the Peer Review Emulator program. This screen provides a summary overview of your proposal as you develop it. Enter your name, the date, and a brief title for your proposal in the fields at the top of this screen. Once you have done that, use the scroll bar to scroll the screen up and down and review its various components.

Each of the red phrases on this screen is hypertext. You can select any of these hypertext phrases to open more detailed screens in which P.R.E. will help you complete that section of your proposal. As each section is completed you will find yourself returned to this summary screen.

NOTE: The hypertext terms change color to green after you have selected them to indicate which pathways you have already visited.

🔆 Peer Review Emulator v. 3.0		
Project Reports Window Debug Help	First Draft Overview MT	< Back
PROCENCE PROPOSAL SUMMANT ST		
RESEARCHER:	Date: 09	10/1919
	OVERALL SCORE:	
Quality/Completeness	SCOPE:	
Type of Study Planned	<u>SCORE.</u>	
Area of Contribution		
Unique Contribution Broad Objectives		
Plausibility Testability/Falsifiability		
□ <u>Importance</u>		
BACKGROUND & SIGNIFI	CANCE	
Builds on Past Research <u>Critiques Past Work</u>		
Quality of Lit Review Relevance		
Importance to study (based on	rhetorical goals)	
Quality/Completeness		
CONTENT	<u>SCORE:</u>	
background assumptions theoretical perspective		
scope/context		
population		
RELEVANT EXPERIENCE	SCORE:	
<u>Results from Prior Work</u> Changes in Objectives		
Intellectual Products		
Importance to study (based on	rhetorical goals)	
Quality/Completeness	& METHODS SCORE:	
data collection procs.	2	
design overview		
analysis plans		
Importance to study (based on	rhetorical goals)	
Quality/Completeness	NT <u>SCORE:</u>	
human subjects concerns schedule		
budget		
facilities/resources		

SCOPE AND COVERAGE

Rather than go through the Peer Review Emulator program in great detail, this section identifies each of the major content areas covered by the program and briefly highlights their most important features. To get the full picture of what the P.R.E. program can accomplish, you will also want to explore it yourself.

The Peer Review Emulator program is divided into major sections corresponding roughly to the major sections required in many proposals for funding. Generally, if you can successfully complete these sections for the P.R.E. program you should be able to complete the entire proposal for most major funding agencies including the National Institutes of Health and the National Science Foundation.

AIMS

Quality/Completeness	SCORE:	
Type of Study Planned	<u>scont.</u>	
<u>Research Strategy</u> Area of Contribution		
<u>Area of Contribution</u>		
Broad Objectives		
Testability Testability/Falsifiability		
Importance		

The AIMS section of the program helps users identify the type of study, the research strategy, its contribution, what makes it important, and how it differs from previous studies. This section also reminds them to assess the plausibility, testability, and falsifiability of the study and to address those issues clearly. This section is very important for the proposal and constitutes the problem statement for the project.

BACKGROUND AND SIGNIFICANCE



The Background and Significance section of the program helps the user clarify how the study relates to the existing literature, how it goes beyond previous literature to address problems with earlier studies. This section also reminds users to address the relevance of the proposal to the funding agency and to provide sufficient information so that reviewers can assess the adequacy of the literature review.

CONTENT



The Content section of the Peer Review Emulator program, unlike the other sections, does not usually appear in instructions for proposals as a separate section. Nevertheless, the issues addressed here are important for working through the specifics of most proposals and need to be addressed somewhere in proposals. Users will need to use their own judgment to decide where these issues should
be addressed in their proposal. Typically, these issues should be addressed in the AIMS section or the Background and Significance section. Often these issues can be addressed with a single sentence rather than many paragraphs. Only if they are particularly important to the study should they be given many lines in the proposal. Proposals should make clear any important background assumptions, the theoretical perspectives to be used, and important concepts. In addition, they should make clear the content domain, the scope and context of the study, the units of analysis, and characteristics of the population.

RELEVANT EXPERIENCE

CRELEVANT EXPERIENCE Previous Research Studies Results from Prior Work Changes in Objectives Intellectual Products	<u>SCORE:</u>
--	---------------

This section of the proposal usually conveys to reviewers the capabilities of the researchers and specific results from prior work (particularly any prior funded work) that pertain to the proposal. This section is crucial when applying for continuation of funding for an ongoing study. In addition, it is an excellent opportunity to show off any pilot work that helps make the proposed work appear more feasible or more promising.

RESEARCH DESIGN & METHODS



The research design and methods components of the proposal are perhaps the most important sections in the sense that they typically receive considerable attention from reviewers. Problems with any one of these sections can make a study fatally flawed and prevent its funding.

P.R.E. provides considerable assistance in developing each of these sections, assuring that the user specifies the design and methods in sufficient detail to make a strong case for funding. In addition, users who have purchased the entire Methodologist's Toolchest can go to other programs in the toolchest to receive more detailed recommendations for each of these components.

ETHICS/MANAGEMENT



The Ethics/Management component of the proposal helps the user review these sections of their proposal to make sure they have not made common errors and to make sure they have provided information in sufficient detail to make their best case to reviewers. For example, the budget section takes the user through several check procedures to assess their budget. This component of the program can also be used in conjunction with standard computer programs for helping with these issues such as spreadsheets for budgeting and scheduling and management programs for developing project schedules.

USING THE PEER REVIEW EMULATOR PROGRAM

Most of the screens in the Peer Review Emulator program have a similar structure. They are either "summary screens" or "detail screens." By explaining the logic of those screens and how to use them here, this should give you sufficient information to explore each section on your own and take maximum advantage of the program. In addition, most screens have either on-line help available through the "help" option on the menu or a "help" or "tutorial" button available on the top right-hand side of the screen. You can select those buttons for additional explanations and help specific to that screen. The help screens are themselves organized into a hierarchy of screens and you can follow the "help" and "tutorial" buttons to get to a summary help screen with hypertext connections to all the major help screens for the program. The general features and how to use the summary screens and detail screens are provided below.

SUMMARY SCREENS

Summary screens provide an overview of a section of the research proposal. These screens are available for various levels and together create a hierarchical structure ranging from the highest level overview down to summaries of narrow sections. Each component of these screens is described below.

SUMMARY PROGRESS INDICATOR

Many summary screens include a checkbox at the top

indicating progress for this section. When the program is unable to assess progress, it lets the user indicate when they believe they have addressed the topic adequately. When the program can make a reasonable judgment about progress based on user inputs, it makes this decision for you. This information is passed back to higher-level summary screens so users can get a quick overview of their progress on various sections of the proposal.

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TOPICAL COMPONENTS AND SUMMARIES
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Most summary screens include a list of topics that make up that section.

IMPORTANCE INDICATORS

In some cases the program reminds users of the importance of a particular topic based on earlier decisions. That is indicated here to remind the user that topic should receive special attention.



Importance Indicators

PROGRESS INDICATORS



To the far left of each line is a place to indicate whether the topic has been adequately addressed yet. Researchers may, at their discretion, check off these issues themselves in this summary screen when they are sure they have addressed them. For topics where they would like assistance, they should select the hypertext label and go to that detail screen so the program can help them. Progress summaries are also provided on the right.

HYPERTEXT TOPIC LABEL

To the right of the progress indicators is a brief label for the topic. Those labels are usually hypertext and by selecting them the user can open the screen for that topic. On the right



of each line is a brief phrase summarizing the content of that specific topic. This phrase is passed back from the detail screen and gives the user an overview of how they handled that topic. Some of these phrases were generated by the program, others were input by the user in that detail section. Users can quickly scan down the topic list to see which sections they have completed and what they did in those sections. This helps assure that researchers don't overlook important issues in the proposal, and the summaries help assure that they are consistent in the different sections.

CRITIQUE

Sometimes the program critiques what has been done, reminding the user of unfinished sections or sections where the desired standards have not yet been met.



EDITOR

Most summary screens include a FirstDraft editor button that will take you directly to a view of the text for that

FirstDraft Briefly Describe: The measures are unobtrusive ones, based on accretion an

section of the proposal and provide you with a field where you can enter text. Use this button to enter the FirstDraft editor and record any text you wish for that part of the proposal. Where a summary screen spans several sections an editor button may not be included because it would not be clear which section should be edited. In that case, you need to select a more detailed section to enter the editor.

When you finish a summary screen you can return to a higher-level summary screen by pressing the [escape] key or double clicking on the close box at the top left of the window.

DETAIL SCREENS

Detail screens give you advice about a specific research issue. An example detail screen is provided below.

🔭 Peer Review Emulator v. 3.0					
<u>Project Edit Search Reports Window Debug Help</u>					
Exit 🔂 Home 📰 Glossary First Draft Overview MT < Back					
🖊 UNOBTRUSIVE MEASURES					
Select here if this applies to your study Tutorial UNOBTRUSIVE MEASURES Unobtrusive measures are efforts to draw social and cultural inferences from physical evidence or other forms of evidence available to the researcher without requiring them to interact with the people being studied (Webb, Campbell, Schwatz, & Sechrest 1966; 1981). Because there is no direct interaction, unobtrusive measures avoid reactivity. This makes them particularly effective when those being studied do not wish to cooperate with the researcher. Unobtrusive measures can be very helpful when studying illegal or illicit activities (Berg, 1995:141). For example, one researcher estimated the popularity of different radio stations in					
FirstDraft Briefly Describe: The measures are unobtrusive ones, based on accretion an			ccretion an		
SUGGESTIONS FOR WRITTEN TEXT You should provide sufficient information to justify the choice of this data collection procedure and to specify the protocol for carrying it out with more detail if it is important or problematic. Issues might include avoiding reactivity, the specific unobtrusive measures to be used and the key concepts they measure, along with some justification for why we should Return					

Generally, use these screens to review the issues you should address in this section. Provide the information required for the program to tailor its advice to you, then enter the editor from this screen to see that the issues are addressed in the proposal text. Each component of these screens is described below.

SUMMARY PROGRESS INDICATOR

Many detail screens include a checkbox at the top left where the user can indicate when they believe they have addressed the topic adequately. This information is passed back to summary screens so users can get a quick overview of their progress on various sections of the proposal.



TOPICAL ADVICE

Usually there will be a section at the top clarifying this issue and identifying the kinds of information typically expected for this part of a research proposal.



QUESTIONS

This optional section may include questions of the user providing information the program uses to assess the completeness of the proposal.

SUGGESTIONS FOR WRITTEN TEXT

Often there will be a second section near the bottom of the screen providing specific suggestions for what to include in the proposal, the length of the section, and key points to address. Sometimes this advice will be fixed. Other times it will vary depending on your response to earlier questions.



RHETORICAL CONTEXT

This optional section includes information from other sections that should be taken into consideration for this topic. It also offers a way to link to those other related sections to review of change the related material.

FIRSTDRAFT EDITOR

Most detail screens include a FirstDraft editor button that will take you directly to a view of the text for that section of the proposal and provide you with a field where you can enter text. Use this button to enter the FirstDraft editor and record any text you wish for that part of the proposal.

	FirstDraft	Briefly Describe:	The measures are unobtrusive ones, based on accretion an
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BRIEF DESCRIPTION

Most detail screens also provide a short line summarizing the text you entered in the editor. This brief description displays the first few words entered in the editor to provide a reminder of what you have said there. This information is often displayed in summary screens and can help you remember what you said in each section.



When you finish a detail screen you can return to a higher-level summary screen by pressing the [escape] key or double clicking on the close box at the top left of the window.

RESEARCH PROPOSAL SUMMARY STATUS REPORT

As each section of the proposal is completed, the program returns you to the "Research Proposal Summary Status Report" screen. This screen serves as the overview for the proposal. From it you can quickly see a brief description of key components that have already been developed along with progress indicators identifying which sections have and have not been completed.

CREATING A FIRST DRAFT OF YOUR PROPOSAL

A new feature in Version 2.0 of the Methodologist's ToolchestTM is the FirstDraftTM editor. On most of the screens in the PRE program there is a "FirstDraft" button. When this

button is selected, you will see the FirstDraft editor window as displayed in the following figure.

FIRSTDRAFT EDITOR WINDOW

The FirstDraft editor window displays information about the section of the proposal you are currently considering. In the top part of this screen are several controls which we shall

📌 FIRSTDRAFT PAGE EDITOR		_ 🗆 ×		
FirstDraft Editor				
View: annotated firstdraft	< > Overview	Tutorial		
Save User-Edited Text				
	Advice	Print		
DESEADOR DESION				
Automatically generated text				
The research design has not been completely based on information provided een				
selected. Strategies to minimize expectation biases have to the program by the user				
external validity have been described. This study does her more any companion groups booddse				
Expandable field where the user can				
enter their own text for this section				
Becommendations	for writing this			
some types of studies. However it	osal generated	opropriate for of comparisons		
built into the design. You should eiti by the program	strong jus	tification for why		
such comparisons are not appropriate for this study.	Criticup of this exertion	of the		
Criticaura: Compositions around have not have identified.	proposal based on info	ormation		
chingue: Companson groups have not been identified. Yt proposal based on minimation planned vet you describe assignment strategies. This doe				
been addressed.	user			

discuss shortly. But first, notice that the bottom portion of the display includes four kinds of text: 1) an automaticallygenerated text description of this section of the proposal, 2) an adjustable-size edit field where the user can provide additional information, 3) recommendations for writing this section, and 4) a critique of this part of the proposal.

1. Automatically-generated text description. The first text field displays text that is automatically generated by the

PRE program. Using information that you provide the program as you select from among various options to describe your project, the PRE program generates a text description of each section of your proposal. This automatically-generated text is unlikely to serve as a final draft of your proposal because it includes only the specific information provided as you complete the advisory screens for each section. However, it does provide a "first draft" describing the essential features of your proposal. This automatically-generated first draft can provide an initial framework that can be edited or supplemented to produce your final proposal.

2. An edit field for user-provided text. Of course, the automatically generated text only includes a broad description of the proposed study based on information provided by the user when completing forms in the advising portion of the PRE program. Additional information and details typically must be provided. For example, specific descriptions of the population, the sampling procedures, and so on, will need to be provided by the user. The FirstDraft editor displays its generated text in one field while in the next field on the screen is an edit window where the user can enter text to supplement or replace what the program has created. This permits the user to keep in mind the broad context as the additional information is provided.

NOTE: The edit window displays text in rich text format (sometimes called "RTF"). This permits including boldface, underlining, italics, and different fonts to highlight different elements of the proposal. To change formatting for a segment of text, first highlight the text by holding the left mouse button and dragging the mouse across the text. Then click on the right mouse button within the edit window and select "edit" then "font" from the popup menu. You will see a window with various fonts from which to select. Select the font you want and then click the left mouse button on the "apply" button. The changes will then show up in the edit window. It is also possible to copy formatted text from a word processor and paste it into this window. That pasted text will retain its formatting.

3. Recommendations for drafting this section. To further assist the user in drafting the proposal, the PRE program provides a third field of recommendations for drafting the proposal section. These recommendations remind the user of specific rhetorical issues that should be addressed in each section, including types of information typically provided, potential concerns that should be addressed, and even recommendations regarding the amount of space to devote to an issue. These recommendations are displayed in the third text field in the FirstDraft editor window.

4. A critique of this section of the proposal. Beyond recommendations for how to improve the proposal, PRE can also provide specific criticisms of the proposal based on information provided as the user completes each advisory screen. The program looks for inconsistencies between different sections of the proposal, essential issues that have not yet been adequately addressed, the use of weak methods instead of stronger ones, and other factors likely to be called into question by reviewers in a in a peer review process.

Note: Of the four text fields displayed in the FirstDraft edit window, the user is only able to directly edit the user-input field. The reason for this is that text in the other fields will be regenerated by the program each time a change is made in the project description in the consultation screens of the PRE program. Consequently, any changes made in those fields would be lost each time the program makes a change. Any changes you wish to make to these fields must be made only after the entire file has been generated and exported to your word processor. You can, however, make notes to yourself or write the changes you wish in the user-edited field.

Editor controls

At the top of the FirstDraft editor window are several important controls. These are reproduced in the figure below.

FIRSTDRAFT PAGE EDITOR				_ 🗆 X
	FirstDraft Editor			<u> </u>
View: Annotated FirstDraft	▼ < >	Overview	Tutorial	
		Save User- Advice	Edited Text Print	_
DESIGN OVERVIEW				

The list-selection boxes at the top left of the edit window labeled "View" and "Section" display the current view and section and permit the user to change to other views or The view shown in the previous figure is the sections. "annotated first draft view." This includes all four of the text fields described above. This annotated view gives the proposal writer a clear sense of the context of the section as they draft any additional text they feel is necessary. However, the user may wish to focus on just their own text input. If so, they can select the "user-provided text only" view and only the editable input field will be displayed. Or they can view both the automatically generated text and their own edited field but hide the program's recommendations and critique. This is the "first draft" view. Finally, users may want to see just the critique by selecting the "critique" view.

The "section" name is the name of the part of the proposal currently displayed. The user can use this control to go to the next section of the text or jump to other sections. In later stages of proposal development after the various consultation screens have been completed, this permits the user to work with the proposal primarily in its text view and only occasionally return to the consultation screens. However, for most effective use, we recommend first going through the entire series of consultation screens before focusing on the text. The reason for this is decisions you make in other sections of the proposal can have an impact on this section and change the computer-generated recommendations and critique in important ways that need to be taken into account as you draft your additions to the text.

On the top right of the editor window are several buttons. Selecting the "overview" button takes you to a summary view of the first draft that will be discussed below. The "tutorial" button displays a tutorial screen describing this editor and its functions. The "save user-edited text" button permits you to save your text in the middle of editing it in case you are called away or you don't want to risk your machine going down in the middle of your editing. However, usually this button is not used because any changes you make in your edited text are saved automatically when you close this screen or select a view that hides your edited text. The "advice" button takes you back to the advising view of PRE displaying the advisory screen for the section you are currently viewing. The "print" button prints all the text fields currently displayed on this screen.

FIRSTDRAFT OVERVIEW

When you select the "overview" button from the FirstDraft editor window, you will see the FirstDraft Overview window as illustrated in the following figure. This screen displays text not just for a single small section of the proposal as in the editor, but for large segments of the proposal or even the entire proposal. Instead of the four text fields found in the editor, only a single text field is displayed. This field is for viewing only and cannot be edited, but it can be scrolled

📌 FirstDraft Overview			_ 🗆 ×	
FirstDraft Overview				
Minue annotated firstdraft	▼ < >	Editor	Tutorial	
view.				
Entire Proposal	▼ < >	Advice	Print	
Timing strategies.				
Critique: You need to indicate whether the study is	a cross-sectio.	nal or longitudinal c	ne.	
Laboratory vs field studies. The study w	/ill be an obse	ervational study with	no direct	
manipulation by the researcher taking place in a field setting.				
Recommendations: You indicate this is a field study. This is likely to increase your control but				
decrease external validity and increase potential for reactivity. Be sure to address these issues.				
Strategies to reduce expectancy effects. Because of the nature of this study, reactivity				
does not appear to be a serious concern for this study, hence there is no need to employ strategies to				
reduce reactivity. The following strategies will be employed to reduce expectancy effects. We will				
analyze data separately for experimenters having different expectations for the outcomes.				
Recommendations: Describe the procedures you	u will use to ca	rry out these strateg	yes.	
External validity strategies. To maximize external validity, we will reduce the number of				
treatments or combinations of treatments, use an independent experimental group at each testing				
(cohort). To broaden the scope of the study and, in the process, improve external validity, we will				
replicate at different times. To improve the selection of cases for the sample, and thereby increasing				
jexternal validity, we will use random sampling.				
recommendations: Describe the strategies you will use to maximize external validity so readers can				
Monitoring and accomment strategies				
Critique: You should use reasonable monitoring at	nd accaceman	it stretorii		
Strategies to assure statistical conclu	cion validity	To accure statistic	el conclusion	
validity, we will do the following. Use rendom selection				
The second s			🔟	

vertically to review the entire text displayed. Within this field, depending on the view selected, you may view any or all of the text from the four fields in the editor window. For example, if you select the "annotated firstdraft" view as displayed here, you will see all text for this larger section including the automatically-generated description of each section, any text you entered for each section, and the recommendations and critique for each section. If you select the "critique" view, you will see only the summarized critique for the section. The "sections" available for the overview are different than those available for the editor. For the overview, you can view major sections such as the Aims section or the Background and Significance section, or even the entire proposal.

FirstDraft Overview Controls

The controls a the top of the overview window are much like those for the FirstDraft editor window. View and Section can be selected using the controls on the left and were discussed above. The buttons on the right are similar to those for the editor window. The "tutorial" button displays the tutorial for the overview screen. The "editor" button returns you to the FirstDraft editor window. The "advice" button returns you to the advisory view of the PRE program. However, since we are now viewing an overview, the "advice" button will return us not to a specific section but to the summary screen for the PRE program. The "print" button will print all the text currently displayed in the viewer. This may be an entire section or even the entire proposal. It may be the complete annotated draft or the critique only, depending your current "section" and "view." The "save/export firstdraft" button saves the entire text displayed. Since this may be the entire proposal, you will be asked to identify the file into which you wish to save the text. You should use this feature when you have completed your use of the PRE program and are ready to continue refining your first draft in your own favorite word processor. The first draft of your proposal you export with this button can then be read into your favorite word processor for final editing.

Notice that this overview screen can not only produce for you the first draft of your proposal (as displayed above) but can also be used to generate a critique of the entire proposal based on the information you provided the PRE consultation program. In the figure below is displayed a portion of such a critique generated by the program. This critique is designed to resemble the kinds of critiques provided by review panels for federal funding agencies such as the National Science Foundation and the National Institutes of Health in the United States. You may find these reviews very helpful in further development of your project.

GENERATING AND SAVING A CONSULTATION REPORT

📌 FirstDraft Overview					
FirstDraft Overview					
View	▼ < >	Editor	Tutorial		
Save/Export First Draft					
Section.	<u> </u>	Advice	Print		
of the measurement plans has not been firmly	established. The app	ropriateness of th	e measures for 🛛 🔺		
planned analyses has not been tirmly establi consistent with planned data collection proce problem. DESIGN OVERVIEW Comparison groups have not been identified	ished. It has not been e dures. No scaling anai l. You indicate there wi	stablished that m lyses are planned Il be no comparis	easures are 1. Perhaps this is a ons planned, vet		
you describe assignment strategies. This doesn't make sense. Timing issues have not been eddressed					
Based on these considerations, your score comparison. Some form of comparison is offu- with some form of comparison. You need to it one. You should use reasonable monitoring. SAMPLING PLAN	e for the design section en essential, and gener indicate whether the stur and assessment strate	is 2.00. You have rally: a study will b dy is a cross-sect gi	not specified a e much stronger ional or longitudinai		
The overall sampling plan is not adequately described. The sampling plan may be flawed by sampling on the dependent variable. The sampling plan may be flawed by being a sample in search of a population.					
Based on these considerations, your score elements are not yet identified exclusion crite elements are not specified. The sampling or frame for elements is not yet specified. Whet specified. The sample size has not been spe many federal programs, this could doom the	e for this sampling plan eria for elements are no occedures for elements ther there are access is actified. No power analy proposal. Without a pow	section is 4.00. Ti specified. Inclus are not yet specifi sues for elements ses have been p wer analysis, prec	he sampling ion criteria for ied. The sampling has not yet been eformed. For ious resources		

In addition to producing the first draft of your proposal and a critique, the PRE program can also provide you with a report summarizing the information and advice

displayed on the consultation screens of the program. Whenever you would like to print a report with the current status of your proposal you can select the "Report" option on the menu bar. Then you have your choice of either a "comprehensive" report a "standard" report, or a "select" The comprehensive report will include report. all consultation screens you have opened during this session along with all the text from the edited files you have created for this project. The standard report includes only the research proposal summary status report screen and the text from the edited files you have created for this project. The select report includes only screens you have "selected" for inclusion. To select a screen for this report you need to first open the screen, then select "report" from the menu, then select "add to select" to add that screen to the selected list.

NOTE: All text created for a project is saved after each session and will continue to be available for future sessions when you use that same project.

After selecting any of the three report options, the program will generate the report and a message window will appear indicating that your report was written to the file "FTPF.RTF." You need a rich text format (rtf) capable word processor such as MS Word, Wordperfect, Word Pro, or Describe.

Each time you generate a report it is written to the same file, "FTPF.RTF." In order to save your report you need to rename the file. Select the "Report" menu item at the top of the screen and then the "Save" menu item from the drop-down menu that appears. A save file dialog box will appear allowing you to rename the report file (see chapter 1 on saving reports). Note, that the ".rtf" file extension needs to remain the same for the "rtf" word processors to recognize the file.

SAVING THE CONSULTATION AND EXITING

Whenever you complete the Peer Review Emulation program, or if you wish to close the program and complete your work at another session in the future, you will be asked to save your consultation before you leave. When you exit the program, you will be asked if you want to save your work. If you say "NO", all the values you have entered will be lost. Your report file remains on your hard disk and is not effected. If you are working with an ongoing project, you might want to save all the values you have entered for later reconsideration. To save your work simply select the "YES" button. Peer Review Emulator will save your work and exit. See chapter 2 on Working with Projects.

4. $EX-SAMPLE^{TM}$

INTRODUCTION

WHY EX-SAMPLE IS NEEDED

Determining the appropriate sample size is a crucial aspect of research design. Too few cases can produce ambiguous findings. Too many cases can waste valuable resources and needlessly lengthen the study time. Today it is not unusual for funding agencies to demand a formal power analysis justifying sample size before even considering a research proposal. Corporations performing their own research also are finding power analyses to determine sample size to be cost-effective.

However, a large proportion of published research in many disciplines does not use systematic procedures for determining sample size. In some cases, the researcher may be unfamiliar with the procedure appropriate for the analysis. These procedures are scattered throughout a diverse literature making it difficult for an individual to keep abreast of new developments. Even if the researcher is familiar with a suitable procedure, they may still choose not to use them because of the difficulty of determining the appropriateness of any given approach and performing the necessary calculations. Ex-Sample is a computer program to help researchers determine sample size for a wide range of analyses.

NOTE: Ex-Sample is appropriate for determining the minimum sample size required for a wide range of quantitative analyses. It is also useful for assessing the effects of response rates, contamination, and other factors on the obtained sample size for both qualitative and quantitative analyses. However, for assistance determining the required sample size for qualitative research and for other sampling design issues, see the Peer Review Emulator program.

A COMPREHENSIVE APPROACH TO SAMPLE SIZE AND POWER ANALYSIS

Ex-Sample is a comprehensive program for determining sample size. You will no longer have to search out formulae scattered in dozens of different books, still not being sure you have found the correct one. Nor will you have to compute the results by hand over and over until you "think" you can trust the results. Ex-Sample helps you identify the correct formula for your statistic and compute the value based on your answers. Ex-Sample is up to date, integrating literature from many disciplines and including many new procedures which appeared only in the last few years.

Ex-Sample advises you on the entire process of sample size determination. Ex-Sample computes the minimum sample size required for a wide range of analyses, adjusting for multiple comparisons, response rates and other factors; then compares it findings to the maximum possible size given resources. It adjusts for multiple comparisons and the design effect due to cluster or stratified sampling. Ex-Sample considers multiple analyses in the same study and identifies which can be successfully analyzed with the planned sample size. It provides common default values and helps estimate population parameters. When required sample size for one or more analyses exceeds the possible size given resources, Ex-Sample suggests ways to reduce the sample size required for that analysis and suggests ways to increase the maximum possible sample size you can obtain based on resources and design factors. Ex-Sample even provides a suggested format for reporting results to ensure you don't leave out important values when describing the power analysis for a proposal or report. This could almost be fun!.

Ex-Sample offers formulae to compute sample size for over 60 different types of analysis, including survival analysis, logistic regression, stepwise regression, path analysis, covariance structure analyses, acceptance sampling, analysis of variance and covariance with and without interactions for factorial and other complex designs, tests of significance for a variety of measures of association, chisquare and contingency tables, scaling and classification analyses, measures of agreement and reliability, a wide range of nonparameteric tests of significance, and of course, many tests comparing means or proportions for one- and twosample tests, when proportions are known or unknown, when group sizes differ or one group is fixed. Ex-Sample also includes an entirely new section of additional analyses common in medical and clinical research such as casecontrol studies and odds-ratios, then Mantel-Haenszel procedure, cohort studies, crossover designs, and tests for bioequivalence.

WHO SHOULD USE EX-SAMPLE?

Ex-Sample is designed to be used by a wide variety of users. For less experienced researchers, Ex-Sample offers advice and detailed procedures for estimating necessary values, an extensive on-line tutorial, and hundreds of hypertext definitions. For more experienced researchers, Ex-Sample can make the research process more efficient by saving the time required in searching obscure references for the appropriate formulae and assuring accuracy of computations. At each point in the process users select the level of help desired, moving quickly over familiar ground, receiving more help for new territory.

TIPS FOR USING EX-SAMPLE

Before you use Ex-Sample for a real research project, we suggest you do two things:

- 1) Go through the step-by-step tutorial provided in this manual or use the on-line help/tutorial. These tutorials will demonstrate how to enter the program, how to take advantage of numerous features offered, and how to save data for later use. The user will also walk step-by-step through a brief research example.
- 2) Prepare yourself before you begin the Ex-Sample program. Gather as much information as possible about the planned research, including available descriptive statistics from any previous studies, before you begin using the program. Think about your research objectives

and the kinds of analysis you are likely to use. This additional effort will improve the quality of the program's recommendations and make the "consulting" sessions much more meaningful. However, we don't expect you to know everything in advance. By saving your problem from within the Ex-Sample program you can return to the problem later with additional information or new ideas.

EX-SAMPLE TUTORIAL

BEGINNING AN EX-SAMPLE SESSION

Double-click the left mouse button on the "MTOOLS" icon on your desktop (see the "Getting Started" chapter on how to create a desktop icon). Alternatively, you can select the "Start" button, then the "Programs" menu item, then the "MTOOLS" menu item and then the "MTOOLS" option. The Methodologist's Toolchest version screen will appear. Click on the "Begin" to view the "Introduction" screen. Now click the left mouse button on the "Ex-Sample" hypertext. This will start the program. It may take a few seconds to load. The logo screen is the first window that you interact with. This screen has four buttons, "EXIT", EX-SAMPLE", "BEGIN", "ABOUT and "INSTRUCTIONS". "BEGIN" will start a consultation. "EXIT" exits the program. "ABOUT" takes you to a screen showing the authors and copyright notice. "INSTRUCTIONS" will take you into a tutorial similar to the one you are now reading. Select the "BEGIN" button.

You will now see the "SAMPLE SIZE CONTROL PANEL" screen. The first time you open this screen a message will appear informing you that some of the input values have been preset to a value of "1". This is necessary to allow some background computations to occur. You will change these values for your own research problems.



This control panel is a summary screen identifying all of the information you need to determine sample size for a research project. The control panel extends beyond the visible window. To view a particular part, scroll up and down by clicking the mouse on the scrollbar at the right of the screen. Scroll to the bottom and then back to the top to familiarize yourself with the contents of the control panel. The "Sample Size Control Panel" screen summarizes the essential steps in determining sample size including

- 1. Determine the maximum possible size,
- 2. Adjust for execution survival factors,
- 3. Determine the minimum size for specific analyses,
- 4. Adjust for design effects and multiple comparisons,
- 5. Select an initial sample size, and
- 6. Adjust the initial size for execution survival factors.

At the top right corner of the control panel is a "TUTORIAL" button. Selecting this button will take you to a screen explaining the steps and logic of sample size determination.

NAVIGATING IN EX-SAMPLE

Ex-Sample provides two very convenient ways to navigate among the stages in determining sample size. The program's screens are organized in a "wheel" model, with the Sample Size Control Panel as the hub and screens addressing each numbered step in the process as spokes. The is illustrated in figure 1.



This "wheel" model provides two natural ways to navigate. One strategy is to begin with Step (1), determining the maximum sample size, and continuing around the outside of the wheel through each step until the process is completed. If you select the hypertext for step (1), this opens up the screen for that step. At the bottom of that screen is a "continue" button. Selecting that button automatically takes you to step (2). Subsequent screens have "continue" buttons taking you the next step in the sequence. The "continue" buttons thus take you around the outside of the wheel to complete all steps in the process. The second way to determine sample size is to move back and forth from the control panel to each step. In the screens for each step, you can return to the control panel by selecting the "return" button and the bottom of the screen. NOTE: the "Control Panel" button on the button bar at the top of the screen will return you to the control panel from anywhere in the program. Using this model, you are able to consider the steps in the process in whatever sequence is useful to you, or not consider steps for which you do not need assistance. Some Ex-Sample users may simply want to determine the minimum sample size required for a specific analysis and not bother to adjust it for execution factors or even consider maximum size.

Less experienced users can follow the steps in sequence and be sure they have considered all of the issues, seeking help from the program at each stage. More experienced researchers may not need help with all stages and can simply enter values in appropriate input lines on the control panel for items they already know. Then they can seek assistance from the program for the elements they don't already know. This permits users to seek the level of help they desire but not be forced to go through unnecessary steps.

Select either the "INSTRUCTIONS" button from the logo screen (the "HOME" button at the top of the main window will take you back to the logo screen), or the "TUTORIAL" button on the control panel. Study the tutorial completely to familiarize yourself with Ex-Sample. You will also find tutorial or help buttons on individual screens that are to help you complete the function of that screen. Note: the "Help" menu item at the top of the screen is a context sensitive help. If a help screen is provided for the current screen then selecting help will open that help screen. If no context help is provided you will be taken to the general ForeThought help system.

STEP 1: DETERMINE MAXIMUM POSSIBLE SIZE

The first step indicated on the control panel is to determine the maximum possible sample size. If you are not interested in determining the maximum possible size, you can simply skip this step (and step 2 which adjusts that size for execution factors) and proceed to step 3. If you already know the maximum possible sample size, you can enter the value in the input line. To receive help from the program in determining the maximum sample size, select the hypertext phrase "Max. Possible Sample Size" on the control panel. You will see the following window.

🐺 Ex-Sample v. 3.0	_ 🗆 X			
<u>Project</u> <u>Reports</u> <u>W</u> indow Debug <u>H</u> elp				
Exit 🔓 Home 🧮 Glossary	Control Panel MT < Back			
POSSIBLE SIZE				
Maximum Possible Initial Size Max. size due to population = Max. size accessible Max. size affordable Max. size given time & personnel				
Maximum Possible Sample Size 1 Maximum Achieved Sample Size 1 Most severe constraint on sample size =				
Where Achieved Size = Initial Size * ESF The <u>Execution Survival Factor</u> , ESF = 1.0000 Return Tutorial Continue				

This window determines both the maximum sample size and the most severe constraint on sample size. Like the "Sample Size Control Panel," this window permits users to either input values they already know, or ask the program for help in determining values. For each of the input lines in the window (fields with black text on a white background, which show as the white limes in the figure above), users can either enter a value when it is known or select the hypertext phrase associated with that input line to receive advice from Ex-Sample.

NOTE: When an input line is active a blinking cursor can be seen in the field. You may find the [tab] key the easiest way to move from one input line to another.

MAXIMUM SIZE DUE TO POPULATION

Sometimes the help is a hypertext description of what is required. For example, select the phrase "Max. size due to population" from this window and you will see the following window containing information clarifying what is needed here.



When you are done viewing this window, you need to close the window by pressing the [esc] key or by doubleclicking the mouse on the "CLOSE" icon in the upper left corner of the window.

When you are back in the "Determine Maximum Possible Size" screen, enter an estimate of the population size available for this study of 1,000,000 (don't enter the commas in the field--it requires that only numbers be entered).

MAXIMUM SIZE ACCESSIBLE

Next we can consider the maximum size accessible. Here again, we could select the phrase--which shows a hypertext screen of information to explain the kind of information required here. In the interests of time, let's just enter a value of 900,000 in this field--that is, we assume about 90% of the population will be accessible for our study.

MAXIMUM SIZE ACCESSIBLE

Maximum Size Affordable is more complex to determine so let's ask the Ex-Sample program to help determine this value by selecting the phrase "Max. size affordable." Doing so, you should see the following screen.



There are two different options here, depending on whether the costs vary for cases reaching different levels of the study. In our case we expect costs will be different for cases which are ineligible for the study, those who choose not to participate, and so on. (Surely, it will cost more to carry a case part way through the study than to have them refuse to participate up front.) So let's select the second option.

You should then see the following screen. The top of this screen explains how the varying costs for different stages of the research project can be combined in the formula presented to determine the maximum sample size based on cost. If you scroll the screen down, you will see several input lines where you can enter various values required for the formula as in the screen below. Initially, the input lines for this screen are all empty. Go ahead and enter the following values: MS=5000, FX=100, CPC=2, CX=0.15, EX=0.15, CN=1, RR=0.60, CC=2, CR-0.001, CD=2, DR=0.001. Again, use the [tab] key to move from one input line to another.



Notice that the output lines (the navy blue text or numbers on the gray background) do not appear until all input lines have values entered in them. This is because the computations for this screen cannot occur until all input values have been initialized.

Based on the values we entered, Ex-Sample indicates the maximum affordable initial size is 3544 and the maximum affordable size we can achieve after execution factors is only 1803.

HYPERTEXT DEFINITIONS AND HELP

In addition to the hypertext help provided by the program at various stages, there are other technical terms on many of the screens in Ex-Sample which are also hypertext. For any of these terms you can select the term and view a definition. For example, in this screen, if you select the term "Exclusion Rate" its definition appears in a pop-up window. Many of the hypertext help screens have additional hypertext items in them. When that is true, you can continue to select hypertext until you are satisfied.

If you opened the hypertext help window, close the pop-up hypertext window by pressing the [esc] key. Then close the larger window for determining the maximum affordable size either by selecting the "Return" button at the bottom left of the screen or by pressing the [esc] key. Keep closing screens until you return to the screen for determining maximum sample size (the screen labeled "Determine Maximum Possible Size").

Notice that when you return to this screen, the values computed above are also transferred to this summary screen. This is one of the powerful feature of Ex-Sample. Variables from one part of the program can be used in other parts of the program and thus we can have many different view of the sample size information, each designed to meet different objectives.

MAXIMUM SIZE GIVEN TIME AND PERSONNEL

The next input line on the screen labeled "determine Maximum Possible Size" is "Max. size given time & personnel." Once again you can enter a value in the line directly or you can select the phrase for assistance. Let's
select the phrase "Max. size given time and personnel" and get assistance. You will then see the following screen:

🔆 Ex-Sample v. 3.0			_ 🗆 ×
<u>Project Reports</u> <u>Window</u> Debug <u>Help</u>			
Exit 🔂 Home 📰 Glossary	Control Panel	MT	< Back
MAX. SIZE GIVEN TIME & PERSONNEL			_ 🗆 🗵
MAXIMUM SAMPLE SIZE GIVEN TI	ME AND PERS	ONNEL	
There are two cases which must be considered in d maximum <u>sample size</u> given time and personnel.	etermining the		
1) <u>max. size when time & personnel are similar for all c</u> 2) <u>max. size when time & personnel vary for cases reac</u>	<u>ases</u> hing different leve	<u>els</u>	

Just as for maximum size affordable, there are two possibilities here: time and personnel required may be the same for cases reaching different levels of the study or may vary. Let's again select the second option and assume they vary. This leads to the following screen.

🐺 Ex-Sample v. 3.0			
Project Reports Window Debug	Help		
Exit 🏠 Ho <u>m</u> e 🚟 <u>G</u> l	ossary	Control Panel	MT < Back
📌 MAX. SIZE WHEN TIME & PE	ERSONNEL VARY FOR CASES RE	ACHING DIFFERENT L	EVELS
			-
MAXIMUM SAMPLE SIZE	WHEN TIME AND PERSONNEL	VARY FOR CASES	
Usually the time a successfully complete th	and personnel required vary de le entire study or are excluded	epending on whethe at some early stage.	r cases . For
example <u>cases</u> which ar	e ineligible for the study are us	sually excluded early	y in the
into the study and then s	subjected to an extensive <u>expe</u>	rimental manipulation	on and
<u>measurement</u> . When time and p	ersonnel vary, then the followi	ng formula can be u	sed to
compute the maximum	sample size based on the dual	constraints of time a	nd
personner.			
Total size	STAFFTE * WORKDAYS * HRSP	ERDAY	
given time, ntim =	HRSPERCASE*(1-EX)*RR*(1-CR)*	= *(1-DR)	
	+ HRDROP*(1-EX)*RR*(1-0	CR)*DR	
	+ HRCNT*(1-EX)*RR*CR		
	+ HREX*EX		[Scroll down]
Number of complete	d		_

Scrolling down, this screen has several input fields, similar to those for maximum affordable sample size. Note that when this screen first appears the values for exclusion rates, response rates, and other rates which we entered in the previous screen appear here as well. So you don't have to reenter those rates, and we can make sure they are treated consistently throughout the consultation.

🐺 Ex-Sample v. 3.0	
Project Reports Window Debug Help	
Exit 🔂 Home 🔚 Glossary	Control Panel MT < Back
MAX. SIZE WHEN TIME & PERSONNEL VARY FOR CASES RE	ACHING DIFFERENT LEVELS
given time, ntim =	= 3786
HRSPERCASE*(1-EX)*RR*(1-CR)	*(1-DR)
+ IRDROF (I-EX) RR (I- + HRCNT*(1-FX)*RR*CR	
+ HRNR*(1-EX)*(1-RR)	
+ HREX*EX	[Scroll down]
Number of course later l	
numper of completed cases given time, nachtim = ntim * (1 EY)*BB*(1 CB)	*(1 DR) = 1927
Cases given une, nachum – num (1-EX) KK (1-CK)	(1-01) - 1527
where	
staff full time equiv's, STAFFTE = 2.000	
number of work days, WORKDAYS = 40.000	
hours worked per day, HRSPERDAY = 8.000	-
hours/excluded case. HRFX = 0.050	exclusion rate, FX= 0.1500
hours/nonrespondent, HRNR = 0.100	response rate, RR= 0.6000
hours/contaminated case, HRCNT = 0.250	contamination rate, CR= 0.0010
hours/dropout case, HRDROP = 0.250	dropout rate, DR= 0.0010
Return	
View Summary of number of cases and tim	e required for each stage

Enter values for the remaining input lines as follows until all input lines are filled: STAFFTE=2, WORKDAYS=40, HRSPERDAY=8, HRSPERCASE=0.25, HREX=0.05, HRNR=0.1, HRCNT=0.25, HRDROP=0.25. Once all input lines are filled the program will automatically compute the maximum sample size based on time and personnel.

When you are done, close this window or select the "return" hypertext phrase at the bottom to return to the "Determine Maximum Possible Size" window. That screen should appear as below. Notice that the value determined in the last screen is returned to this screen, thus completing all of the input lines. The Ex-Sample program then computes the values displayed in the output lines for this window. In this example we see that the most severe constraint on



sample size is money--not an unusual finding, incidentally. The maximum initial sample size is 3,544, and after adjusting for execution survival factors, the maximum achieved size is only 1,803. This means that if we began with an initial sample size of 3,544, after refusals, exclusions, contamination, and other factors, the resulting sample size will be approximately 1803.

STEP 2: ADJUST FOR EXECUTION SURVIVAL FACTORS

The next step after determining the maximum possible size is to adjust it for execution factors, such as response rate, exclusions, and so on. The easiest way to go on to this step from the maximum sample size screen is to select the "continue" button at the bottom of that screen. This will take you to the screen titled "Adjust for execution factors."

🐺 Ex-Sample v. 3.0		_ 🗆 X
<u>Project Reports Window Debug H</u> elp		
Exit Dome Control Panel	MT	< Back
ADJUST FOR EXECUTION SURVIVAL FACTORS (ESF)		_ 🗆 🗵
ADJUST FOR EXECUTION SURVIVAL FACTORS (ESF)		
Initial (Planned) Sample Size = 2		
EXECUTION EACTORS IMPACT ON SAMPLE SIZE N (number)	Parcont	
	ercent	
Exclusion rate, EX 0.150 Eligible cases 1	0.51	
Response rate, RR 0.600 Non-contaminated cases 1	0.51	
<u>Contamination rate</u> , CR 0.001 Participating cases 1 <u>Dropout rate</u> , DR 0.001 Non-dropouts 1	0.51	
·		
SUMMARY: Execution Survival Factor ESF = (1-EX)*RR*(1-CR)*(1-DR) = 0.509		
Achieved Sample Size = Initial Size * ESF = 1		
<u>Net Adjustment Factor</u> = NAF = 1/ESF = 1.965		
Return Tutorial Continue		

Navigation Options: Note, instead of pressing the "continue" button to go to the next step, you could have selected the "return" button and returned to the Sample Size Control Panel. Then you could select any of the steps in whatever order you desire.

Notice that when you open the "Adjust for Execution Factors" screen, all of the input lines are already filled in with values used on earlier screens and the Execution Survival Factor (the net impact of execution factors) has already been computed. So, in effect, you have already completed this step by virtue of entering the information in the earlier screens. If you had not chosen the two options where costs and time required for sampling vary by the stage in the research process, you would not have been asked for this information yet, and you would need to input it at this time.

Notice too that the information on the right side of the table regarding the impact on sample size is not very useful to you because we have not yet determined the initial sample size. However, once you do set a value for the initial sample size, this table displays the number of cases surviving to different stages of the research project.

Since there is nothing more that need to be done to adjust for execution factors, select the "continue" button at the bottom left of the screen and we will go on to step 3.

STEP 3: DETERMINE THE MINIMUM SIZE FOR SPECIFIC ANALYSES

You should now see the following screen. Notice, this screen includes a broad range of specific types of analyses. Only the broad categories are listed here. If you select any one of those you will see a screen with the types of analysis within that broad category.

🐺 Ex-Sampl	e v. 3.0						_ 🗆 X
<u>P</u> roject <u>R</u> ep	orts <u>W</u> indow	Debug <u>H</u> el	P ,				
Exit	\Lambda Ho <u>m</u> e	🔚 <u>G</u> loss	агу		Control Panel	MT	< Back
DETER	INE SAMPLI	SIZE REG	UIRED FOR ON	E OR MORE A	NALYSES		_ 🗆 ×
	DETE	RMINE MI	NIMUM SIZE RE	QUIRED FOR	SPECIFIC ANALY	<u>'SES</u>	
N	OTE: You ca	an conside	r multiple anal	yses in a sing	le consultation.		
	Whe	n done, pr	ess the "Contin	ue" button be	elow.		
Test	s of Proporti	ions					
Test	s of Means						
Med	ical or Clini	cal Reseau	<u>ch</u>				
Mea	sures of Ass	<u>ociation</u>					
Mult	iple Regres	<u>sion, Path</u>	Analysis, & Cov	ariance Strue	<u>cture Models</u>		
<u>Con</u>	tingency Ta	<u>oles</u>					
Sca	ling or Class	ification A	<u>nalyses</u>				
Ana	lysis of Varia	ince and i	Related Proced	ures			
<u>Corr</u> Dali	ability 9 Aug	variances	0.00UT00				
Non	anni <u>y a Ay</u> i narametric	<u>eement w</u> Foete	easures				
Acc	antanco San	nnling					
Sup	vival Analysi	e e					
		2					
Re	turn T	utorial	Continue				

Let's select one of those categories now. Select the phrase "Comparisons of Variances." You should then see another screen with a list of specific analyses comparing variances. Select the first of these, "Hypothesis Tests Comparing Variances (Power)." Then you should see the following screen.

🔆 Ex-Sample v. 3.0		_ 🗆 ×
<u>Project</u> <u>Reports</u> <u>Window</u> Debug <u>H</u> elp		
Exit 🔂 Home 📰 Glossary	Control Panel M	T < Back
HYPOTHESIS TESTS COMPARING VARIANCES (POWER)		
		_
HYPOTHESIS TESTS COMPARING	VARIANCES	
Desu and Raghavarao (1990:34-35) provide a me	ethod for estimating the	
sample size required to test <u>nypotneses</u> comparing two variances are based on <u>samples</u> from two normal <u>distr</u>	ibutions . Sample size	is
computed as follows:		
v2 = ((k+1)/2*k)*((za+zb)/ln(lambda))^2 =	<u>(1</u>	n 🗌
vi = Kvz = if the means are known	ų.	9
n1 = v1 + 1 and $n2 = v2 + 1$		
if the means are unknown		
n1 = v1 + 2 and n2 = v2 + 2		
Check here if the means are known:		
n1 =		
nz = The total sample size N = n1 + n2 =		
110 total sample size H = 11 + 112 =		
where n1 = the sample size for one group,		
n2 = the sample size for the other group,		
k = the <u>ratio</u> of v1/v2 or roughly the ratio o	f the <u>sample</u>	
size for the group having the largest	variance to the	<u> </u>

The format of this screen is similar to that used for each specific analysis. The top of this screen explains the test and gives the appropriate formula or formulae. Scrolling down, you will see the input lines for variables required to solve the formulae for sample size, as below.

🔭 Ex-Sample	e v. 3.0					_ 🗆 X
Project Repo	rts <u>W</u> indow	Debug <u>H</u> elp			,	
Exit	🏠 Ho <u>m</u> e	🚟 <u>G</u> lossary		Control Pane	el MT	< Back
🏓 НҮРОТН	ESIS TESTS	COMPARING '	VARIANCES (POWER	1)		_ 🗆 ×
Note, t the ari then s	alph beta tail = za = zb = lamt bitrary desi olve the eq	sample size f = a = the probabi = the probabi = one or <u>two-t</u> ; the <u>z</u> score fo the <u>z</u> score fo the <u>z</u> score fo da = the ratio un assumes la gnations of va uations.	or the group havin bility of a type I err lity of a type II err ailed test =, r alpha = r beta = of the two varianc mbda > 1. If lambd riances so the ratio	g the smaller varian or =, if =, , and es, s1^2/s2^2 = a is less than 1, ther b becomes greater t	ce , simply switc han one and	_▲ ch
EXAN detect .90 in : <u>values</u> v	APLE For examp a variance a one-tailed into equat 2 = ((1+1)/2" = 13.03	ole, if <u>two gro</u> ratio of s1^2/ d test of the <u>hy</u> ion (1) above *1)*((1.645+1.2)	ups are of equal sia s2^2 = 2.25 with an xpothesis that s1^2: produces the folloy 82)/In(2.25))^2.	te (k=1.0) and we w alpha level of .05 a ⊳s2^2. Then, substitu ving:	ould like to and a <u>power</u> a uting these	of
S	imilarly, v1	= k*v2 = 1 * v	2 = 13.03.			-

Scrolling down still further, you see an example problem and references.

Scroll the screen back up to where the input lines are visible and enter the following values in those fields: k=1, alpha=0.05, beta=0.1, tail=2, and lambda=1.2. Once these values are entered for all input lines, the Ex-Sample program computes the required sample size for this analysis. In this case, the required size is 636.

SIMULATIONS AND SENSITIVITY TESTS

Since all of the variables required for each formula are displayed in this screen, it is an easy matter to change the value of one of more of those parameters and immediately view its consequences for the required sample size. For example, let's imagine that instead of an alpha level of 0.05 as is customary, we chose an alpha level of 0.01. Move to the field for alpha and change its value to 0.01. Notice what this does to the required sample size. The required size increases fro 636 to 898. You can make other changes easily as well and see how they influence the required sample size.

CRITIQUES

Ex-Sample can analyze your responses and results for each analysis and the control panel to suggest ways to improve your results. If for example, you could reasonably adjust your alpha assumptions for a particular analysis, you might achieve a lower minimum sample size requirement.

The first time students use this program for determining sample size they often begin with very restrictive standards (such as an alpha less than 0.05) and very pessimistic assumptions about population parameters such as standard deviations. The result often is a very large required sample size beyond their resources. Less experienced researchers in general, often make this sort of initial pass at determining sample size before they develop an understanding of what might be realistic for their problem.

To assist researchers who may find that the required sample size is far larger than their resources would permit, Ex-Sample offers a "critiquing" option. You can receive a critique by selecting the "Frame" menu item at the top of the screen and then select "Critique". For screens that have no critique, this action will have no effect. After a few seconds, the program will display a critique window on top of the current window containing suggestions for ways to reduce the required sample size for this particular analysis, as shown in the screen below.



For example, if you call for a critique for the analysis with values as shown above after we did the sensitivity analyses, the program suggests you increase alpha to the more common level of 0.05, beta to 0.2, and asks whether the effect size might not be any larger than that you expect. If you make these changes (change alpha to 0.05, change beta to 0.2, and tail to 1, and change the effect size or ratio of variances to 1.5) the required sample size drops to 78. Press the [esc] key to close the critique window and make these changes now.

Note: The recommendations of the critique are not always possible or wise to follow for your particular circumstances. Keep in mind, they are only suggestions based upon standard principles and issues. You may need to override them for your case.

SUMMARY DESCRIPTION OF RECOMMENDATIONS

When you have finished experimenting with various values of parameters and have what you believe is the final analysis of required size you want to use as the basis for your study, one concern is how to describe this recommendation in your proposal or report. If you have ever reviewed research proposals and even final reports, you will probably find that many researchers, when reporting power analyses, leave out information crucial for evaluating its correctness. For this reason, Ex-Sample offers a recommended summary format for each of these analyses which provides a brief statement of the results of the power analysis or sample size determination including all the information required for a concerned reviewer to replicate the analysis themselves.

To view the summary description of the recommendation for this particular analysis, scroll the window down until you can see the "View Summary" button at the bottom of the screen. Then select the button. You should then see the following screen. Notice that this summary even includes the references for the technique.

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Project Reports Window Debug Help		
Exit 🕼 Ho <u>m</u> e 📰 <u>G</u> lossary	Control Panel MT < Ba	ck
HYPOTHESIS TESTS COMPARING VARIANC	ES (POWER) SUMMARY	×
		-
To determine the <u>sample size</u> re	quired to test <u>hypotheses</u> comparing two	
variances when both variances are bas we employed a procedure described by	ed on <u>samples</u> from two normal <u>distributions</u> v Desu and Raghavarao (1990:34-35), Using	
this procedure we find that the sample	size required to detect a variance ratio of	
1.500 in <u>two samples</u> having a 1.000 with an alpha of 0.0	a ratio of <u>sample sizes</u> between the two of 50 <u>a beta of 0.200</u> unknown	
means , and a 1 - tail ed test requires	s a <u>sample</u> of 39 for one group,	
39 for the second, and a t	total sample size of 78 .	
References:		
Desu, M. M. and Raghavarao, D. 1990.	Sample Size Methodology.	
Boston: Academic Press.	rmination for many different	
types of statistical tests.	imination for many unerent	
Brent, E. E., Mirielli, E. J., and Thompso	on, A. EX-SAMPLE: An	
Expert System for Determining Sam	iple Size. Version 3. Columbia,	_

This recommended summary report is automatically included in any comprehensive report you generate after a consultation, even if you did not open the summary screen during the consultation.

MULTIPLE ANALYSES

When you are done determining the sample size for this specific analysis, press the "return" button at the bottom of the screen. You can also press the [esc] key for the same effect as selecting the "return" button. Continue closing screens until you return to the screen titled "DETERMINE MINIMUM SIZE REQUIRED FOR SPECIFIC ANALYSES." You can continue to consider other analyses and the sample size required for them. In fact, one of the best features of Ex-Sample is that it permits you to consider many different analyses in the same consultation and then determine a study sample size suitable for several proposed analyses.

STEP 4: ADJUST MINIMUM SIZES FOR DESIGN EFFECTS AND MULTIPLE COMPARISONS

When you have finished determining the minimum sample size for all specific analyses, you should select either the "return" or "continue" buttons at the bottom of the list of specific analyses. The "return" button take you back to the "Control Panel." The "continue" button takes you to Step 4: adjusting minimum sizes for design effects and multiple comparisons. Now press the "continue" button and let's go to step 4. If you went back to the control panel, select the hypertext term "Adjust for design effects and multiple comparisons."

You should now see the following screen which permits you to specify the design effect and multiple comparison adjustment factor. Both of these are adjustments which must be made to the required size.

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<u>P</u> roject	Reports Window	Debug <u>H</u> elp						
Ex	it 🏠 Ho <u>m</u> e	🚟 <u>G</u> lossary			Control Par	nel	MT	< Back
🏓 AD	JUST FOR DESIG	IN EFFECT ANI) MULTIPLE COM	PARISONS				_ 🗆 🗵
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Г	ADJUST FO	R SAMPLING	PLAN		!	4-		
	determine the	<u>sample size</u> m actual size re	ust be multiplie quirements.	a by the a desian ef	esign eπect fect = 1.00	to		
			•					
	 ADJUST FO 	R SUBGROUP	COMPARISONS	OR DESC	RIPTIONS			
	The required	sample size n	ust be multiplie	d by the a	djustment fa	ctor f	Dr	
	multiple grou	os, mc, when	comparing or ex	amining s	ubgroups			
	SUBGROU	P COMPARIS	ONS OR DESCRI	PTIONS	ADJU	STME	NT FAC	TOR
	Compare s	ubarouns of e	ual size		n	nc = 2	* nsub	
	C examine e	qual size sub	roups independ	ently	n	nc = n	sub	
	C compare s	ubaroune of u	nonual eizo			nc = (1	l/nmin).	(1/nmin2)
	Compare s	nequal size s	ibgroups indepe	ndently	n	nc = 1	/pmin	(i/pininz)
	The a	ljustment fact	or for multiple g	roups,	n	nc = 1	.000	
			1					
	Return	lutorial	Continue					

Since many people are unfamiliar with these factors, let's find out more about them before proceeding. You could examine the hypertext help for each item. However, since these are so complex, let's first scroll the screen down to the bottom and select the "tutorial" button. You should see the following screen.

🔭 Ex-Sample v. 3.0		
Project Reports Window Debug Help		
Exit 🕼 Home 📰 Glossary	Control Panel MT	< Back
📌 T5. ADJUST THE REQUIRED SAMPLE SIZE FOR SAMPLE AND	STUDY EFFECTS	- 🗆 ×
		<u> </u>
ADJUST REQUIRED SAMPLE SIZE FOR SAMP EFFECTS	LE AND STUDY	
Estimates of required <u>sample size</u> need to be furt influence of the <u>sample design</u> on required sample size comparison groups in the study design.	ther adjusted for the and the number of	
Sample Design		
The nature of the sample design <u>influences</u> the s Stratified <u>samples</u> typically require fewer <u>cases</u> than <u>sin</u> achieve the same <u>level</u> of accuracy; <u>cluster samples</u> typ straightforward way to adjust sample size for the sample desired sample size by the design <u>effect</u> , "deseff", for th following equation:	ample size required. t <u>ple random</u> samples to ically require more. A e design is to multiply tl ne <u>sampling plan</u> as in t	ne he
(desiredsizeadjust) = (desiredsize) x (deseff)		
Kish (1965) defines the <u>design effect</u> as the <u>ratio</u> of the v <u>cluster</u> or <u>stratified sample</u> to the variance obtained by a of the same size. Generally, the design effect for a <u>clust</u> one and the design effect for a stratified sample is less t	ariance obtained from a a <mark>simple random sampl er sample</mark> is greater tha han one. Hence. the	a e in v

You should read this screen if you are unfamiliar with these concepts, scrolling down as required to read the rest of the information. When done, press the [esc] key to close the tutorial window and return to the window asking for these values. Let's imagine we have a cluster sample, so our design effect is likely to be something greater then 1.0 (that is, we need to obtain a larger sample to achieve the precision we could have obtained with a simple random sample). Let's enter 1.1 for the design effect.

Now, with the mouse check the second checkbox in the bottom segment of the screen to indicate that we plan to "examine equal size subgroups independently." When you select that checkbox a checkmark will appear in it and a new input line will appear on the screen. That line asks for the number of subgroups, nsub. Enter "2" there to indicate we will be examining 2 equal sized subgroups. The program will then indicate that the adjustment factor for multiple groups, mc, equals 2.

When you are done, press the "continue" button at the bottom of the screen. (You will have to scroll the screen down to the bottom.) This will take you back to the Sample Size Control Panel.

STEPS 5 AND 6: SELECT INITIAL SAMPLE SIZE AND ADJUST FOR SURVIVAL FACTORS

When you return to the sample size control panel you should notice that summary values from the various steps you have already completed have been automatically returned to this screen as well, as seen below.



You can now scroll this screen up and down and view the maximum possible sample size, its value after adjusting for execution factors, the minimum sample size required for each specific analysis you considered, and those values adjusted for design effect and multiple comparisons.



Now that you know the maximum size you can achieve and the minimum size required for each, you can select an initial sample size. The task is to end up with an achieved size larger than the size required for each analysis and smaller than the maximum possible achieved size. In this case, the maximum possible achieved size is 1803 and the maximum required size for analyses is 172. Hence, the achieved size must fall between these two numbers. You should enter your desired value for the achieved size as some value between these two numbers. Ex-Sample will use that the execution survival number and factor (already determined earlier) to automatically compute the initial size you must begin with to achieve that size. Notice that Ex-Sample recommends the achieved size equal the largest size required for any analysis (after corrections) when that is smaller than the maximum possible size (after corrections).

Enter 172 in the "achieved size" field at this time. The program computes the required planned size to produce this achieved size. So, based on this consultation, you would want an initial size of 338 and an achieved size of 172.



Warnings when results conflict: When the maximum possible size is less than one or more of the required sizes, when your initial size is larger than possible, or when other conflicts occur among values, Ex-Sample provides warnings on the control panel.

For example, the control panel initially displayed the warning "yourachieved size is smaller than required for an analysis" just below the achieved size field. That warning should go away when you enter a value of 172 or higher for achieved size. You should heed these warnings to determine a practical sample size. Note: The control panel also offers you additional views of the information which, though not required, may provide useful information to you. For example, near the bottom of the control panel are two hypertext options: "final cost" and "final time required."

If you select either of these options you will be able to view a summary screen which computes the overall cost or time required based on information you have provided. This information is not required for determining sample size but may be invaluable in computing your budget or planning staffing for the project.

SAVING YOUR RESULTS

Once you have completed your consultation you will probably like to save the results. One quick method is to simplY print the control panel to your printer. With the control panel screen on top, select the "Window" menu item and then the "Print Current" item. Your can repeat this process when any screen of interest is the top window. To produce a file copy of the control panel for import into a word processor select the "Window" item again and then the "Save to RTF" item. This will produce a one screen report (see "REPORTS" in the ForeThought tutorial section of this manual or the on-line help).

Several more detailed reports are possible. When you click on the "Report" menu item at the top of the screen you can generate a "Select", "Standard", or "Long" report. The Select report works as described in the ForeThought tutorial. The Standard report for Ex-Sample will include the "Sample Size Control Panel" and summary screens of each of the analyses you have completed. The Long report includes all the screens you have visited including Critiques and Summary screens for the control panel and each analysis. These reports are written to the file "FTPF.RTF" and may be viewed with any RTF capable word processor.

You might want to save your current work to return to it at another time. You can save every screen's contents by selecting the "File" menu item and then the "Save Desktop" item. When you restart Ex-Sample you can retrieve an old desktop by selection the "Retrieve Desktop" item (see Save/Retrieve Desktop in the ForeThought tutorial section of this manual).

EXITING THE PROGRAM

You can exit the program at any point by selecting the exit button at the top of the screen or selecting the "File" menu item and then "Exit" submenu item. The "Exit Query" dialog box will appear allowing you to save your work, exit, or cancel and return to the program. When you exit the program, you will be asked if you want to save your work. If you say "NO", all the values you have entered will be lost. Your report file remains on your hard disk and is not effected. If you are working with an ongoing project, you might want to save all the values you have entered for later reconsideration. To save your work simple select the "YES" button. Ex-Sample will save your work and exit. See chapter Working Projects. 2 with on

5. STATISTICAL NAVIGATORTM

INTRODUCTION

WHY STATISTICAL NAVIGATOR IS NEEDED

Selection of the appropriate form of statistical analysis is a crucial aspect of any research project. An inappropriate choice of analysis can inadvertently answer the wrong question, produce mistaken conclusions, jeopardize the publication of papers, threaten the funding of proposals, doom an otherwise excellent study to disrepute, or even call into question the competence of a researcher or an organization. Such dire consequences, one would hope, are rare. Nevertheless the ineffective use of statistics can degrade the quality of research in important ways long before it becomes a career-threatening problem.

There are literally hundreds of forms of statistical analysis available today. Powerful packages such as SPSS, SAS, SYSTAT, Statistica, StatGraphics, BMDP, and others provide an embarrassment of riches to the user in the form of possible forms of statistical analysis. However, most researchers receive training in only a few of these techniques. It is difficult for many to keep up with new changes and improvements in them over time, and when not used for years at a time, we quickly forget even the basics of statistical analyses, much less their subtleties. It is easy for competent researchers to be unfamiliar with or to overlook important options when considering how to analyse data.

WHAT IS STATISTICAL NAVIGATOR?

Statistical Navigator is a thought tool. That is, it is a computer program designed to help researchers make better decisions regarding the appropriate statistical analysis for their research task. Statistical Navigator uses a combination of three important computer science technologies: expert systems, hypertext, and decision support systems. Statistical Navigator is an expert system program using artificial intelligence strategies to guide the researcher to the appropriate form of statistical analysis. The strategy used by Statistical Navigator to determine the appropriate statistic is suitable for a wide variety of disciplines which use statistical analyses. These approaches are used in both basic and applied research in academic institutions, business, and industry.

Expert systems are so named because they are designed to help the user with a specific complex task in much the same way an expert consultant would do if available. In this instance, Statistical Navigator acts as an "expert" for the user seeking accurate information on how to plan or conduct the statistical analysis of empirical data.

Experts play an important role in statistical analysis. Even if Researchers devote the long hours of hard work required to examine the range of available statistics, they can never be sure they have read the right references, understood them as well as they should, or made the correct decision. One of the advantages to using an expert consultant over searching text books for advice is that if the researcher were to become confused he or she could ask the consultant questions. Presumably, by interacting with each other, the expert's knowledge could be meaningfully applied to the specific research project and this exchange would result in competent advice appropriately tailored to the research problem. To offer meaningful advice, human experts have to ask the researcher several questions about the specific goals and objectives of the study in question. The more careful the researcher was in answering the expert's questions the better the advice he or she could expect for planning their statistical analysis.

However, seeking advice from competent statisticians is not always a viable option. One has to find a competent statistician. There may be fees or other costs involved which are beyond the person's means. Most competent statisticians are relatively busy and don't enjoy unsolicited phone calls in the middle of the night. In this respect, there are some notable differences between a human consultant and Statistical Navigator. The program is always friendly and patient with a user, no matter how many times that user may ask for help. And Statistical Navigator is always available without an appointment.

In its Consult Mode, Statistical Navigator is programmed to function much like a human expert. Statistical Navigator asks the user a series of questions, much as a human expert might, and based on the user's answers, suggests several appropriate kinds of statistical analysis ranked by suitability. In each case, it explains what the analysis does and how it does (or does not) fit the user's research objectives and assumptions. The researcher still makes the final decision, but now he or she can be confident it is an informed one. Statistical Navigator assures that researchers know where they are going and which courses are available to get them there. Statistical Navigator does not perform statistical analyses for researchers, but it does what other statistical packages cannot do. It helps researchers select the appropriate statistic for their problem.

Included with Statistical Navigator is an extensive hypertext facility. Users can browse among descriptions of statistical techniques organized by major approach, can examine references also organized by major analysis approach, and can examine an extensive glossary of statistical terms. In the "Browse" mode users have complete control over these facilities and can examine each of them to the level of depth they desire and in a sequence of their own choosing. In the "Consult" mode users can access hypertext definitions of terms and descriptions of statistical techniques as they become relevant to the consultation. Users can even consult hypertext definitions of terms while viewing the report of Statistical Navigator's recommendations on their screen.

WHO SHOULD USE STATISTICAL NAVIGATOR?

While most researchers have access to powerful statistical packages, in many cases they may find it difficult or impossible to use those packages in an effective manner. Statistical Navigator is designed to provide a supplement to existing statistical packages to help users identify the appropriate form of statistical analysis to use for specific research problems. For researchers who don't often use statistics or who have difficulty keeping up to date, Statistical Navigator helps them make competent selections of statistics for their research projects. Even for researchers with strong statistical backgrounds, Statistical Navigator can be helpful, providing a reassuring check of their logic, insuring that important analysis options are not overlooked, reminding the researcher of the assumptions of the most likely techniques, offering a convenient way to review various analyses and statistical terms, and providing a useful summary and report to document their decision.

NOTE: Statistical Navigator helps select from among a wide range of statistics, including many nonparametric statistics. Clearly it is useful for quantitative studies. In addition, many of these statistics are sometimes used in qualitative research as well. In that case, the program can also be helpful for qualitative studies or studies that combine qualitative and quantitative approaches.

TEACHING APPLICATIONS

Statistical Navigator should be a useful aid in statistics courses. It can serve as a supplement to the lectures, permitting students to try their hand at selecting appropriate forms of statistical analysis, then using the Statistical Navigator program in its consult mode to check their judgment. In its browse mode it serves as an electronic glossary and reference book providing definitions of statistical terms and descriptions of over two hundred analysis techniques. The program could free up much of the time now required of the instructor and teaching assistants, permitting them to focus on other aspects of statistics such as the actual computation of results and their interpretation. Students could use the program several times for initial problems to help them understand the logic of selecting appropriate statistics. The program may be particularly helpful for use outside the classroom for individualized selfstudy.

HOW DOES STATISTICAL NAVIGATOR WORK?

There are several important features of the approach taken by Statistical Navigator which should be discussed Statistical Navigator should be contrasted with the here. strict decision tree models for deciding on statistical analyses which are so common in the literature. You can find many statistical texts with abbreviated decision trees in the front or back for choosing among the types of analyses covered in The decision tree approach has also been that text. incorporated into a few computer programs. There are several problems with such decision trees and programs. Statistical Navigator attempts to overcome these problems of other programs through several strategies. Some of the important strategies used are the following:

OVERCOMING TERMINOLOGY PROBLEMS

Existing decision tree programs tend to ask questions using terms which are unfamiliar to users. In many cases it is no exaggeration to say that if the user knew enough to answer those questions, they would not need the program. It is neither unlikely nor uncommon for researchers unfamiliar with specific terms to have difficulty expressing their analysis objectives and assumptions with such programs.

Statistical Navigator attempts to overcome this problem by permitting users to select from three different methods for specifying their analysis objectives:

- (1) If they are already relatively sure of the general type of analysis they want to consider they can choose to select a broad category of analysis from a list of such categories. This list includes options such as "causal analysis," "measures of association," "scaling and classification," and so on.
- (2) If researchers are less sure they know the general category of analysis required, they can choose to view a brief list of common research questions. They then select the question which best describes their research objective. From their selection, Statistical Navigator infers the appropriate general category of analysis techniques to select for further consideration.
- (3) If they find the first two methods to be inadequate, researchers can examine several successive lists of common research questions. These lists are more detailed and comprehensive than the short list described above. Users can then select an item from these more detailed lists which best describes their research objective.

From each of these techniques, Statistical Navigator determines the broad category of analysis techniques to consider and informs the user of its judgment. At that point it gives the user the option of restarting the selection process. Thus, researchers can try one of these methods. If they are unsure it has produced the best result, they can go back and try another. This can continue until they find a result which they believe provides the best selection of the broad categories of analysis for their problem. Because there are multiple problem statements and types of analysis described and they use different terms which may be more or less common in different disciplines and research traditions, this procedure gives users an opportunity to express their analysis objectives from a wide range of perspectives selecting from a broad range of terms. This avoids the problems of earlier programs which often required users to describe a particular analysis using only a single term when many different terms are commonly used in the research literature.

CONFIDENCE FACTORS

Another problem with existing decision trees and programs for selecting statistics is that they force the user to answer with an absolute "yes" or "no" questions which do not have simple "yes" or "no" answers. In many cases, researchers cannot reasonably be expected to answer with great finality questions regarding informed judgments about assumptions or the relative importance analysis of objectives. Such questions are much more sensibly answered by reporting the user's confidence in an answer. In many cases, for example, whether data are measured at the interval level is a judgment call rather than an absolute given. The importance of a particular analysis objective such as being able to detect interactions may also best be expressed as a preference score on a scale rather than as an absolute necessity. Statistical Navigator permits users to answer such questions with an expression of confidence values or an indication of relative importance rather than forcing them to make rigid yes/no decisions.

DISTINGUISHING BETWEEN ANALYSIS OBJECTIVES AND ASSUMPTIONS

Decision trees and earlier programs often failed to distinguish analysis objectives from assumptions about or constraints on the data. Even worse, they often ask the user questions about the data before they have established the analysis objectives. This often presents users with questions which it is impossible to answer appropriately. For example, when the researcher is designing a study and has not yet decided how to collect the data, it is unhelpful to have a program which forces the researcher to answer questions about the measurement of variables before recommending appropriate analyses. Even when the data are already collected, the failure to distinguish these two dimensions makes it impossible to determine whether they are consistent with one another.

Statistical Navigator distinguishes analysis objectives from constraints on and assumptions about the data. It first asks a series of questions to identify the analysis objectives, and only when they have been determined does it ask questions about the nature of the data. Furthermore. Statistical Navigator considers these two dimensions separately in recommending statistical analyses. This is crucial because it permits Statistical Navigator to point out to the user instances where their analysis objectives conflict with their data measurement assumptions. For users designing a study this can be critical information shaping the way they collect data. For users who have already collected the data, it may present a brutally frank lesson in the importance of planning the analysis before the data are collected

AVOIDING SIDETRACKING AND BLIND ALLEYS

It is well-known that algorithms which rely solely on decision trees often get sidetracked early in the decision process, leading the user inexorably down a path taking them farther and farther from where they should be going. Such sidetracking in statistical selection programs is particularly likely when the programs are asking about data assumptions before determining analysis objectives and when the user is forced to make rigid yes/no decisions.

Statistical Navigator in a strict sense does not use decision trees at all. Decision trees provide only a single way to reach a given endpoint or leaf node. Statistical Navigator uses a similar branching strategy at first to select from among several broad categories of analysis. However, Statistical Navigator provides several alternative paths which can each lead to the same broad category. By providing alternative ways of specifying the analysis, Statistical Navigator permits users from vastly different disciplines who may be used to expressing things differently and who may use different terminology to still be led to the correct form of analysis. Statistical Navigator also provides opportunities for the researcher to backtrack and begin again if they believe they are going down the wrong path. Finally, this branching or narrowing strategy is used only for the first few steps in its decision process to identify only the broadest categories of kinds of analysis to be considered. Then. within the broad analysis category selected, pattern matching is used to assess the fit between the analysis objectives and assumptions of the researcher and the variety of alternative analyses available.

MULTIPLE APPROPRIATE ANALYSES

Another complaint regarding many decision trees for selecting statistical analyses is that they produce only a single final recommendation. Yet, in many cases, there are likely to be two or even several types of analysis which could be used for a particular study, each having their own pattern of advantages and disadvantages. Forcing the recommendation to a single analysis has the unfortunate effect of making the decision seem more clearcut than it actually is, and hiding from novices and experienced users alike the complexity of the selection. It fails to alert the user to other likely types of analysis which they should consider and be prepared to justify not using in order to get their study funded or published. Finally, it gives the user too little discretion in deciding whether to follow the recommendation of the program or not.

Statistical Navigator's recommendation includes a list of the four statistical procedures which appear most suitable for the analysis. Those are ranked by preference and a detailed discussion is provided for each, pointing out their weaknesses and strengths for addressing the analysis task under consideration. This alerts the user to other possible analyses which should be considered, makes clear even to novices the complexity of the decision, and provides the user with some flexibility in making the final determination of which type of analysis to use.

TUTORIAL

Perhaps the best way to become comfortable using Statistical Navigator for your own research problems is to participate in a step-by-step tutorial session. In approximately 30 minutes this lesson can demonstrate to you what it's like to apply Statistical Navigator to a research problem. In addition, you can learn about several features of the program that may make it much easier for you to use. These features include understanding the "browse" and "consult" modes, using hypertext help, saving your results, quitting in the middle of the program to return later, and so on.

RESEARCH EXAMPLE

Imagine you have a research question and you would like to determine the appropriate statistical analysis to use for it. Suppose, for example, you are conducting a study in which you are testing the effects of a new treatment on AIDS patients. You would like to know whether patients receiving the treatment live longer than those not receiving it. What is an appropriate statistical analysis to address this question?

BEGINNING A STATISTICAL NAVIGATOR SESSION

Double-click the left mouse button on the "MTOOLS" icon on your desktop (see the "Getting Started" chapter on how to create a desktop icon). Alternatively, you can select the "Start" button, then the "Programs" menu item, then the "MTOOLS" menu item and then the "MTOOLS" option. The Methodologist's Toolchest version screen will appear. Click on the "Begin" to view the "Introduction" screen. Now click the left mouse button on the "Statistical Navigator" hypertext. This will start the program. It may take a few seconds to load. The logo screen is the first window that you interact with. This screen has four buttons, "BEGIN", "EXIT", "ABOUT STATISTICAL NAVIGATOR", and "INSTRUCTIONS". "BEGIN" will start a consultation. "EXIT" exits the program. "ABOUT" takes you to a screen showing the authors and copyright notice. "INSTRUCTIONS" will take you into a tutorial similar to the one you are now reading. Select the "BEGIN" button.

You will see the main menu screen below. This screen gives the user three options. You may enter the "Browse Mode" to browse through the hypertext definitions and descriptions of analyses. You may enter the "Consult Mode" to receive explicit advice from the program regarding appropriate analyses for your problem. Or you may exit the program.

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<u>Project</u> <u>R</u> eports <u>W</u> ind	ow Debug <u>H</u> elp		
Exit 🔒 Hog	ne 🔚 Glossary	MT	< Back
MINTRODUCTION			_ 🗆 ×
	Statistical Navigator™		
	MAIN MENU		
Select w	nich mode of operation you wish to use.		
Browse Mod	This mode lets you examine descriptions of analyses, look at definitions of statistical ter and view references in whatever order you	various ms like.	
Consult Mo	This mode lets you consult with Statistical N Professional much like you would consult w expert for advice on selecting the correct st analysis for your research objectives and as	lavigator rith an atistical sumptions.	
Exit			

Let's begin our tutorial by examining the Consult mode since our objective is to get advice relating to our specific analysis problem. Use the mouse or [tab][enter] keys to select Consult Mode.

CONSULT MODE

The Consult Mode of the Statistical Navigator program is designed to guide the user through the process of selecting an appropriate statistical analysis for their problem. In successive screens, it asks users to identify their research objectives, assumptions. Based on that information, the program rank-orders analyses based on their suitability for the problem described by the user, identifies the four best statistical analyses, and provides a detailed report with its recommendations. The report is saved in a disk file for future use. The user can view it on the screen and print it to a
printer. The report includes a detailed description of the recommended analyses, identifies common statistical packages which will compute those statistics, and gives a point-by-point explanation of how each technique does or does not fit the researcher's problem.

BEGINNING A NEW CONSULTATION

When you select "Consult Mode" from the opening menu you are taken to the first menu of the consult mode shown here. You can begin a new consultation, reconsider an earlier consultation (if you have already finished a consultation) by reexamining the information provided in that earlier consultation, retrieve a saved consultation (see Save/Retrieve Project in Chapter 2), or you can quit the consult mode and return to the main menu.

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Exit Deme Glossary	MT	< Back
CONSULT MODE		- 🗆 ×
		Help
Statistical Navigator ™		
CONSULT MENU		
Statistical Navigator is ready to begin the consultatio What would you like to do first?	n.	
Begin a New Consultation		
Reconsider Last Consultation		
Retrieve Saved Consultation		
Return to Main Menu		

If we had previously considered this problem and saved our file for future consultation, we could reload that file now and reconsider that consultation. However, let's assume this is our first time and we want to begin a new consultation. Use the cursor keys or mouse to select NEW consultation.

SCREENING FOR BROAD TYPES OF ANALYSIS

The next screen you should see is the main screening menu. The first step in selecting an appropriate analysis for any particular research problem is determining the broad category of analysis. Statistical Navigator offers three ways to accomplish this.

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A SCR	EENING FOR BF	IOAD TYPES OF	ANALYSIS				
re op th	SCI The first s search problem tion below. If y ese options you	REENING FC tep is to deterr n. This section you are unable u will be able t	OR BROA nine the bro gives you t to determi to return to	D TYPES OF AN, and type of analysis rree options for doi ne the appropriate this menu and try a	ALYSIS appropri ing this. S category nother ap	iate for your Select an using one o oproach.	f
	View list of ge	eneral types of	analysis	Return t	to Main M	lenu	
	View list of	f research que	stions	View questions lis	t organiz	ed by catego	лу

Selecting the list of general types of analysis takes you to a list of common analysis techniques from which you can select the broad category most suitable for your project. If this doesn't help you, you may select the list of research questions. This provides a list of common phrases people often use to describe their analysis problem. If that too doesn't help, you may wish to try the lists of questions organized by major category. This option displays a series of lists of phrases with a separate screen for phrases describing each major analysis type.

Let's first examine the list of general types of analysis to see what it tells us.

LIST OF COMMON KINDS OF ANALYSIS

If you select the option to view a list of general types of analysis then you will see the following screen.



This screen lists the broad categories of analysis which you may want to examine. To learn more about each kind of analysis you would select the hypertext phrase for each category. Selecting the option button to the left of the phrase selects that broad category of analysis for further consideration.

Let's imagine that we don't recognize any analyses in this list which appear suitable for our problem (for some of us, this requires less imagination than others). So, let's select the last hypertext option "None of these--Let's try another approach." This should bring you back to the main screening menu. This time, let's view the second option "view list of research questions."

LIST OF COMMON PHRASES DESCRIBING RESEARCH OBJECTIVES



Next, you should see the following screen. In this menu are a list of phrases often used by people to describe their research objectives. The reason for having this option is that different disciplines sometimes use different terms to describe the same types of analysis. Often researchers in one field are unfamiliar with terms used by other fields to describe an analysis, but they may recognize these more general phrases. Once again, let's imagine that none of these phrases seems sensible to us to describe a broad category of analysis which might be reasonable for our problem. Use the mouse or keyboard to select the None of these option (on the bottom of the menu). This should once again return you to the main screening menu.

We could consider the third option at this point. This option leads to a series of screens, each containing a list of phrases describing analysis "organized by category."

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RESEARCH QUESTIONS BY MAJOR CATEGORY
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The screen shown below contains a hypertext list of broad categories of analysis.



Let's select the phrase Process Analyses. You will then see the following screen.

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<u>P</u> roject <u>R</u> eports <u>W</u> indow Debug <u>H</u> elp		
Exit 🏠 Home 🚟 Glossary	MT	< Back
PROCESS ANALYSIS QUESTIONS		- 🗆 ×
PROCESS ANALYSIS QUESTIONS		
Process Analysis If ANY of the following questions fit your prosections for a select here to consider this type of analyses	blem, then	
Return If NONE of these questions fit your problem, here to try another approach	then select	
 Monitor an ongoing process to see that it meets standards Control a process over time Model a process Predict or forecast future values of a variable Identify cyclical patterns in data over time Examine a growth process Examine a survival process Examine causal patterns in time series data Examine the effect of one var on another in a time series 		

Here, there would be one list of phrases typical of process analyses. Each of the hypertext terms in the previous screen takes you to a screen like this one. Read the questions. If any question of the questions fits your problem then you would select the appropriate button to continue. If none of the questions is appropriate you would select the return button.

Select the Process Analysis button. You will now see the "Process Control/Time Series Objectives" screen. Note: Selecting an analysis for further consideration determines the broad scope of the rest of this consultation. Statistical Navigator will now ask you a series of questions to determine which specific analysis within that broad category best fits your problem. However, you can later run different consultations or reconsider this consultation and explore other broad analysis categories.

For each hypertext concept there is an input line for you to indicate the importance of this concept to your study. Select each hypertext term for more details. Let's select the "examine for survival process" phrase to see if it describes analyses which might be appropriate. After all, survival is the key dependent variable in our planned analysis.



Notice that subsequent windows may also include hypertext. Selecting each hypertext term produces yet another pop-up window. We can continue examining these help screens until we run out of hypertext options or reach a level of explanation which is sufficient to understand the content. Hopefully, for most of you, the latter will happen before the former.

When you are done examining hypertext, simply press the [esc] key. Each time you do this you will close a hypertext window. The windows will close in reverse order of their opening, giving you the sensible impression of backing out of this feature. Close the hypertext windows now using the [esc] key until you again see the Process Control/Time Series window.

NOTE: the hypertext changes color to indicate that you have already visited the window the hypertext term points to.

PROCESS ANALYSIS SCREENING

Process analyses differ in one important way from all other types of statistical analysis considered by Statistical Navigator. Because there are so many different types of process analyses and they diverge so widely from one another, when the user selects process and control analyses to explore they are first taken to the Process Screening screen shown above. There they are asked to specify the importance of several objectives related to process and control analyses.

Note: The process analysis screening module only appears when you have selected one of the general process analyses. If you select another type of analysis, it will take you directly to the objectives section at this point.

Statistical Navigat	tor v. 3.0		_ 🗆 ×
Exit 🔂 Ho	me 📅 Glossary	MT	< Back
PROCESS CONT	ROL/TIME SERIES OBJECTIVES		
PROCE	ESS CONTROL/TIME SERIES: OBJECTIVES ——— Enter the importance of each of the following odel a process (emphasize analysis/understanding) redict/forecast future values of a variable introl and monitor a process over time entify cyclical patterns in data over time tamine a growth process artition effects into trend, seasonal, random, etc. tamine causal patterns in time series data tamine changes in factor structure (measurement) ove tamine two or more variables over time	g objectives — r time	nstructions

This screen is much like the objectives and assumptions screens common to all analyses. The researcher is asked to input a number in a field on each line indicating the importance of that objective.

Go ahead and enter a values for these objectives in the following order: 0,0,0,0,0,10,0,0,0. (You can use the [tab] key to move to the next input line.) Once you have entered all of your answers on this screen, the program then computes the fit of several broad types of process analyses to the objectives described by the user. Select the new hypertext term "Process Control/Time Series Screening" that appeared at the bottom of the screen. Those computed values are shown in the summary screen that will now appear.

Statistical Navigator v. 3.0				_ 🗆 ×
			мт	C Back
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PROCESS CONTROL/TIME SERIES SCREENING				
PROCESS CONTROL/1	IME SERI	ES SCRE	ENING	
Based on your answers on the prior screen, following broad kinds of process control or is displayed below. These scores range fro appropriate) for your problem. Specific Kinds of Process Control Analysis	the fit to your time series and om 0 (least app s Score	problem of ea alyses to your ropriate) to 1.1	ich of the problem D (most	
ARIMA Models	0.53 Th	ese scores ind	icate the	
<u>Smoothing</u>	0.72 fit	between each	class of	
C Spectral Analysis	0.67 wit	th O being leas	st appropria	te
O Survival Analysis	0.56 an	d 1.0 being m	ost appropri	iate.
Markov Models	0.52			
<u>Changing Measurement Models</u>	0.70			
For a detailed desc	cription of a pro tton on the sid ration.	ocedure selec le to choose a	t the phrase class of teo	e. chniques

Here you see eight different kinds of process analysis. These are scored by relative fit to the objectives, with the highest scored analysis having the best fit and the lowest score having the worst fit. Notice that the actual scores are displayed in the column on the right so the user can get a better idea of the relative goodness of fit of the various techniques to the problem they have described.

The analysis names are hypertext. So, if you are unfamiliar with any of them and want to see a description, simply select the appropriate phrase. When you have decided which type of process analysis you want to consider further, select the option button to the left of that name. For example, in this screen, survival analysis has the best fit to the problem described and would be a sensible choice. Note: You do not have to select the topmost category of analysis. You are free to select whichever one you desire. In fact, you may want to select one type of process analysis the first time, then rerun the consultation later and consider one or more other types of process analysis.

Go ahead and select survival analysis by using the left mouse button on the option button.

OBJECTIVES SCREEN

After you select survival analysis the next screen you should see is the Objectives Screen. The screen below is used to describe your research objectives. Each objective appears as a single-line prompt on the screen. You are asked to enter a number between 0 and 10 indicating the importance you attach to that objective.

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Exit	Home Glossary	MT	< Back
SURVIVAL AN	ALYSIS OBJECTIVES		
ADVIC IMPORTANC (0 to 10)	E FOR SURVIVAL ANALYSIS: OBJECTIVES The metric of the following objective of the following objective and estimate survival distribution Compare survival rates for two or more groups Quantify effects of several variables on hazard rates Compare rates of groups controlling for other vars Give more weight to early transitions Desirability of a more powerful test Foucies on effects of explanatory vars, not time dependent Specific the distribution of the bazard over time	} ≥ctives –	Instructions
	continue		

The prompts are hypertext. Hence, if you are unsure what is meant by a prompt, you can click on it with the mouse to view a more detailed prompt window. To illustrate this, select the phrase compare survival rates for two or more groups to see what it means and you will see the following screen.

Hypertext help for prompts is organized to first display a clarified prompt. Then, if you need further help typically definitions for one or more terms in that clarified prompt can be viewed by clicking on that term.

Note: you must enter a value for each input line before a computation can occur. If after viewing the addition information provided by through the hypertext prompt, you

are unsure of the importance of this item, you can enter a neutral value of 5.

Enter the following values: 8,9,0,0,0,0,0,0. When you have completed the Objectives section of the program, the program next considers assumptions you are willing to make about the data. Select the new hypertext term for "Survival Analysis Assumptions."

ASSUMPTIONS SCREEN

Next you should see the Assumptions screen. Each assumption appears as a single-line prompt on the screen. Again, you are asked to enter a number between 1 and 10 indicating your confidence that the assumption is met by your data.

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<u>P</u> roject <u>R</u> eports	<u>W</u> indow Debug <u>H</u> elp		
Exit 🔒	Home Glossary	MT	< Back
🏓 SURVIVAL A	NALYSIS ASSUMPTIONS		
ADVIO	E FOR SURVIVAL ANALYSIS: ASSUMPTIO	NS	Instructions
CONFIDEN (0 to 10)	CE — Specify your confidence in each of the following assu Dichotomous dependent variable (e.g., life or death) Irrevocable transition from one state to another Censored observations (study ends before all outcomes) Cases may enter the study at different times Process is thought to occur continuously in time Constant ratio of hazard rates for different groups Permit expanatory variables whose vals change over time Hazard rate constant over time Hazard rate shows inverted U shape over time Log of hazard rate is linearly related to log of time The log of the hazard rate is linearly related to time The disturbance term has a normal distribution The disturbance term has a logistic distribution	umptions -	
	continue		

This pattern will be compared to a similar pattern for each analysis in a pattern-matching strategy to determine which analysis is most appropriate for this problem. The prompts are hypertext. Again, if you are unsure what is meant by a prompt, you can click on it with the to view a more detailed prompt window. Go ahead and enter the following values in successive fields: 10,10,8,8,8,0,0,0,0,0,0,0,0.

When the computation is done you will see the new hypertext term "Summary Analysis Recommendation." Click on the term with the mouse. You will now see an informational screen summarizing the significance of you answers to the objectives and assumption questions. When you are through reading, press the continue button. This will take you to the Summary Screen shown below.

SUMMARY SCREEN

This screen summarizes Statistical Navigator's recommendations based on pattern matching of your responses in the objectives and assumption screens. Statistical Navigator automatically shows you the four analyses that most closely matches your research problem. Each analysis is a hypertext term you can select for a description. The objectives and assumption scores on the top right indicate the closeness of the match of your responses to the analysis to the left.



You can scroll down the screen to see the textual recommendations. A Good solution would have a match of

0.90 or better for both the objectives and assumptions. An Acceptable fit would be when the match is between 0.70 and 0.90 for both the objectives and assumptions. If the scores are not good or acceptable, Statistical Navigator will indicate that it cannot recommend any technique.

This section ends with a series of optional warnings. These warnings only appear when they are appropriate. A common warning occurs when one or more techniques which meet the analysis objectives relatively well does a poor job of meeting the assumptions. In such cases, Statistical Navigator points this out and reminds the user that they need to be particularly careful in considering the assumptions because they will be critical for deciding among the techniques.

OPTIONS

At this point you have completed a consultation. You have several options. You can generate a report that includes this summary screen, and details for each analysis including how each response you made to the objectives and assumptions questions match each analysis. You can return to the "Main Menu" to consider a new consultation or review this last one again. From the Main Menu you can go to the "Browse Mode" to view hypertext descriptions of statistical terms without performing a consultation. This is also a good point to save your consultation to review at a later time (select the "Save Consultation" button).

NOTE: The "Summary Screen" can be sent to your printer. Select the "Window" menu option at the top of the screen, and then select the "Print Current" menu options. Be sure your printer is on and connected.

GENERATING A REPORT

Let's go through the steps to generate a report. Select the "Generate Report" button in the Options box. This will take you to the Report Setup screen shown below.

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Project Reports Window Debug Help		
Exit 🔂 Home 🚟 Glossary	MT	< Back
A REPORT SETUP		_ 🗆 ×
This screen is to help you design a final report of your Statistical Navigator consultation.		
1 Your Name		
Report Title:		
2. Do you want to include detailed results for a specific technique in addition to the four best ones.		
3.		
Generate Report Main Menu (No Report)		

Enter your name and the title you want to appear on the report. You can generate the report now if you wish by selecting the generate report button or return to the Main Menu without creating a report. Statistical Navigator automatically includes the four analyses with the best fit that appeared in the "Summary Screen." You can include other analyses that had lower scores in the report. Select the "Yes" button in step 2 to select additional techniques for the report.

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<u>Project Reports Window Debug H</u> elp			
Exit 🔂 Home 🔚 Glossary		MT	< Back
ADDITIONAL TECHNIQUES			_ 🗆 🗙
REPORT MAIN		a the report	
and select the report button v	vhen you are d	lone.	
TECHNIQUES	RANKI	IGS:	
The 4 best Techniques are:	Objectives	Assumptions	
 ✓ Survival Analysis Comparing 2 GroupsGene ✓ Survival Analysis (Life Tables) Single Pop ✓ Survival Analysis Comparing 2 Groups-Logr ✓ Exponential Distribution Regression Model ✓ Log-Normal Regression Model ✓ Log-Logistic Regression Model ✓ Gompertz Distribution Regression Model ✓ Weibull Distribution Regression Model ✓ Proportional Hazards Regression Model 	0.78 0.73 0.78 0.45 0.45 0.45 0.36 0.36 0.36	0.90 0.88 0.73 0.84 0.80 0.80 0.74 0.72 0.63	

ADDING TECHNIQUES TO THE REPORT

This screen shows all the techniques for this particular type of analysis (in this case-Survival Analysis). Other categories of analysis would have different lists of specific analyses.

Notice that they are ordered in descending order of their pattern matching scores with the top four techniques

already checked. Check any additional techniques you wish to add to the report.

WARNING. Adding all the techniques may produce a report file that is too large to be viewed in the Statistical Navigator program.

Go ahead and click the mouse on one of the unchecked checkboxes and then click on the report button in the top right corner. Statistical Navigator will begin generating a report (note the status box at the top right of the screen indicates "Reporting"). When the report is completed two windows will appear. The message window indicates that your report was written to a rich text format (rtf) file for import into an RTF capable word processor such as MS-Word, Wordperfect, etc. This file allows you to insert the Statistical Navigator consultation report into your research documents. The other window allows you to view a shortened version of the report as a text file in a scrollable window.

REPORT WINDOW

Maximize the report window by clicking on the up arrow button in the top right of the window. Now scroll down through the report. A text image of the summary screen appears first showing Statistical Navigator's recommendations. Next appears a detailed description of each of the top four techniques and any additional techniques that you specified. It is worth taking a closer look at the details provided in the report for each technique.

DETAILED REPORT OF TECHNIQUES

Appearing in bold below is one of the techniques as it appears in the report. The report begins with the title of the technique and a detailed description, and a discussion of possible significance tests where appropriate. Next comes a listing of the references to the statistical literature where the user can find out more about the technique, and wherever possible, a listing of commonly available statistical packages which perform that type of analysis.

SURVIVAL ANALYSIS (LIFE TABLES) SINGLE POPULATION

SURVIVAL ANALYSIS (LIFE TABLES) SINGLE POPULATION

Description:

Survival analysis (including actuarial analysis and life tables) is useful for assessing the long-term effects of a treatment or condition by examining survival of cases over time. For example, it is often used in medical studies to examine the length of time people live after major surgery.

Survival analysis is particularly useful when the data are censored--that is, when some cases are still in the study at the time of analysis. This occurs, for example, when we want to estimate the effects of a form of major surgery on mortality while some of the patients are still alive. Survival analysis is also effective even when patients enter the study at different times (i.e., they are operated on at different times). When both of these conditions hold--some cases are still alive and cases enter the study at different times--the data are said to be progressively censored.

Survival analysis usually includes some graphical form for displaying the survival distribution such as life tables (e.g., see Namboodiri and Suchindran, 1987) or survival curves. Survival curves plot the percent of cases still surviving at each point over time.

References:

Gross and Clark, 1975; Kalbfleisch and Prentice, 1980; Lee, 1980; Namboodiri and Suchindran, 1987; Dixon et al, 1983:555-575; Dawson-Saunders and Trapp, 1990;

Statistical Packages:

BMDP-P1L, CSS,

Finally, for each technique, there is a detailed breakdown of the factors which should be considered for both analysis goals and assumptions. The preferences and assumptions score indicates how closely your responses in the objectives and assumptions screens come to an ideal pattern for this particular technique. Below, for first the objectives and then the assumptions, for each of those factors we identify the ideal score for that technique and the reported score provided by the user. Using this information, the user can identify those goals or assumptions of the technique which are consistent with the user's goals and assumptions and those which are not.

 Preferences: 0.73

 Assumptions: 0.88

 OBJECTIVES and ASSUMPTIONS

 ANALYSIS OBJECTIVES
 Optimal Reported

 describe and estimate survival distribution
 10
 8

 compare survival rates for two or more groups
 0
 9

 quantify effects of several variables on hazard rates
 0
 0

 compare rates of groups controlling for other vars
 0
 0

ANALYSIS ASSUMPTIONS Optimal dichotomous dependent variable (e.g., life or death)	Repo 10	rted 10
irrevocable transition from one state to another	10	10
censored observations (study ends before all outcomes)	10	8
cases may enter the study at different times	10	8
process is thought to occur continuously in time	10	8

These scores can be helpful if you decide to reconsider this consultation. Note especially those concepts in which your response differs greatly from the ideal and you perhaps did not feel sure of your response. You might want to explore the hypertext details for these concepts to gain a greater understanding of how this concept relates to your research.

PRINTING THE REPORT

You can print this text report by selecting the "File" menu item at the top of the screen and then select the "Print" menu item. A print dialog box will appear allowing printer options. Select the OK button when you are ready to print. Keep in mind that the full report was written to the "FTPF.RTF" file in the directory in which Statistical Navigator is running. To print that file you will need to open it in your RTF capable word processor. See Chapter 2 on printing.

SAVING A REPORT

Each time you create a report, it is written over the last report. To save a report you must rename the report file. Select the "Report" menu item and then the "Save Report" menu item. Then in the Save file dialog box that will appear, enter a name for your report that you will later recognize. Note that the "rtf" file extension must not be changed (see Chapter 2 on reports).

FINISHING A CONSULTATION

When you are done viewing the report, you can exit it by pressing the [esc] key. Repeat pressing the [esc] key until you return to the "Report SetUp" screen or the "Summary Screen." In either of these windows there is a button to return to the main menu. Note also, you can exit, save the desktop, or go to a particular screen but using the menu and buttons at the top of the screen (see Chapter 2 on getting around).

SAVING THE CONSULTATION FILE (SAVE PROJECT)

After going through a complex consultation and viewing the recommendations of the Statistical Navigator program you may want to save the information you provided so that you can come back to this problem in the future; perhaps performing a sensitivity analysis, considering how changes in one or more of your answers influences the programs' recommendations. This consultation file containing information you provided should not be confused with the report or recommendation file containing the recommendations of the program.

When you exit the program, you will be asked if you want to save your work. If you say "NO", all the values you have entered will be lost. Your report file remains on your hard disk and is not effected. If you are working with an ongoing project, you might want to save all the values you have entered for later reconsideration. To save your work simply select the "YES" button. Statistical Navigator will save your work and exit. See chapter 2 on Working with Projects.

6. DESIGNER RESEARCH™

INTRODUCTION

WHY DESIGNER RESEARCH IS NEEDED

Designing a study to accomplish the research objectives is a crucial aspect of any research project. An inappropriate design can open the study to criticism leaving several plausible alternative explanations for the findings. An inefficient study can waste resources of time, people, and money, producing no greater information than provided by a more efficient and tightly designed study. Poor choice of a design can doom an otherwise excellent study to disrepute. An inappropriate design can inadvertently fail to rule out competing explanations, produce mistaken conclusions, jeopardize the publication of papers, deny the funding of proposals, or even call into question the competence of a researcher or an organization. Such dire consequences, one would hope, are rare. Nevertheless the ineffective design of research can degrade the quality of research in important ways long before it becomes a career-threatening problem.

There are literally hundreds of competing explanations that need to be ruled out in research designs and design strategies to address those. However, most researchers receive training in only a few of these techniques. The literature on experimental design in different disciplines tends to focus on some of the problems most relevant to that discipline, but neglects other issues which may be crucial for a particular problem. It is difficult for researchers in any particular discipline to gain an overview of the issues much less keep up with new changes and improvements in them over time. When particular strategies are not employed on a routine basis, one can quickly forget even the basics of the approach, much less its subtleties. As a result, it is both easy and common for competent researchers to be unfamiliar with or to overlook important options when considering how to design research.

The design process is complicated by the fact that a design strategy intended to address one threat to validity may cause another threat to become worse. In addition, some design strategies are mutually exclusive and only one can be used in any given study. Thus, researchers must balance their designs, seeking to minimize all threats, but avoiding contradictory design strategies and sometimes being forced to decide which of the threats constitute a greater danger to their study, minimizing those with designs that may permit other lesser threats to affect the results.

HOW DOES DESIGNER RESEARCH WORK?

To understand how Designer Research works it is first necessary to understand a bit about the literature on experimental design. Different disciplines take very different views of experimental design. The social sciences emphasize threats to validity and basic methodological issues surrounding the design of research, but ignore almost completely issues of efficient designs or even very complex designs. This emphasis is understandable given the reliance of many social sciences on field research and surveys. The social sciences also usually are studying individuals or groups of people so there are both ethical and pragmatic limitations on the complexity of designs.

Psychology and more behaviorist disciplines including some of the health professions with a strong tradition of laboratory research tend to place greater emphasis on internal validity issues and less emphasis on external validity and issues of generalizability. However, even those disciplines still tend to emphasize relatively simple research designs.

The physical sciences and industry and associated disciplines such as operations research and industrial engineering tend to place far greater emphasis on developing complex designs with maximal efficiency. These disciplines rarely study humans and hence are more free to develop relatively complex designs which might become hopelessly confused if tried on human subjects.

Unfortunately, these diverse literatures overlap little or none. Most of the more complex designs currently popular in industry are rarely or never mentioned in the behavioral or social sciences. Many of the important methodological issues addressed by the social and behavioral sciences (including concerns with the validity of measures, external validity, and of course issues of reactivity and human bias produced by subjects or experimenters) are often not addressed in industry--occasionally with disastrous consequences.

MULTIPLE APPROPRIATE DESIGN STRATEGIES

Designer Research considers a combination of specific designs and design strategies. When considering efficient designs for complex experiments, for example, the emphasis is on complete designs such as the Plackett-Burman or Central Composite designs. However, for most other topics, the focus is more on design strategies than complete designs. Design strategies may be combined with one another to create complete designs. Of course, some strategies are inconsistent with one another and the researcher should use one or the other but not both simultaneously. In that case, Designer Research points out other design strategies inconsistent with a particular recommended strategy and, wherever possible, takes those inconsistencies into account in deciding what to recommend.

WHO SHOULD USE DESIGNER RESEARCH?

Designer Research is designed to help users construct efficient and valid designs for a wide range of research projects. For researchers having modest design background, Designer Research helps them make competent selections of design strategies for their research projects. For researchers with stronger design backgrounds, Designer Research can still be helpful, providing a reassuring check of their logic, insuring that important design options are not overlooked, reminding the researcher of the strengths and weaknesses of alternative designs as well as their compatibility with one another, and providing a useful summary report to document their decisions.

Designer Research can be useful for studies whether the approach is qualitative or quantitative. For some studies it may not be possible to specify in advance many of the threats to validity that are relevant or design strategies that will be employed. However, even then, Designer Research can help the researcher anticipate problems that might be encountered and identify design strategies that might be employed to rule out alternative explanations.

TEACHING APPLICATIONS

Designer Research should be a useful aid in experimental design courses. It can serve as a supplement to the lectures, permitting students to try their hand at designing efficient and valid designs, then using the Designer Research program to check their judgment. The program could free up much of the time now required of the instructor and teaching assistants, permitting them to focus on other aspects of research design such as the actual computation of results and their interpretation. Students could use the program several times for initial problems to help them understand the logic of research design. The program may be particularly helpful for use outside the classroom for individualized self-study.

TUTORIAL

Perhaps the best way to become comfortable using Designer Research for your own research problems is to participate in a step-by-step tutorial session. In approximately 30 minutes this lesson can demonstrate to you what it's like to use Designer Research to develop a study. In addition, you can learn about several features of the program that may make it much easier for you to use.

BEGINNING A DESIGNER RESEARCH SESSION

Double-click the left mouse button on the "MTOOLS" icon on your desktop (see the "Getting Started" chapter on how to create a desktop icon). Alternatively, you can select the "Start" button, then the "Programs" menu item, then the "MTOOLS" menu item and then the "MTOOLS" option. The Methodologist's Toolchest version screen will appear. Click on the "Begin" to view the "Introduction" screen. Now click the left mouse button on the "Designer Research" hypertext. This will start the program running.

NOTE: You can also enter the Designer Research program from within the PRE program by first opening that program, then at the "Research Proposal Summary Status Report" screen, selecting "Design Overview," and then selecting the "Designer Research" button at the bottom of that screen.

The logo screen is the first window you interact with. This screen has four buttons, "BEGIN", "EXIT", "ABOUT DR", and "INSTRUCTIONS." "BEGIN" will take you to the main menu screen. "EXIT" exits the program. "ABOUT DR" takes you to a screen showing the authors and copyright notice. "INSTRUCTIONS" will take you to a tutorial similar to the one you are now reading. Select the "BEGIN" button.

The next screen you will see is the "Designer Research Overview" Screen as displayed below.

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A DESIGNER RESEARCH OVERVIEW	
	Help
DESIGNER RESEARCH OVER	VIEW
Research Strategy The first step is to determine whet component will be primarily quality	her to study or study tative or quantitative.
Threats to Validity The second step in the design of a which threats to validity must be a threats have been identified, the p to suggest appropriate design strategies.	study is to consider Iddressed. Once these program will be able tegies.
Specify Design After you identify important threats you are ready to select specific str consider these, the program will in strategies it suggests and will remi influence one another to assure yo	s to be considered ategies. As you ndicate which ind you how strategies ou are consistent.
Report Finally, you can select the level of you wish to include in your writter	f detail n report.

As this screen indicates, the first task is to select a broad research strategy. Select the "Research Strategy" button and you will see the following screen.

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Approaches			Tutorial
C <u>quantitative strategy</u> C <u>both qualitative</u> <u>and quantitative</u>			
SUMMARY:			
Suggestions for Wr This decision is a very import research project. While qualit issues such as sampling, mee very different ways. A key fea differences and not specifying	itten Text ant one that will influence virtually every aspe ative and quantitative research face many of surement, design, and analysis, they addres ure of a competent research project is recog design strategies that are incompatible with	ect of your the same b ss those iss gnizing those one anothe	oroad uesin e er. ▼
			Return

Qualitative and quantitative research approaches have many differences. When qualitative research is open-ended and exploratory, with new concepts evolving during the research, it is now possible to specify in advance all of the design strategies that will be employed or even all of the threats to validity that may be important for the study. In this case, the Designer Research program can only be used in a tentative fashion to explore potential concerns and strategies. When the research is less exploratory and it is possible to assess the various threats to validity and select design strategies, the Designer Research program is much more useful.

Here you should select one of the overall strategies-qualitative, quantitative, or some combination of the two. Then continue with the rest of the program as appropriate given your research approach. For this example, let's select a combination of qualitative and quantitative approaches. Once you have done that, press the "return" button at the bottom right of the screen to continue.

The next task is to consider which threats to validity are most important for this project. To do this, select the "Threats to Validity" button and you will then see the following screen.

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A THREATS TO VALIDITY		
THREATS TO VALIDIT	Y What is Validity?	
Threats to validity have been identified for each of the categories		
below. You must assess the extent to which each of these threats is important for your study before the program can can advise you		
·····		
Threats to Internal Validity		
Threats to External Validity		
Threats to Construct Validity		
Threats to Statistical Conclusion Validity		
Overview of Threats to Validity & Extent Addressed		

THREATS TO VALIDITY

From this screen you can select the hypertext phrase for the broad category of threats to validity you wish to consider or you can select the bottom button which provides a summary overview of all threats to validity in a single screen. Let's select the button, "Overview of Threats to Validity and Extent Addressed."

OVERVIEW OF THREATS TO VALIDITY AND EXTENT ADDRESSED

This screen lists all of the threats to validity considered by this program. The threats are organized by broad area: internal validity, contamination, statistical conclusion validity, external validity, and construct validity. To examine any particular threat, simply select its hypertext phrase. After each threat has been considered, to the left of the threat in this summary screen there may appear one or both of two indicators (see the legend at the bottom left of the screen). A red symbol is a "warning light" indicating this threat is a plausible threat for your particular project. A blue symbol is an "all clear" light indicating that, even though that threat may be of concern for your project, you have handled it adequately based on the design strategies you have selected. The objective is to end up with the overview screen having no red warning lights that are not accompanied by blue "all clear" lights. If any single threat has a red light but no blue light, then the broad category of threats to which it belongs is also given a red light with no blue light to indicate there are one or more problems in that category of threats.

Note that, as you consider each individual threat, the information you provide relevant to the severity of that threat and your design strategies for addressing the threat often have implications for other threats as well. Each time you return to this summary screen all of those implications for all threats are reassessed and the summary screen is updated accordingly. Initially, this screen has neither red lights nor blue lights displayed for any threat because they have not yet been considered.

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OVERVIEW OF THREATS TO VALIDITY & EXTENT ADDRESSED		
History Diffusion of Irt Maturation Compens.Equal. Testing Compens.Equal. Instrumentation Resent.Demoral. Selection Biases STATIST'L.CONCL. Causal Ambiguity Power Regression power Select.Hist.Intn violated assump Select.Matur.Intn reliab.meas Select.Instr.Intn reliab.meas LEGEND addressed successfully	Interview Construct valuation IntSetting Intn IntSetting Intn IntHistory Intn Intaken explication construct/level? Intaken explication inadeq.explication Intaken explication mono-operation bias Intaken explication mono-method bias Intaken explication inadeq.explication Intaken explication mono-method bias Intaken explication reat-test intn Intaken experimenter hypothesis-guess evaluation appreh experimenter expec Intaken experimenter	

From this overview screen we can select any threat to validity for detailed consideration. For example, let's select the "history" threat by clicking on that hypertext phrase in the top left of the screen. This takes us to a detailed screen for this threat.

HISTORY

The screens for assessing threats to validity have the same general format. In a box at the top of the frame, the threat is defined and described. Below that are several pages with tabs at the top of each. Each of those pages provides additional information related to that threat to validity. In the screen
below we see the "examples" page where one or more examples of this threat are displayed.



Next, select the "Is this a plausible threat" tab to see a brief description of factors that make this threat more likely. On this page, these factors are displayed and you can indicate which of these are true for your project. If you don't understand any of the factors, you can select the hypertext phrase describing it for a detailed description.

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History			
"History	is a possible competing explanation for findings in which changes b	etween two po	ints in
time ma	y be due to events occurring between the two times other than the e	(perimental tre	atment.
Examples	Is This a Plausible Threat Strategies for Reducing This Thre	at Strategie	s Selected
group of time for l studies.	ife-long residents). History is often a plausible explanation for differer ongitudinal studies. History could be a problem for both cohorts and p	nces over panel	<u>-</u>
	and continued study		
	groups to be compared may plausibly have incomparable histories		
🔽 🔽	igitudinal		
1	time span of study sufficient for events to occur that might affect the results		
	udy takes place in a field setting		
E.t.	a ta uchich bistom is a threat (from 0 to 10) 10		
	ic to which history is a threat (from 0 to 10): 10 verride and provide own estimate of threat		

Use your mouse to check off the check boxes indicating certain factors are true for this study, as shown above. As you do this, you will see the program recalculate a number between 0 and ten indicating the extent to which history is a threat for this study. This score is automatically computed by the program. If you are knowledgeable about this threat and disagree with the program's estimate of the likely threat to this study, you can check the check box below to override the program and provide your own estimate.

Next, select the "Strategies for reducing this threat" tab to view a description of design strategies that may be used to reduce this threat. After viewing those descriptions, select the "Strategies selected" tab. This permits you to view a list of design strategies and select those you wish to use to address this threat. Select the same design strategies selected in the screen below.

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History		
"History" is a possible competing explanation for findings in which changes bet	ween two po	ints in
time may be due to events occurring between the two times other than the exp	erimental tre	atment.
	1	
Examples Is This a Plausible Threat Strategies for Reducing This Threat	Strategie	s Selected
STRATECIES SEI ECTED-		
STICTEDES SELECTED.		
include a control group in a pretest-posttest design		
Isolate experimental groups from outside influences		
choose dependent variables for which history is implausible		
monitor during study to assess potential history effects		
Extent to which history is addressed (from 0 to 10): 8		
Override and provide own estimate		

Note: Normally, when you view the design strategies, some of them may already be selected from earlier screens because each design strategy can influence several different threats to validity. As you select strategies, the program computes an updated estimate of the extent to which you have successfully addressed this threat and displays it as the number between 0 and 10. As above, these strategies are also described by hypertext phrases, and if you don't understand any of them, you can simply select the phrase for a detailed explanation. If you believe the program's estimate is faulty, you can override it and replace it with your own.

Your screen should now indicate the extent to which history is a threat for this study is "10" and the extent to which that threat to validity has been addressed is an "8." Now press the [escape] key to close this screen and return to the overview screen.



Wow! What happened? We only considered a single threat, yet when we return to this screen we find indicators showing up for that threat and six others. In fact, the screen indicates that we have successfully addressed those six other threats based on strategies we used to address history. This illustrates how interrelated are the various design strategies and threats. Design strategies we use to address one threat can have both positive and negative ramifications for other threats, reducing some others, making others more of a problem.

Now, let's look more closely at the summary screen and see what it tells about the "history" threat to validity. History now displays a red light indicating it is a plausible threat for this study. But it does not display a blue light indicating we have adequately addressed that threat. This is precisely the kind of problem this screen is designed to help us find. Any time a threat has a red light and no blue light, this is an indication of a serious threat to validity that has not been adequately addressed. To help understand why this happened, let's look at the summary screen for threats to internal validity alone. To do this, select the hypertext phrase "Internal Validity" on this screen. You should then see the following screen.



This screen provides more detail than the overall summary screen because here the red and blue bars display the magnitude of the effects as estimated by the program. The reason there is no blue light on the summary screen for "history" is because the level of threat (10) exceeds our level of addressing the threat (8). In short, this is a highly plausible threat for our study and our design strategies are not yet strong enough to adequately address it. To fix this, close the "Threats to Internal Validity" screen (by pressing the [escape] key and return to the overview screen). Then select the "history" hypertext, return to the history detail screen and check an additional design strategy, "monitor during study to assess potential history effects." This changes the program's estimate of the extent to which this threat is adequately addressed to a "10." Close the "History" screen by pressing the [escape] key and, when you return to the overview screen, "history" should now have both a red and blue light next to it, indicating that this threat has been adequately addressed.

CONTINUE CONSIDERING EACH THREAT TO VALIDITY

This same process should be continued until each individual threat to validity has been examined and design strategies selected to address it. As this process continues, watch for the presence of red lights without accompanying blue lights on the summary overview screen. You may find you need to reconsider some of the threats as you work through them, when your strategies to address later threats lead to problems with earlier ones. As you do this you should find the summary overview screen helpful to provide a quick visual overview of the current status of your design with respect to its treatment of various threats to validity. As you can see in the screen below, even when many threats have been considered, you can quickly scan this screen to determine whether there are any problems with the design.



When you have considered all threats to validity, and when you believe you have addressed those threats as best you can, you are then ready for the second phase of the design: design specification. Close this overview screen by pressing the [escape] key, then press the [escape] key again until the program returns you to the "Designer Research Overview" screen below.

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		Help
DESI	GNER RESEARCH OVERVIEW	
Research Strategy	The first step is to determine whether to study component will be primarily qualitative or qu	r or study antitative.
Threats to Validity	The second step in the design of a study is to which threats to validity must be addressed, threats have been identified, the program wil to suggest appropriate design strategies.	consider Once these I be able
Specify Design	After you identify important threats to be cons you are ready to select specific strategies. As consider these, the program will indicate whi strategies it suggests and will remind you how influence one another to assure you are consi	idered : you ch v strategies istent.
Report	Finally, you can select the level of detail you wish to include in your written report.	

From this screen, select the button, "Specify Design."

SPECIFY DESIGN

This section begins with a brief introductory screen explaining the issues to be faced in specifying a design.

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DESIGNER RESEARCH OVERVIEW		- I ×						
A SPECIFY DESIGN								
There are several components to the design of an experiment. Ea study should address all of these. In addition, the design strategies must be consistent with one another and should address the threat validity identified by the researcher as significant for the study. The next screen provides an overview of the design, identifying ea major objective and summarizing the strategies selected to address objective. You should select each strategy in turn.	ch s s to ich s that							
As you complete the specification for each objective, its status will be updated on this screen. When you have specified strategies for all objectives you will be ready to print your summary conort	As you complete the specification for each objective, its status will be updated on this screen. When you have specified strategies for							
Design Overview								
you wish to include in your written report.								

Press the "Design Overview" button to continue. The next screen provides an overview of the major design objectives and their current status as shown in the screen Note that the objectives are organized by their below. relationship qualitative and quantitative to research On the one hand, for qualitative studies the approaches. researcher needs to identify a method for selecting comparisons, a strategy that is usually not required for quantitative studies. On the other hand, quantitative studies should address issues of statistical conclusion validity and efficient designs--both issues that are less relevant for purely qualitative studies. . Both qualitative and quantitative studies should generally consider the remaining issues.

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A DESIGN OVERVIEW		
DESIGN O	/ERVIEW	Help
Select each design objective to specify strategies for meeting it.	View a brief summary of each design objecti	y of the current status ive below
DESIGN OBJECTIVE PRIMARILY QUALITATIVE Method for selecting comparisons QUALITATIVE OR QUANTITATIVE Appropriate comparison groups Assign to make groups comparable Assure measurement validity Appropriate setting (field/lab) Minimize expectation biases Maximize external validity PRIMARILY QUANTITATIVE Statistical conclusion validity Efficient designs	STATUS OF OBJ	ECTIVE
SUMMARY: **WARNING: NOT SP	ECIFIED**	
A check here indicates this design obj	ective has been specified	

Each design objective can be examined by selecting the hypertext phrase associated with it.

METHOD FOR SELECTING COMPARISONS

Let's begin by selecting the phrase "Method for selecting comparisons." This displays a screen offering three options: the constant comparative method, analytic induction, and some "other" method for selecting comparisons. To see a definition of these methods and suggestions for how to specify them, select the phrase. For example, selecting the phrase, "constant-comparative method" displays the following screen.



In this example, since we are using a blend of qualitative and quantitative approaches, let's select the constant comparative method as the strategy we will use for revising our comparisons based on insights that come during the qualitative analysis. Indicate this by clicking on the check box in the upper left of this screen. Then close the window by pressing the [escape] key, and continue pressing the [escape] key until you are back to the design overview screen.

APPROPRIATE COMPARISON GROUPS

From the Design Overview screen, select the phrase "Appropriate comparisons groups." This section begins with a brief diagram to illustrate the possible comparison groups that are often used in designs as displayed in the screen below.



When you finish examining this diagram, press the "Continue" button. This takes you to the following screen where strategies for providing appropriate comparisons are listed. To the right of each strategy is a "desirability" score. This is a score from 0 (least) to 1.0 (most) indicating the preference among these techniques by the program. The desirability score is based on the information you provided regarding various threats to validity. Generally, the desirability of each design strategy is computed as a weighted average of the threats to validity it addresses and the severity of those threats. The more threats a single strategy addresses, and the more severe those threats, the more "desirable" is the use of that design strategy. NOTE: These desirability scores may be different from those

displayed on your screen depending on which other threats to validity and design strategies you selected in earlier sections.



Each of the design strategies in the screen is hypertext. To view a more detailed description of any of those strategies just select the hypertext phrase. For example, if you select the phrase, "compare to a known population," you will see the following explanatory screen.

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COMPARE TO A KNOWN POPULATION/EXISTING LITERATURE		_ 🗆 ×
COMPARE TO A KNOWN POPULATION		
If data are available, results for the experimental group can be		
compared to the results for a known population.		
For example, support for a political candidate in one community		
can be compared to national polls and support for the candidate		
This stratev is limited to information available for a known		
population and it is constrained by time. If the time between the		
study producing the population estimates and the current study is		
of nonulation parameters for the nonulation are based on probabilis	tic	
sampling procedures and cases are selected and assigned to the	a c	
current experimental condition using probabilistic procedures, then		
the population data can be compared to data for the experimental (jroup.	
J		

When you are done viewing this explanatory screen, press the [escape] key to close it and return to the "Strategies to Provide Appropriate Comparison Groups" screen.

From that screen, select the "Related Monitoring and Control Strategies" button at the bottom right of the screen. This produces the following screen.

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MONITORING & CONTROL F	OR APPROPRIATE COMPARISONS		
		Help	
MONITORING AND CON standardize impleme measure heterogene substitute perceived of choose dependent va make costs/rewards s	TROL STRATEGIES TO ASSURE APPROPRIATI ntation of treatment ity of treatment implementations and analyze effects for treatment groups in analysis riables for which history is implausible imilar for each condition	Desirability E COMPARISO	NS 0.2 0.2 0.0 1.0 0.5
STRATEGIES FOR (select groups with sir <u>select groups unlikely</u>	CROSS-SECTIONAL STUDIES nilar histories of mortality y to differ in maturation	Desirability	0.5 0.0
SUMMARY: monitoring s	trategies specified		
Editor	Monitoring & Control Strategies for Longitu	dinal Studies	

This screen includes monitoring strategies for cross-sectional studies. If your study was a longitudinal study, you should go on to examine "Monitoring & Control Strategies for Longitudinal Studies." However, we won't do this here in the interests of saving time.

When you finish with this screen, press the [escape] key as many times as required to return to the "Design Overview" screen. On that screen, select the next research objective, "Assign to make groups comparable."

ASSIGNMENT STRATEGIES

This section begins with an explanatory screen shown below. After you have read this screen, press the "Continue" button to go on.



The next screen you see will be the one titled, "Criteria for Assignment Strategies." This screen asks for additional information that is required to help select among the assignment strategies. You must enter values in this screen before going on. Screens like this requesting additional information appear before several of the design strategies screens.

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CRITERIA FOR ASSIGNMENT STRATEGIES			_ 🗆 🗙
CRITERIA FOR ASSIGNMENT	STRATEGIES		
In addition to the <u>threats to validity</u> , the following cri	teria		
must be considered in the selection of comparison a strategies.	nd timing		
2 number of independent variables	anticipated san	nple size	
2 number of control variables	C less t	han 30	
Must control for unknown variables	e over "	en 30 & 100 100	
· ·			
Continue			

Enter values as shown in this screen, then press the "Continue" button. The next screen you see will be the one below identifying various assignment strategies.

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Assignment specification		_ _ ×
ASSIGNMENT STRATEGIES	H	elp 0.6 0.3 0.1 0.0 1.0
SUMMARY: **WARNING: NOT SPECIFIED** **WARNING: NO MONITORING SPECIFIED** Editor Return		

Once again, we see on the right of the screen are the desirability scores for each assignment strategy. You can use these recommendations by the program to help make your decisions. However, you do not have to do so. You are still free to override the program and make your own selection of design strategies at any time.

When you have finished selecting the assignment strategy and any monitoring or control strategies you like, press the 'Return' key to take you back to the "Design Overview" screen.

Continue this process, selecting each of the research objectives from this overview screen and considering them until you have finished specifying your design. If, for some reason, any of these objectives are not relevant to your project, you do not have to consider them.

As you complete your consideration of various design objectives, summary information regarding each is returned to the Design Overview screen in a manner similar to that shown below.



REMINDER: You may wish to document your decisions and strategies in the edited file as you make them. To do this, use the "Editor" button on each design strategies screen. That file can be printed or incorporated into a research proposal when you complete the program.

DESIGN SUMMARY

When you finish specifying your design strategies, press the "Continue" button. You will then see the following summary screen..



GENERATING AND SAVING A REPORT

If your computer is attached to a printer and it is turned on, you can now print the text file you may have created summarizing your design decisions. To to this, select the "Print Design Comments" button on this screen.

You can also generate a report from this consultation. Pressing the "Comprehensive Report" button will generate a comprehensive report including all screens in the program considering both threats to validity and design strategies. Pressing the "Summary Design Report" button generates a summary report including all screens specifying design strategies but not including the screens detailing threats to validity. after selecting either of these two report buttons, the program will generate the report and a message window will appear indicating that your report was written to the file "FTPF.RTF." You need a rich text format (rtf) capable word processor such as MS Word, Wordperfect, Word Pro, or Describe.

Each time you generate a report it is written to the same file, "FTPF.RTF." In order to save your report you need to rename the file. Select the "Report" menu item at the top of the screen and then the "Save" menu item from the drop-down menu that appears. A save file dialog box will appear allowing you to rename the report file (see chapter 1 on saving reports). Note, that the ".rtf" file extension needs to remain the same for the "rtf" word processors to recognize the file.

SAVING THE CONSULTATION AND EXITING

You have now completed the Designer Research program. When you exit the program, you will be asked if you want to save your work. If you say "NO", all the values you have entered will be lost. Your report file remains on your hard disk and is not effected. If you are working with an ongoing project, you might want to save all the values you have entered for later reconsideration. To save your work simply select the "YES" button. Designer Research will save your work and exit. See chapter 2 on Working with Projects.

NOTE: If you entered Designer Research from the PRE Program you also have the option of returning to the PRE Program at any time during the consultation or when you complete the consultation by selecting the "PRE" button in one of the menu bars at the top of the screen. Key information from Designer Research will be returned to the PRE Program automatically.

7. MEASUREMENT & SCALING STRATEGISTTM

INTRODUCTION

WHY MEASUREMENT & SCALING STRATEGIST IS NEEDED

Operationalizing concepts, constructing questions, and designing questionnaires are important tasks in many different scientific disciplines. In the social and behavioral sciences these tasks are particularly important because of the difficulty of constructing questions which can elicit valid and reliable information from human subjects.

There are many different issues which must be considered in constructing questionnaires. It is difficult for novice researchers to keep all of these issues in mind as they construct measures. Even practiced researchers may occasionally overlook important issues. There is thus a need for a computer program which can make this task more manageable and help assure the quality of the result.

In addition to being difficult, constructing questionnaires can be a boring, tedious, and onerous task for even dedicated researchers. There is considerable work involved in looking up likely existing scales, carefully drafting items, reordering items for the final questionnaire, and the many other tasks of designing good measurement instruments. A computer program which can make this task more interesting, easier, and more efficient would surely be welcome.

Measurement & Scaling Strategist asks the user a series of questions, much as a human expert might, and based on the user's answers, it recommends how concepts should be measured. It explains the reasoning behind its recommendations. The researcher still makes the final decision, but now he or she can be confident it is an informed one.

WHAT IS MEASUREMENT AND SCALING STRATEGIST?

Measurement & Scaling Strategist is an expert system program using artificial intelligence strategies to help the researcher select the appropriate form of measurement and scaling. The strategy used by Measurement and Scaling Strategist to determine the appropriate measurement and scaling approach is suitable for a wide variety of disciplines. These approaches are used in both basic and applied research in academic institutions, business, and industry.

WHO SHOULD USE MEASUREMENT & SCALING STRATEGIST?

Measurement and Scaling Strategist has the potential to bring about dramatic improvement in the construction of questionnaires. For students or researchers having a modest background in questionnaire design, Measurement and Scaling Strategist can serve as a useful guide, systematically approaching measurement issues and offering sound advice. For those already skilled in questionnaire design, Measurement and Scaling Strategist can make the questionnaire construction process more efficient by saving the time required to identify existing scales in the literature, by providing a reassuring check on the user's reasoning, by making the composition and ordering processes more efficient, and by documenting design decisions with a minimum of effort by the user.

Measurement and Scaling Strategist can be used in a wide range of disciplines and content areas to help design questionnaires. However, at this point its ability to identify sources for existing scales is strongest in the social and behavioral sciences and education. For this reason, it will be most useful for people in the social or behavioral sciences, education, or researchers in business, medicine, and other areas where the focus of research is people or social institutions.

Measurement and Scaling Strategist helps the researcher identify existing measures or develop measures for known concepts. For assistance identifying new concepts, see the measurement section within the Peer Review Emulator program.

TEACHING APPLICATIONS

Measurement and Scaling Strategist should be a useful aid in research design courses. It can serve as a supplement to the lectures, permitting students to try their hand at questionnaire design and construction then using Measurement and Scaling Strategist to check their judgment. The program could free up much of the time now required of the instructor and teaching assistants, permitting them to focus on other aspects of measurement and research design. Students could use the program several times for initial problems to help them understand the logic of questionnaire design. The program may be particularly helpful for use outside the classroom for individualized self- study.

WHAT DOES MEASUREMENT & SCALING STRATEGIST DO?

Measurement and Scaling Strategist helps the researcher in all stages of constructing a questionnaire. For each concept it recommends whether the concept should be measured with an open-ended or closed-ended question, whether it should be measured using a single item or multiple items, and the appropriate level of measurement. If a multiple item scale is recommended, Measurement and Scaling Strategist helps the researcher determine whether there is an existing scale available in then social and behavioral science literature suitable for measuring this concept. If such a scale appears to be available, it points the researcher to one or more references where they could likely find descriptions of such a scale. Currently, Measurement and Scaling Strategist includes references to approximately forty source books or compendia of social and behavioral science scales.

When closed-ended items are recommended, Measurement and Scaling Strategist also helps the researcher determine whether one or more standard scaling strategies such as Likert scales, the Semantic Differential, Thurstone, or Guttman Scales would be appropriate and assists the researcher in determining the appropriate number of possible responses. Measurement and Scaling Strategist includes a built-in editor which the researcher can use to compose the question.

While the question is still displayed on the screen, Measurement and Scaling Strategist takes the researcher through a checklist of common problems to make sure the question is not double-barreled, offensive, vague, or otherwise poorly composed. If the question exhibits any of these common problems, the user is taken automatically back to the editing window to revise the question to eliminate that problem.

This process can be repeated as many times as the user likes until all questions in the questionnaire have been composed. As each question is completed it is automatically entered into a questionnaire database along with key information obtained during its construction.

BROAD SCOPE

Scaling Strategist performs Measurement & а comprehensive examination of measurement issues during each consultation. Its goal is to assure that the researcher does not overlook an important point, fail to consider an available scale, or fail to recognize an important mistake. No program is perfect any more than any individual human expert is perfect. But already Measurement & Scaling Strategist incorporates a wider range of information than many researchers have available to them, and computer programs are well known to be better than most humans at performing exhaustive searches and retrieving information. We are continually refining and expanding the Measurement & Scaling Strategist, and we expect it will be even more comprehensive and detailed in the future. Updates will be made available to registered users for a nominal cost as they become available.

TUTORIAL

Perhaps the best way to become comfortable using Measurement & Scaling Strategist for your own research problems is to participate in a step-by-step tutorial session. In approximately 30 minutes this lesson can demonstrate to you what it's like to apply Measurement & Scaling Strategist to a portion of a typical survey research design problem. In addition, you can learn about several features of the program that may make it much easier for you to use, particularly if you have only recently been exposed to measurement and scaling issues. These features include asking the program to clarify questions or terms you don't understand, and using the change and rerun option to examine the impact of various assumptions after the program has made its recommendations.

RESEARCH EXAMPLE

Imagine you are constructing a questionnaire and you would like to determine the most appropriate method for measuring particular concepts in the questionnaire. Suppose, for example, that one of the most important concepts in your study is organizational complexity. Should it be an openended or closed-ended question? Should it be measured with a single question or a scale? Are there any existing scales to measure this concept? What is the appropriate level of measurement? Where should it appear in the questionnaire? In short, how should this concept be measured?

BEGINNING A MEASUREMENT & SCALING STRATEGIST SESSION

Double-click the left mouse button on the "MTOOLS" icon on your desktop (see the "Getting Started" chapter on how to create a desktop icon). Alternatively, you can select the "Start" button, then the "Programs" menu item, then the "MTOOLS" menu item and then the "MTOOLS" option. The Methodologist's Toolchest version screen will appear. Click on the "Begin" to view the "Introduction" screen. Now click the left mouse button on the "Measurement and Scaling Strategist" hypertext. This will start the program running.

SELECTING A PROJECT

A dialogue box titled "Projects" will now be displayed. Measurement & Scaling Strategist (MSS) is one of the programs in the Methodologist's Toolchest that requires a project directory. Part and sometimes all of the program must be saved in disk files for later retrieval. These files will be saved in a directory specified by you. If you select a project directory in which you have already saved part or all of a previous consultation with MSS, the program will automatically retrieve your older information and begin where you left off.



At the top center of the "Projects" window is the "current path" text showing the complete path to the current directory. This will look something like "c:\mtools" and is the location where the MSS program is now running. In the center column of the window are two boxes that also point to the "c:\mtools" directory. The smaller box (drive list box) at the bottom indicates the current hard disk drive ("c" in this example, but it may be a different letter on you machine). The larger box (directory list box) indicates the path from the root directory on this disk drive ("mtools99" in the example, but may be different is you installed the program to a different location). In the left column is the project box at the top, the project list box in the middle, and the project extension name list box at the bottom. The project list box contains a list of all the project directories found in the current path. The first time you run MSS, this list will probably be empty. If any projects appeared in this list, you could click the mouse on any line and the text on that line

would be moved up into the project box.

For this tutorial we will create a project in the current directory. Chapter 2 explains the issues and methods of working with projects in much greater detail. Click the mouse on the project box in the top left small input box. Now type "mss1" and then click on the "Ok" button on the right. MSS will then create a new project directory to save your work in this tutorial.

The next screen you see is the logo screen for Measurement & Scaling Strategist. This screen has four buttons, "BEGIN", "EXIT", "ABOUT MSS", and "INSTRUCTIONS." "BEGIN" will take you to the main menu screen. "EXIT" exits the program. "ABOUT MSS" takes you to a screen showing the authors and copyright notice. "INSTRUCTIONS" will take you to a tutorial similar to the one you are now reading. Select the "BEGIN" button.

MAIN MENU

The smaller windows will now disappear and the Main Menu will come to the front as shown below. Here you have the option to consider "Concepts", "Items", or exit the program. Lets begin with concepts (click on the "Concepts" button now).

Measurement and Scaling	Strategist v. 3.0		
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MSS MENU		-	
			Help
Mea	surement & Scaling Strateg	ist™	
Concepts	Select this option to identify existing scales a concept or to decide how to develop your of that concept.	for own meas	ures
Items	Select this option to go right to developing specific items or questions to measure a co	ncept.	
Exit	Select this option to quit the program.		

IDENTIFY THE CONCEPT

You are now ready to describe the (first) concept to be measured. The next screens deal with this concept. You will later be given an opportunity to repeat this process with other concepts until you have considered all the concepts you want to consider in your questionnaire.

We begin with the name of the concept. Click on the input line, or [tab] to the input line. When an input line is active the color changes from blue to while and the text from white to black. Now type ORGANIZATIONAL COMPLEXITY and press [enter] when you are through.

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A CONCEPTS					
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SEL	FCT ONE OF	THE FOLLOWING (OURSES OF ACTIO	าท	
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	simply nee	a to ruentity and jus	ary it		
Help Find Scale	You are not scale avails	sure whether there able and would like	e is an acceptable heln identifying o	10	
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No Scales	You are con for this con	winced there are n	o acceptable scale: velop vour own sca	3 10	
	or measure	ceptiso you will det	relop your own sea		

HELP FIND SCALE

You are now ready to begin the next phase of the consultation--determining whether one or more scales exist for measuring this concept which might be suitable for your purposes. To do this, let's select the button, "Help Find Scale." (If we already knew of an existing scale, we could have selected the button, "A Good Scale.") This takes us to the following screen.

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🏓 IDENTI	FY EXISTING	SCALES					
ID scal abo	ENTIFY EXIS Each of the es in an are ut it.	TING SCALES following are good a. Select each for CHECK OF research in the arr vith established res related areas for s available databas reference books o	d strategi r more de F EACH <u>tea</u> <u>searcher</u> <u>scales th</u> <u>ses in the</u> <u>of existin</u>	es for identifyin etailed advice o STRATEGY YOL s in the area at might be ada area for appro g scales in the a	g existing n how to go I HAVE USEI priate scales area) <u>s</u>	
	When yo	ı complete your se	earch, ind	licate your findi	ng below.		
0,	Acceptable S	Scale Identified		O No Accept	able Scales	Are Availa	ble

You can examine each of these strategies by selecting the hypertext phrase, then, when you are convinced you have adequately addressed them, you should select the checkbox to check them off. For example, selecting the phrase "Examine research in the area" displays the following screen.

🏹 Mea	urement and Sc	aling Strategist v	/. 3.0		_ 🗆 ×	
Project	<u>R</u> eports <u>W</u> indow	Debug <u>H</u> elp	1	ыт	[. n . [
Ex	t 🛛 🖬 Ho <u>m</u> e	E Glossary		MI	< васк	
A EXAMINE RESEARCH IN THE AREA						
EXAMINE RESEARCH IN THE AREA In the literature review for the study, one issue that should be consi- dered is the measures other researchers have used for concepts to be included in the study. Many of the measures used in past research are at least good candidates for the proposal. If the proposal uses different measures than those commonly used in the field, then that choice needs to be justified.						
	Briefly Describ	e:	ſ			
	SUGGESTIONS FOR WRITTEN TEXT Show how the measures employed have been used in similar past research and where different measures are used, justify the decision by pointing out the limitations of previous measures and how the proposed measures will improve upon them.					

This screen gives you suggestions for how to approach this issue. When you are done with this screen, press the [escape] key to close the screen and return to the previous screen.

You can continue selecting each of these strategies and doing your best to address them. When you finally get to the strategy, "examine reference books of existing scales in the area," Measurement & Scaling Strategist becomes particularly useful because it can help you identify likely books. Selecting this phrase opens up the following screen.

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Ex	kit 🕼 Ho <u>m</u> e 🚟 <u>G</u> lossary	MT	< Back				
COMPENDIA OF SCALES							
		Tutorial					
Books providing summary information about scales are available for a number of substantive areas. The following allows you to identify these books by topical area.							
GENERAL CATEGORIES OF SCALES							
	Select a highlighted term for help locating scales on that topic						
	attitudes family and organizations psycholog occupations social psycholog occupations social psycholog education economic health child deve mental health social gen drug abuse crime	l/or community ical measures chological measures and/or financial measures elopment ontology or the aged	2				

The concept to be measured, ORGANIZATIONAL COMPLEXITY, falls in the general area of organizational measures. So select the "organizations" hypertext category in this screen. This leads to the following screen.
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Exit 🔂 Ho <u>m</u>	e 🚟 <u>G</u> lossary		MT	< Back
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	ORGANIZAT	TIONAL SCALES		
	Check all c	ategories that apply		
☐ absente ☐ general ☐ commit ☐ commit ☐ distribut ☐ formaliz ☐ ideology ☐ mechan ☐ need str ☐ bases of ☐ producti ☐ satisfact ☐ standarc ☐ work gr	eism training nent tity titon ive justice ation ation zation ength power vity ion lization uup cohesion	administrative auto centralization (pow communication violence or conflict departmentalizatio effectiveness leadership innovation pay stratification prestige stratification size turnover	nomy rer stratificati : n	on)
Recon	mended Sources of Org	anizational Scales		

Note that complexity is one of the concepts listed here, so check it. After you do that, a hypertext link will appear at the bottom of the screen ("Recommended Sources of Organizational Scales"). Select this phrase and you will see the following screen.

Measurement and Scaling Strategist v. 3.0		_ 🗆 ×
Project Reports Window Debug Help		
Exit 🏠 Home 📰 Glossary	MT	< Back
RECOMMENDED SOURCES OF ORGANIZATIONAL SCALES		_ 🗆 ×
 Indik, Hockmeyer, and Castore. A Compendium of Measures of Individuals, Groups, and Organizations Relevant to the Study of Organizations. 1968. Miller, Delbert C. Handbook of Research Design and Social Measurement. New York: David McKay, 1977. Price, James L. and Charles W. Mueller, Handbook of Organizationa Measurement. Marshfield, MA:Pitman, 1986. Robinson, J.P., R. Athanasiou, and K. B. Head Measures of Occupational Attitudes and Occupational Characteristics. Ann Arbor: Institute for Social Research, University of Michigan, 1969. * Highly likely to include a scale for your topic 		

Not only does the program identify four resource books in this area, but it even places an asterisk beside the one most likely to have one or more measures of this particular concept. This is a pretty painless way to quickly identify sources of scales!

Now press the [escape] key three times until you have closed the most recent windows and are back viewing the window titled, "Identify Existing Scales." Let's assume you have gone to look up this source book and found a scale you believe is acceptable. Then the next step is to select the radio button at the bottom of this screen: "Acceptable scale identified." This causes the hypertext link to appear at the bottom of the screen, "scale specified/justified." Select this link and it takes you to the following screen.

Measurement and Scaling Strategist v. 3.0 Project Reports Window Debug Help		
Exit De Home E Glossary	MT	< Back
SCALE SPECIFIED/JUSTIFIED		_ 🗆 🗵
Concept organizational complexity		
Scale Name or Reference		
Reliability Acceptable Validity Acceptable Normed for this population? Respondent burden acceptable Reading level appropriate Appropriate language(s) Competence/training required		
□ Scale description		
SUGGESTIONS FOR WRITTEN TEXT		
	Conti	nue

This screen provides a framework for you to identify the scale and specify its characteristics. You should complete the items on this screen to be sure the scale meets common standards for measurement.

To speed things up a bit, let's imagine we decide this scale is not adequate after all and there are no other obvious scales in the literature. Then we should return to the previous screen (by pressing [escape]) and change our selected radio button at the bottom of the screen to "No acceptable scales are available." Now a different hypertext link appears at the bottom of the screen: "No acceptable scale available." Select that link to see the following screen.

🔆 Measurement and Scaling Strategist v. 3.0		
<u>Project Reports Window Debug Help</u>		
Exit 🔓 Home 🧮 Glossary	MT	< Back
NO ACCEPTABLE SCALE AVAILABLE		
NO ACCEPTABLE SCALES ARE AVAILABLE Indicate all procedures you used to identify existing scales. Examine research in the area Discuss with established researchers in the area Examine related areas for scales that might be adapted Examine available databases in the area for appropriate	e scales	
Status of Your Argument strong justification		
SUGGESTIONS FOR WRITTEN TEXT If you are convinced there are no adequate scales available concept, then your task is to persuade the reader that you are k ledgeable about the area and would have identified a scale if i available. The more of these procedures you used, the more p your argument.	for this mow- it were ersuasive	
Develo	op Your Own Me	easure(s)

Once we are convinced there are no acceptable scales available and we have done a reasonably good job of looking for those scales, then we should select the hypertext phrase, "Develop Your Own Measure(s)" which takes us to the following screen.

DEVELOP YOUR OWN MEASURES

Nea Project	surement and Scaling S <u>R</u> eports <u>W</u> indow Debu	i trategist v. 3.0 g <u>H</u> elp			<u>- 🗆 ×</u>
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Г	r				
	<u>Concept</u>	organizational corr	plexity		
	No Existing Scale	strong justification	on		
	Multiple Items?	Open-Ended?	Measurement Level	Scaling Method	
	C Single item C Multiple items	C Open-ended C Closed-ended	C Nominal C Ordinal C Interval C Ratio	C Likert Scale C Semantic Differe C Guttman Scale C Thurstone Scale C Magnitude Scale	ential e
	Analysis tip:				
	Once it is established task is to decide how	l there is no adequat to measure this con	e existing scale, then t cept. Compose	he : item(s) for this concep	pt

This screen summarizes the key features of measures we have to select: whether there are to be multiple measures or a single item, whether the scale should be open- or closedended, the level of measurement, and scaling methods we might use. If you know what you are doing for any one of these things, you can simply indicate it here by selecting the appropriate radio button. However, if you are unsure about any of them you can select the hypertext phrase and view a screen that will provide you with expert help to decide that issue. We won't illustrate all of these screens here, but feel free to examine them yourselves. Let's select one just to show you what the program can do. Let's select the "Scaling Methods" phrase which takes us to the following screen.

SCALING METHODS

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<u>Project</u> <u>Reports</u> <u>Window</u> Debug <u>H</u> elp		
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SCALING METHOD		_ 🗆 ×
CONCEPT: organizational complexity		
(0-10) CRITERIA FOR SELECTING AMONG SCALING PROCEDURES		
9 desirability of specific and focused measures		
2 desirability of a single way to achieve a score		
3 your willingness to commit effort to developing the scale		
9 importance of responses which cannot be easily slanted		
9 desirability of discarding few items during development		
5 desirability of having a clear center to the scale		
9 desirability of requiring few items to develop the scale		
5 need for fine discrimination among many categories		
9 <u>need to measure at the interval or ratio level</u>		
- SELECTION - DESIRABILITY - SCALING PROCEDURE		
U.7 Likert Scale		
U.3 Semantic Differential Scale		
0.4 <u>Guttman Scale</u>		
0.3 Inuisione Scale		
······································	recommentat	eu

Answer the questions on this screen by filling in the blank lines with numbers indicating the desirability of each of those criteria (ranging from 0 as the least desirable to 10 as the most desirable). Once you complete the numbers, the program displays its desirability scores for each scaling procedure in the bottom of the screen. You can then make your selection of procedures by selecting the appropriate radio button on the left of the screen. For example, in this case the program recommends Magnitude Scales and we selected that option. If you want help understanding any of the criteria or the scaling procedures, just select the hypertext phrase for help.

When you are done with this screen, press the [escape] key to return to the previous "Develop your own measure(s)" screen. Similarly, you can get help

for the other measurement issues, or you can simply select them yourself. Let's select "multiple-items," "closedended," and "interval." When you have selected all the measurement strategies you are ready to go on. To do this, select the button at the bottom right of the screen, "Compose item(s) for this concept." Let's do that now. This takes us to the following screen.

Measurement and Scaling Strategist v.	3.0					_ 🗆
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MITEM COMPOSITION AND CHECKLIS	T					_ 🗆 >
Concept organizational complexity	•	<<	< !	Save	Delete	> >>
multiple items , closed-end	led , interval	,	Magni	tude S	cale	
number of locations	•	<<	< 3	Save	Delete	> >>
1 one 2 two to five 3 five to twenty-five 4 twenty-six or more 5 don't know						
item meets standards ✓ Unidimensional ✓ Single-barreled ✓ Relevant to study ✓ Avoids unnecessary detail ✓ Avoids unnecessary detail ✓ Avoids unnecessary detail	Short Avoids negatives Logically exhaustive Avoids biased or leadi	I⊽ <u>Mi</u> I⊽ <u>A</u> p I⊽ <u>Is</u> Ing qu	nimize propri- not offi iestion:	es socia ate lev ensive S	al desiral rel of abs to one o	<u>pility</u> traction r all
Image: Provide the second	Avoids implicit assump Frame of reference is	otions clear			1	Tutorial

ITEM COMPOSITION AND CHECKLIST

Having decided the basic characteristics of the measures for this concept (level of measurement, number of items, and so on), the next step is to actually develop the one or more questions to measure the concept. In this screen you can use the edit window to compose the item. Then, while the item is still in view, you should examine each of the standards in the bottom of the screen. Check off each of those standards as you decide the item meets them. If you are unsure about any of them, select the hypertext phrase to get help. When you are done, you should be pretty confident the item you have developed is an adequate measure.

At that point, you can save the concept and item in the database for this project. To save the concept, use the mouse to press the "save" button on the same line as the concept name. To save the item measuring this concept, use the mouse to press the "save" button on the same line as the item name. After saving the first item to measure this concept you can then go on to create a second item using the same procedure. You can continue this process, saving items as you develop and check them, until you have developed all of the items you wish to create to measure this concept.

Note, these items are stored in a database for this project. You can use the right and left arrow keys to scan through that database to view, edit, or delete different concepts and items.

NEXT CONCEPT

At this point we are done with our first concept. You can use the same basic procedure to identify an existing scale or develop new measures for as many concepts as you like. The quickest way to begin the process again for the next concept is to enter a new concept in the "Concept" field in this screen and press [return]. When you do this you will see a dialogue box asking if this is a new concept or a change in an old one. Select "New" to indicate it is a new concept. Next you will see a second dialogue box asking if you would like to conduct a complete new consultation or compose items for this concept. Select "new consult" and this will take you back to the "Concepts" screen where you can use the program to get advice for this new concept.

GENERATING AND SAVING A REPORT

Whenever you would like to print a report with the current status of your proposal you can select the "Report" option on the menu bar. Then you have your choice of either a "comprehensive" report a "standard" report, or a "select" The comprehensive report includes all screens report. opened during this consultation plus all concepts and items measuring those concepts in the database for this project. Note that the screens printed are the last versions of those screens viewed by the program, so if those screens have been visited several different times for different concepts, only information relevant to the last concept considered will be included in the report. The standard report for the Measurement & Scaling Strategist program consists solely of the concepts and items measuring each concept in the database for this project. The select report includes only screens you have "selected" for inclusion. To select a screen for this report you need to first open the screen, then select "report" from the menu, then select "add to select" to add that screen to the selected list.

NOTE: All concepts and items developed and saved in the database for a project are saved after each session and will continue to be available for future sessions when you use that same project.

After selecting any of the three report options, the program will generate the report and a message window will appear indicating that your report was written to the file "FTPF.RTF." You need a rich text format (rtf) capable word

processor such as MS Word, Wordperfect, Word Pro, or Describe.

Each time you generate a report it is written to the same file, "FTPF.RTF." In order to save your report you need to rename the file. Select the "Report" menu item at the top of the screen and then the "Save" menu item from the drop-down menu that appears. A save file dialog box will appear allowing you to rename the report file (see chapter 1 on saving reports). Note, that the ".rtf" file extension needs to remain the same for the "rtf" word processors to recognize the file.

SAVING THE CONSULTATION AND EXITING

You have now completed the Measurement & Scaling Strategist program. When you exit the program, you will be asked if you want to save your work. If you say "NO", all the values you have entered will be lost. Your report file remains on your hard disk and is not effected. If you are working with an ongoing project, you might want to save all the values you have entered for later reconsideration. To save your work simply select the "YES" button. Measurement & Scaling Strategist will save your work and exit. See chapter 2 on Working with Projects.

NOTE: If you entered Measurement & Scaling Strategist from the PRE Program you also have the option of returning to the PRE Program at any time during the consultation or when you complete the consultation by selecting the "PRE" button in one of the menu bars at the top of the screen.

8. DATA COLLECTION SELECTIONTM

INTRODUCTION

WHY DATA COLLECTION SELECTION IS NEEDED

Deciding which data collection procedure to use is an important task in many different scientific disciplines. In the social and behavioral sciences, for example, the researcher must choose from a wide range of possible methods of data collection, ranging from face-to-face interviews to laboratory experiments to the use of existing data sets.

There are many different issues which must be considered in selecting a method of data collection. It is difficult for novice researchers to keep all of these issues in mind as they consider the options. Even practiced researchers may occasionally overlook important issues. There is thus a need for a computer program which can make this task more manageable and help assure the quality of the result.

Data Collection Selection asks the user a series of questions, much as a human expert might, and based on the user's answers, it rates the various data collection procedures by their suitability for the particular problem at hand. The program also explains the reasoning behind its recommendations. The researcher still makes the final decision, but now he or she can be confident it is an informed one.

WHAT IS DATA COLLECTION SELECTION?

Data Collection Selection is an expert system program using artificial intelligence strategies to help the researcher select the appropriate form of data collection strategy. The strategy used by Data Collection Selection to determine the appropriate measurement and scaling approach is suitable for a wide variety of disciplines. These approaches are used in both basic and applied research in academic institutions, business, and industry.

Data Collection Selection is programmed to function much like a human expert might. It represents a collection of knowledge from a number of sources that are applied to specific research objectives through a series of IF...THEN rules. The program asks the user a series of questions about the topic to be studied and uses that information to recommend procedures for measuring those concepts.

WHO SHOULD USE DATA COLLECTION SELECTION?

Data Collection Selection has the potential to bring about substantial improvement in the selection of data collection procedures. For students or researchers having a modest background in research design, Data Collection Selection can serve as a useful guide, systematically approaching the issue of data collection and offering sound advice. For those already skilled in data collection, Data Collection Selection can make the selection process more efficient by saving the time required to review the advantages and disadvantages of each technique, by providing a reassuring check on the user's reasoning, and by documenting design decisions with a minimum of effort by the user.

Data Collection Selection can be used in a wide range of disciplines and content areas to help select appropriate data collection procedures. Data Collection Selection includes many diverse data collection procedures, suitable for either qualitative or quantitative research. However, at this point it will be most useful for people in the social or behavioral sciences, education, or researchers in business, medicine, and other areas where the focus of research is people or social institutions.

TEACHING APPLICATIONS

Data Collection Selection should be a useful aid in research design courses. It can serve as a supplement to the lectures, permitting students to try their hand at selecting a mode of data collection then using Data Collection Selection to check their judgment. The program could free up much of the time now required of the instructor and teaching assistants, permitting them to focus on other aspects of research design. Students could use the program several times for initial problems to help them understand the logic of data collection selection. The program may be particularly helpful for use outside the classroom for individualized self- study.

WHAT DOES DATA COLLECTION SELECTION DO?

Data Collection Selection helps the

researcher select an appropriate data collection strategy by asking the researcher questions about the kinds of data they want to include, the precision required of the process, its relation to basic epistemological issues, the importance of data completeness, their claims for the analysis, pragmatic concerns, and ethical issues. Based on the user's answers to these questions, the program then rates the various data collection procedures to summarize their appropriateness for the problem at hand.

TUTORIAL

Perhaps the best way to become comfortable using Data Collection Selection for your own research problems is to participate in a step-by-step tutorial session. In approximately 10 minutes this lesson can demonstrate to you what it's like to apply Data Collection Selection to a portion of a typical research problem. In addition, you can learn about several features of the program that may make it much easier for you to use, particularly if you have only recently been exposed to data collection issues. These features include asking the program to clarify questions or terms you don't understand, and using the change and rerun option to examine the impact of various assumptions after the program has made its recommendations.

RESEARCH EXAMPLE

Imagine you want to assess political attitudes before a national election and you would like to determine the most appropriate method of data collection.

BEGINNING A DATA COLLECTION SELECTION SESSION

Double-click the left mouse button on the "MTOOLS" icon on your desktop (see the "Getting Started" chapter on how to create a desktop icon). Alternatively, you can select the "Start" button, then the "Programs" menu item, then the "MTOOLS" menu item and then the "MTOOLS" option. The Methodologist's Toolchest version Click on the "Begin" to view the screen will appear. "Introduction" screen. Now click the left mouse button on the "Data Collection Selection" hypertext. This will start the program running. The logo screen is the first window you This screen has four buttons, "BEGIN", interact with. DCS". "EXIT". "ABOUT and "INSTRUCTIONS." "BEGIN" will take you to the main menu screen. "EXIT" exits the program. "ABOUT DCS" takes you to a screen copyright showing the and notice. authors "INSTRUCTIONS" will take you to a tutorial similar to the one you are now reading. Select the "BEGIN" button.

EVALUATING DATA COLLECTION PROCEDURES

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Evaluating Data Collection I	Procedures				
Instructions Begin by selecting ea category of criteria to	ch broad consider.		Compare Procedi	ires	
Data Completeness Kinds of Data	Analysis Claims Pression of Pro	Pragma cess	tic Concerns Epistem	Ethic:	al Issues ssues
What kinds of <u>data</u> shoul course, require face to fa long, complex questions face to face contact or w visual display. Examine respon Nonverbal behas Stimuli likely to	d be included in the st ce contact. Complex s also are much easier t hen a person can read from 0 (least) to 10 (m dent's environment for should be observe be relatively complex	udy? Any ol timuli such to answer w the questia nost) <u>d</u>	oservational dat as visual display chen there is n on a form or s	a, of ys or see a	

The first screen you will see appears above. Now we're ready to answer questions about our objectives and the kinds of data we want to study that will be used to recommend an appropriate data collection procedure. Each set of criteria is displayed in a page with a tab at the top of the page indicating the broad category. The first category shown here includes criteria based upon kinds of data. As you can see, the other criteria include data completeness, analysis claims, pragmatic concerns, ethical issues, precision of process, and epistemological issues. The Data Collection Selection program scores each data collection procedure based on how each of the criteria listed in this screen relates to your research problem.

KINDS OF DATA

First we are asked questions about the kinds of data we want to include in the study. For each input line you enter a value of 0 to 10 to indicate the importance to your research of the kind of data described in the prompt to the right. Each prompt is a hypertext term. If after reading the prompt, you are unsure of it's mean or significance, you can select the term for further help. Select the term "Examine respondent's environment" now. A window will pop-up giving a more detailed description of the prompt.

When you are finished reading the screen for "Examine respondent's environment" you can close the window by pressing the [esc] key. Notice that the hypertext term has changed colors. This is to remind you of which hypertext pathways you have already taken.

For our research goals the importance of being able to examine the person's personal environment as part of the data collection process (e.g., observing their home, interactions with family members, and so on) has 0 importance.

The next question asks how important is it that nonverbal behavior be observed as part of the data collection process? Is it, for example, important to see the expression on the person's face when they answer the question? Or, is it important that the study examine nonverbal interactions between people as part of the data? Nonverbal behavior may be useful to get a better reading on attitudes or opinions people are reluctant to express more explicitly. Let's enter a value of 2. Note: You can use the [tab] key to easily move to the next input line.

Next we are asked about how complex the stimuli (in this case, questions) will be (for example, involving many questions, branches to appropriate sections and skipping of inappropriate sections). For our example research problem we believe the questions will be moderately complex, so we enter a "7" here.

You have now defined the kinds of data for the project. Note that an asterisk now appears in the tab for this page to indicate that we are done with it. The next step is to consider additional criteria. To consider "Evaluating Data Collection Procedures" you can either select that tab or click on the ">" button at the bottom left of the current page. Do this now.

PRECISION OF PROCESS

Now you should see the "Precision of Process" page as in the figure below. This page asks you a series of questions about how precise the data collection process must be. You answer these questions in the same way you did for the "kinds of data" screen.

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Instructions When all criteria tabs with "*" you are done your problem.	are marked specifying	0	Compare Procedu	ires	
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Data collection procedur data collection can be c Importanc Subjects should Very specific an Stimuli should b	res differ in the precision ontrolled. e from O (least) to 10 (n <u>be presented with star</u> <u>d easily interpreted res</u> e presented in a speci	on with which nost) <u>ndardized stir</u> s <u>ponses</u> fic order	n the process of <u>nulli</u>		
The environmer	<u>it should be controlled</u>	<u>to minimize</u>	<u>variance</u>		

How important is it that the stimuli presented to the respondents be standardized (e.g., questions worded in precisely the same way for each respondent). Enter a "9". For how important it is that responses be very specific and easily interpreted as to their meaning, enter "10." We are less concerned that the questions be in a specific order and we don't feel it is important to control the environment while the data collection takes place, so we enter "5" and "3" for these two questions. Now select the ">" button.

EPISTEMOLOGICAL ISSUES

Next, we are asked a series of questions which relate to our epistemological assumptions. Epistemology refers to how we come to know something to be true. Issues to be concerned with here include whether subjects are likely to respond in unusual ways if they know they are in a study, whether we want to avoid preconceived ideas when we conduct the study, and the extent to which it is important to permit respondents to act spontaneously and respond in their own words.

Let's imagine here that we are interested in political attitudes in our own country and we feel relatively confident about the assumptions we will be making, and we are much more interested in achieving standardized responses which may be compared than with having the respondents respond in their own unique way. Hence, we would answer these questions in the following manner:

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Epistemology refers to H collection procedures d about those studied.	now we come to know s iffer in the epistemolog	something to lical assump) be true. Data tions they make		
5 the study shoul 1 The study shoul 2 Respondents sh 6 Respondents sh	e from u (leasy to fu (n <u>d be nonreactive</u> Id minimize assumption Jould be encouraged to Jould be permitted to re	nostj <u>18</u> <u>act spontan</u> espond in ove	eously m words		

Enter a "5" for how important it is that the study be non-reactive, that is that it minimize the participants perceptions that they are part of a study and reduce the likelihood that they will change their behavior as a result.

For the importance of conducting the study with a minimum of preconceived ideas in order to minimize the researcher's bias and maximize their receptivity to the ways in which respondents organize and make sense of their social world, enter a "1."

Enter "2" for how important it is that respondents be permitted or encouraged to act spontaneously as opposed to rigidly restricting their possible responses.

And then enter a "6" for the importance of permitting respondents to answer questions using their own words and phrases rather than restricting them to fixed responses.

Now select the ">" button.

DATA COMPLETENESS

The next issue is how important it is that the data be complete--i.e., that there be a high response rate and few missing values. We are interested in a high level of completeness, so we answer these questions as follows:

For the importance of obtaining a high response rate or high participation rate in the study, let try a "9." And for how important it is that there be few missing values or questions which the respondent failed to answer, try "8."

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Evaluating Data Collection Instructions	Procedures				
with "*" you are done your problem.	specifying		Compare Procedu	res	
* Kinds of Data	* Pression of Pro	cess	* Epistemo	ological k	ssues
* Data Completeness	Analysis Claims	Pragm	atic Concerns	Ethics	al Issues
How complete must the data be? Some data collection procedures are far more successful at obtaining complete data than others. Importance from 0 (least) to 10 (most) 9 A high response rate is desired 8 A minimum of missing data is desired					
< >					

Now select ">" to go on.

ANALYSIS CLAIMS

The next two questions deal with analysis claims or objectives of the study. How important is it that the results be generalizable and how important is it that the study be able to unequivocally establish causal relationships. We are very interested in generalizability so we respond to that question with a "10." However, we are less concerned with unequivocally establishing causal relationships, so we enter a "5" for that question.

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Two criteria deal with an Importanc 10 Importance of b 5 Importance of b	nalysis claims or <u>objectiv</u> e from 0 (least) to 10 (mos <u>eing able to generalize r</u> eing able to assess causa	res of the st st) <u>esults</u> al relations	tudy. <u>hips</u>		

Again, select the ">" button to continue.

PRAGMATIC CONCERNS

The next series of questions addresses several pragmatic concerns, such as whether the cases are geographically dispersed, the size of the sample, and the extent to which cost, time, and access must be considered in selecting the data collection procedure. Like most national studies of political attitudes we envision a large sample of geographically dispersed cases, so we answer the first two questions as follows: "10" for how likely it is that the sample of cases for this study is geographically dispersed, and "9" for the likelihood the sample for this study is relatively large (e.g., hundreds or thousands of cases as opposed to only a

few).

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* Kinds of Data	of Data * Pression of Process * Epistemological Issues				ssues
* Data Completeness	* Analysis Claims	* Pragn	natic Concerns	Ethic	al Issues
Data collection procedures differ in the extent to which they address various pragmatic concerns. Importance from 0 (least) to 10 (most) 10 Cases for the study are widely dispersed geographically 9 A relatively large sample size is likely 5 Importance of minimizing cost of the study 10 Cases for the study are widely dispersed geographically 9 4 relatively large sample size is likely 10 10 10 10					
0 Access to subject >	ts is likely to be difficul	<u>t</u>			

Cost is a moderate factor, time is not because we imagine we have several months to complete the data collection, and we don't envision problems gaining access to most people in the sample, so we answer the next three questions as follows: "5" for the extent to which cost must be minimized for this study, "2" for the extent to which time is an issue (i.e., the study must be completed in a relatively short, fixed amount of time), and "0" for the extent to which access to the cases for this study is problematic or uncertain.

Select the ">" button to continue.

ETHICAL ISSUES

Finally, there are two questions regarding ethical concerns. We believe it is essential to preserve the anonymity of respondents and to select a data collection procedure which minimizes the respondents' concern for their anonymity, so we enter a "10" for the first question. On the other hand, apart from anonymity, we believe there are few additional ethical concerns which may be raised by this study, so we answer "3" to the second question.



Now notice that all tabs have an asterisk indicating we have answered the questions on each page. In addition, the ">" button is grayed out indicating there is no need to go on to another page. If at this point you wanted to change your responses for any of the criteria you simply click on the tab to display the appropriate page, and then make your changes. Finally, and most importantly, the "Compare Procedures" button in the top portion of the screen is now no longer grayed out. This means we can now select that button to compare scores for different data collection procedures.

COMPARING PROCEDURES

Select the "Compare Procedures" button now to see the screen shown below.

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COMPARING DATA COLLECTION PRO	CEDURES	_ 🗆 🗵
When all criteria are checked you are done specifying your problem.	Preference scores range from 0.00 (worst) to 1.00 (best).	
CRITERIA * kinds of data * precision of process * epistemological issues * data completeness * analysis claims * pragmatic concerns * ethical issues Select a Procedure	DATA COLLECTION PROCEDUR 0.66 mailed questionnaires 0.74 telephone interviews 0.55 face-to-face interviews 0.57 focus groups 0.53 elite interviews 0.54 participant observation 0.64 participant observation 0.64 projective techniques 0.64 projective techniques 0.61 field experiment 0.57 laboratory experiment 0.57 laboratory experiment 0.48 existing documents, ava 0.47 historical records	ES Select hypertext term for defintion and reasons for scores
OVERALL ADVICE:	0.59 <u>film, video, photographs</u> * Acceptable procedures	

On the right side of the screen is a listing of the data collection procedures and preference scores for each. Procedures with scores greater than 0.70 also have an asterix ("*") next to them to indicate that Data Collection Selection recommends them for you research procedures. These scores are based on computing pattern matches for all of the criteria between your responses on the criteria questions and

ideal values. A score of 1 would indicate a perfect match.

You can reselect any of the broad criteria for reconsideration. Selecting the "Compare Procedures" button when you are done with those changes will return you to this screen and the preference scores will automatically be recomputed.

For our tutorial example problem and the answers you entered, the "telephone interviews" procedure has the highest score and is recommended by Data Collection Selection. To learn more about the procedure and how it matches our example research problem, click on the "telephone interviews" hypertext term now.

SPECIFIC PROCEDURES

You will now see the "Telephone Interviews" screen shown below. All of the procedures in the hypertext list in the previous screen take you to similar screens for each specific procedure. The upper portion of the screen contains a textual description of the procedure. The text includes hypertext links to delve further into each subject as needed. Also included are references from the literature.

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A TELEPHONE INTERVIEWS					
DESIR	ABILITY 0.743				
TELEPHONE INTERVIEWS					
DESCRIPTION:					
Telephone interviews are interviews which take place over the phone. Typically, the researcher dials the <u>subject</u> 's number then asks them questions. A <u>telephone interview</u> does not require the interviewer to travel to the location of the <u>respondent</u> , hence it can be considerably less expensive than a face-to-face interview. Because the researcher interacts with the respondent they can generally assure a relatively high <u>response rate</u> and little or no <u>missing data</u> . Telephone interviews also permit <u>stimuli</u> to be presented in a specific <u>order</u> . The questions can also be rather specific and <u>precise</u> . Telephone interviews are suitable for collecting relatively large <u>samples</u> at moderate cost even for widely <u>dispersed</u> samples in a short period of time. Telephone <u>interviews</u> do require access to <u>subjects</u> by telephone. They do not permit the collection of nonverbal <u>data</u> , they <u>limit</u> the complexity of stimuli which can be presented to <u>respondents</u> , and they may limit the ability of respondents to act spontaneously.					
REFERENCES					
Groves and Kahn, 1979					
CRITERIA FOR RECOMMENDING					
Optin	mal Reported				
KINDS OF DATA	7 0				
nonverbal behavior should be observed	2 2				

In the lower portion of the screen (you will need to scroll the window to see this clearly) is a table showing each criteria and it's questions. On the right hand side are both the optimal values and your responses to the questions. It can be especially helpful to note questions where your answers differ greatly from the optimum. You can click on the hypertext criterion on the left-hand side of the screen to view a description of that criterion. If you want to reconsider your answers based on these results, you can use the [esc] key to close this screen and return to earlier criteria screens. Any changes you make there will be automatically reflected in this screen when you return to it. Your response will reflect any changes and the preference scores will be recomputed automatically.

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A TELEPHONE INTERVIEWS			
			-
CRITERIA FOR RECOMMENDING	Ontimal I	Penarted	
KINDS OF DATA	<u>optitiai</u> i	topontou	
examine respondent's environment	7	0	
nonverbal behavior should be observed	2	2	
stimuli likely to be relatively complex	7	7	
PRECISION OF PROCESS			
standardized stimuli	6	9	
very specific and easily interpreted responses	9	10	
stimuli presented in a specific order	9	5	
the environment should be controlled to reduce extra vars. EPISTEMOLOGICAL ISSUES	б	3	
the study should be nonreactive	5	5	
the study should minimize assumptions	7	1	
respondents should be encouraged to act spontaneously	5	2	
respondents should be permitted to respond in own words	9	6	
DATA COMPLETENESS	_	_	
a high response rate is desired	9	9	_
a minimum of missing data is desired	y	8	
ANALITSIS CLAIMS	0	10	
importance of being able to access causal relationshine	9	6	
PRAGMATIC CONCERNS		5	-

SELECT A DATA COLLECTION PROCEDURE

Let's return to the "Comparing Data Collection Procedures" screen. Press the [esc] key until this screen reappears (allow each window to close between pressing the [esc] key again). Note: if you had reconsidered your responses, the scores in this screen would be recomputed also. We can now select a procedure based on the program's recommendations. Click on the "Select A Procedure" hypertext term in the lower left corner now.

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SELECT A DATA COLLECTION PR	ROCEDURE					
* Acceptable procedure	s –	Pre 0.0	ference scor 0 (worst) to 1	es range fro .00 (best).	om	
You can select one or more		DA	TA COLLECT	ION PROCE	DURES	
data collection procedures		0.66	mailed que	<u>stionnaires</u>		
by checking the box to	Π *	0.74	telephone i	<u>nterviews</u>		
the left of the procedure.		0.55	face-to-face	interviews		
		0.57	focus group	<u>s</u>		
		0.53	<u>elite intervi</u>	ews		
		0.44	participant	observation	<u>l</u>	
		0.61	systematic (observation		
		0.44	<u>unobtrusive</u>	measures		
		0.64	projective t	<u>echniques</u>		
Click on the procedure		0.61	<u>field experi</u>	<u>ment</u>		
name itself to see		0.57	laboratory e	<u>experiment</u>		
definition and reasons		0.47	existing do	cuments, av	<u>railable dat</u>	<u>a</u>
for the scores.		0.47	<u>historical re</u>	cords		
		0.63	simulations	and/or gan	nes	
		0.59	<u>film, video,</u>	photograph	<u>15</u>	
Report		Exit		Reco	nsider Crite	ria

Again you see the list of data collection procedures and their scores. To select a procedure simple click on the checkbox to the left of each procedure to add it to the final report. Even at this late stage in the consultation you can reconsider your responses. Simply select the hypertext term for the procedure and repeat the steps in the previous section. You can also select the "Reconsider Criteria" button to return to the "Evaluating Data Collection Procedures" screen and begin the consultation process again with your old responses still present. To start a whole new consultation, press the "exit" button to leave the program and begin fresh by restarting the program from the Methodologist's Toolchest screen.

GENERATING AND SAVING A REPORT

Once you have checked each procedure you want added to the report, you can select the "Report" button. You do not need to only select procedures recommended by Data Collection Selection. You might want to view the details of procedures that were of interest to you but whose scores were below 0.70. Select the "Report" button now. The status box at the top of the screen will say "reporting." When the report is generated a message window will appear indicating that your report was written to the file "FTPF.RTF." You need a rich text format (rtf) capable word processor such as MS Word, Wordperfect, Word Pro, or Describe.

Each time you generate a report it is written to the same file, "FTPF.RTF." In order to save your report you need to rename the file. Select the "Report" menu item at the top of the screen and then the "Save" menu item from the drop-down menu that appears. A save file dialog box will appear allowing you to rename the report file (see chapter 1 on saving reports). Note, that the ".rtf" file extension needs to remain the same for the "rtf" word processors to recognize the file.

EXITING AND SAVING THE CONSULTATION

You have now completed you Data Collection Selection consultation. You can exit the program by selecting the "Exit" button at the bottom of the window or the "Exit" button that is always available at the top of the screen.

When you exit the program, you will be asked if you want to save your work. If you say "NO", all the values you

have entered will be lost. Your report file remains on your hard disk and is not effected. If you are working with an ongoing project, you might want to save all the values you have entered for later reconsideration. To save your work simply select the "YES" button. Data Collection Selection will save your work and exit. See chapter 2 on Working with Projects.

9. ETHXTM

INTRODUCTION

WHY ETHX IS NEEDED

Federal requirements for research involving human subjects and general ethical concerns make it necessary to carefully consider any research that proposes to study human subjects. Institutional Review Boards (IRBs) at each institution receiving federal funding vary somewhat in the interpretations they place upon specific research. Nevertheless, there are now a number of general guidelines that appear to characterize most of these decisions. ETHX is designed to help researchers determine whether human subjects are involved (a surprisingly nontrivial task for some studies), whether the study meets commonly accepted criteria for exemption from a full human subjects review, and whether projects requiring a full human subjects review have addressed all the appropriate issues and met the standards for that review.

WHO SHOULD USE ETHX?

ETHX should be used by any researcher who is planning research studying human subjects. ETHX will help researchers create the human subjects proposal, and should help make sure important issues are not overlooked. An added feature of ETHX is it will give the researcher a tentative reading on whether or not the project as they describe it meets human subjects requirements. It should be generally consistent with the procedures and requirements of most institutional review boards. If there are any inconsistencies or differences in format or requirements between ETHX and a specific IRB, those differences can be resolved by modifications of the edited draft files created during the ETHX consultation.

For students or novice researchers, ETHX can serve as a useful guide, assuring that all issues are addressed and providing the user with explanations of important elements of the proposal as well as suggested strategies for addressing potential problems. For experienced researchers, ETHX can make the human subjects proposal more efficient, can provide a reassuring check on the user's reasoning, and can document decisions with minimal effort by the user.

ETHX can be used in the full range of disciplines conducting research on human subjects, including researchers in the social and behavioral sciences, education, the humanities, professions such as medicine, law, and business; and applied areas such as agricultural economics or child development. ETHX is appropriate for both qualitative and quantitative studies.

TEACHING APPLICATIONS

EHX should be a useful aid in research design courses. It can serve as a supplement to the lectures, permitting students to try their hand at developing a proposal for a study involving human subjects to be submitted to their local IRB. The process of completing the program consultation should raise many interesting ethical issues for class discussion.

TUTORIAL

Perhaps the best way to become comfortable using ETHX for your own research problems is to participate in a step-by-step tutorial session. In approximately 30 minutes this lesson can demonstrate to you what it's like to use ETHX to develop a proposal for review by an Institutional Review Board. In addition, you can learn about several features of the program that may make it much easier for you to use.

RESEARCH EXAMPLE

For this example, let's imagine we're conducting a study of teenagers in which they will be interviewed and asked about various risk-taking behaviors including drug and alcohol use.

BEGINNING AN ETHX SESSION

Double-click the left mouse button on the "MTOOLS" icon on your desktop (see the "Getting Started" chapter on how to create a desktop icon). Alternatively, you can select the "Start" button, then the "Programs" menu item, then the "MTOOLS" menu item and then the "MTOOLS" option. The Methodologist's Toolchest version screen will appear. Click on the "Begin" to view the "Introduction" screen. Now click the left mouse button on the "ETHX" hypertext. This will start the program running. NOTE: You can also enter the ETHX program from within the PRE program by first opening that program, then at the "Research Proposal Summary Status Support" screen, selecting "Human Subjects Concerns," and then selecting the "PRE" button at the bottom of that screen.

Next you will be asked to select a project or start a new one. For this example, enter "ethx1" in the blank field in the top left of the "Projects" window, then press the "OK" button to continue.

The logo screen for ETHX is the next window you will see. This screen has four buttons, "BEGIN", "EXIT", "ABOUT ETHX", and "INSTRUCTIONS." "BEGIN" will take you to the main menu screen. "EXIT" exits the program. "ABOUT ETHX" takes you to a screen showing the authors and copyright notice. "INSTRUCTIONS" will take you to a tutorial similar to the one you are now reading. Select the "BEGIN" button.

The next screen you will see is the "Human Subjects Concerns" Screen as displayed below. In this screen you can select which of the three methods for meeting the requirements for treating human subjects you wish to consider. The simplest (though not always necessary) is to consider whether you are NOT using human subjects. If you believe this is the case, you should select that hypertext phrase and the program will help make sure this is true.
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MUMAN SUBJECTS CONCERNS		_ 🗆 ×
Human Subjects Concerns Organizations receiving federal funding are required to follow proce the protection of human subjects based upon internationally recognize principles in order to safeguard the rights and welfare of individuals w participate as subjects in research. Even research not funded by feder must follow these procedures for research involving human subjects if organization receives any federal funding.	edures for d ethical ho al funds the	Tutorial
 Human subjects standards have been met The research does NOT involve human subjects The research appears to be exempt due to minimal risks The research meets all the standards for treatment of human subjects 		
You must fulfill ONE of these criteria to meet the ethical standards for the treatment of human subjects. Select a hypertext phrase to consist any of these criteria.	r der	
Continue		

The next simplest is research posing minimal risks that is exempt from a full review. The third, and most complex option is considering whether research meets all the standards for treatment of human subjects. Just for fun, let's select the first option by clicking on the hypertext phrase "the research does NOT involve human subjects." This leads to the following screen.

DOES YOUR RESEARCH INVOLVE HUMAN SUBJECTS?



This proposed study obviously involves human subjects because it meets the first criterion—obtaining information from a living individual. Note however, that even studies that don't obtain the information directly from the individual are still studies involving human subjects. Check the first checkbox and then select the "Continue" button. This takes you to the screen to assess whether the research is exempt from a full review.

IS THE RESEARCH EXEMPT?

This introductory screen explains "exemption" and what it means. When you have finished reading it, select the "Continue" button.

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IS THE RESEARCH EXEMPT?		_ 🗆 🗙
Is the Research Exempt?		
Regulations regarding human subjects research identify some involving human subjects which pose little or no risk to subjects. Bec studies pose little or no risk to subjects they are therefore EXEMPT for provide a detailed protocol describing their treatment of human subj exempt studies require only a brief, expedited description and reviev For this reason, once you have determined human subjects are next task is to determine whether the research is exempt. In the following screen you will be asked to indicate which, if a common types of research you are proposing. That information will the whether the proposed research MAY qualify for exemption.	forms of reso cause those om having to ects. These v for approv. e being studi any, of these be used to p	earch al. ied, redict
NOTE: Normally, the individual researcher is not permitted to decide on their own whether their proposed research is exe Most IRBs require researchers to submit documentation clair an exemption, then the IRB makes the final determination a whether that is true.	mpt. ning s to	
	Cor	ntinue

The next screen lists several common types of research that pose little or no risk for subjects and are therefore routinely exempted from a full IRB review. If any of these applied to this research we should check the item. If you were to check one of these items, one or more additional screens will open asking for further information to assess whether the project qualifies for exemption. Keep in mind that this is only an assessment by the program. The official determination of whether a project is exempt must be made by your local IRB.

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📌 CRITERIA FOR	EXEMPTION			
Check al research educati research or obse research to the a evaluat taste and	l of the following th ————————————————————————————————————	at apply to the proposed research. E RESEARCH INVOLVES ngs involving normal hal tests, surveys, interviews, havior lata projects conducted by or subject ent or agency heads studying or r service programs ttion and consumer acceptance		Tutorial
Editor	Briefly Describe:	Based on your responses, this researc	ch is no	onexempt
SUGGEST Nonexempt treatment of	LIONS FOR WRITTEN research requires th human subjects de	I TEXT — nat the researcher meet the standards t tailed in the next section.	ior	Continue

As you continue through the program, remember to open the editor using the "Edit" button to record your decisions and information pertaining to each issue. When you do this, you will see the edit window as in the screen below.

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CRITERIA FOR EXEMPTION Check all of the following that apply to the proposed research. THE RESEARCH INVOLVES Check all of the following that apply to the proposed research. THE RESEARCH INVOLVES Check all of the following that apply to the proposed research. THE RESEARCH INVOLVES Check all of the following that apply to the proposed research. THE RESEARCH INVOLVES Check all of the following that apply to the proposed research. THE RESEARCH INVOLVES Check all of the following that apply to the proposed research. THE RESEARCH INVOLVES Check all of the following that apply to the proposed research. THE RESEARCH INVOLVES Check all of the following that apply to the proposed research. THE RESEARCH INVOLVES Check all of the following that apply to the proposed research. THE RESEARCH INVOLVES Check all of the following that apply to the proposed research. THE RESEARCH INVOLVES Check all of the following that apply to the proposed research. THE RESEARCH INVOLVES Check all of the following that apply to the proposed research. THE RESEARCH INVOLVES Check all of the following that apply to the proposed research. The RESEARCH INVOLVES Check all of the following that apply to the proposed research. The RESEARCH INVOLVES Check all of the following the tests, surveys, interviews, or observation of public behavior Check all of the tests and following the tests and the tests and following tests and following tests and following tests and following tests	Tu	
SUGGESTION Bere you should be writing down your plans for treatment of hu Suggestion subjects. This edited file will be what you use as the file Nonexempt response to submit to an IRB. You can later edit and for treatment of hu as you like with your own word processor.	ent of human rst draft of the rmat the file	, , , , , , , , , , , , , , , , , , , ,

You can exit the editor by pressing the [escape] key. When you do this you will be asked if you would like to save changes to "humsubj.fte" "Humsubj.fte" is the name of the ASCII text file that will contain your draft human subjects proposal. Select the "Yes" button to save your changes and exit the editor now. After exiting the editor, select the "Continue" button to begin considering the standards for nonexempt research.

NONEXEMPT HUMAN SUBJECTS RESEARCH

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ANDNEXEMPT HUMAN SUBJECTS RESEARCH		- O ×
Standards for Treatment of Human Subjects	S I	ſutorial
Risk/Benefit Assessment Risks Minimized Equitable Selection Informed Consent Sought Monitoring for Safety Privacy/Confidentiality Vulnerable populations		
NOTE: All of these requirements must be satisifed in any nonexempt research invol involving human subjects requiring IRB approval according to Title 45, Code o Regulations, Part 46, Revised June 18, 1991, pp. 8-9.	ving human f Federal	
Editor Conti	nue	
SUMMARY: human subjects NOT adequately addressed		_

This screen summarizes all of the standards that must be met in a typical human subjects review. As each standard is met it will be checked off on the left. When all are met, the top checkbox by "all standards have been met" will be automatically checked by the program.

If you are experienced and confident you know what you are doing, you can simply check these items off yourself and use the "editor" button at the bottom left of the screen to enter your summaries of how those criteria are met in your edited file. However, to take full advantage of the program you should select the hypertext phrase for each standard and follow the instructions you see on the screens.

REMINDER: The ETHX program takes you through the process of evaluating how well these standards have been

met for your project. But you must summarize your decisions and strategies yourself in the edited file (or using your favorite word processor). It is that edited file that will actually be printed and submitted to an IRB.

Let's begin by selecting the hypertext phrase, "Risk/Benefit Assessment."

RISK/BENEFIT ASSESSMENT

This screen summarizes the risks and benefits. For further help determining what risks might be present, let's select the hypertext phrase "Risks Assessed."

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📌 RISK/BENEFIT	ASSESSMENT					
C RISK/BEN Every stud possibility th value related affect the inc and society a should only in <u>The Belmont</u> Risks Asse	k here when you IEFIT ASSESSMEI ly has both risks a at harm may occu d to health or wel lividual subjects, at large(or special be conducted whe <u>Report</u> (1979) Sec <u>sseed</u>	feel yo VT – nd pot ir." A fare the far I group en the consi	u have addressed this ential benefits. Risk "r benefit is "something of Risks and benefits of re nilies of the individual s of subjects in society potential benefits outw derations in risk/benefi	issue adequ efers to a if positive ssearch may subjects,)." Research reigh the ris it assessmer	nately T	utorial
Editor	Briefly Describe:					
SUGGESTIONS FOR WRITTEN TEXT Proposals claiming no risks when IRB members perceive risks are immed- iately suspect. Make a systematic effort to consider the range of poten- tial risks and benefits. Assess benefits and risks for all who may be affected, not just the subjects. Show benefits outweigh risks.						
						Return

That leads us to the following screen with several possible types of risk identified. We can use this information to help us write the section on possible risks in the editor.



When you are done, press the "Return" key to go back to the "Risks/Benefit Assessment" screen. There is a similar screen to help you assess the benefits of the study. You can go to that on your own if you like and complete it. Once both the risks and benefits have been specified, the "Risks/Benefit Assessment" screen will display a check at the top of the screen to indicate this standard has been met.

RISKS MINIMIZED

Selecting the "Risks Minimized" hypertext phrase leads to the following screen with suggestions for writing this section. Again, when you are done, press the "Return" button at the bottom of the screen.

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Project Reports Window Debug Help					
Exit 🔒 Home 🚟 Glossary	MT < Back				
📌 RISKS MINIMIZED					
	<u> </u>				
	Tutorial				
check here when you feel you have ad	dressed this issue adequately				
It is not enough that benefits of a study outweigh the risks. In addi- tion, researchers should take all reasonable steps to minimize risks-to subjects or anyone else-that are a consequence of the study. After assessing the risks, researchers should examine each significant risk to					
objectives of the research. Here you should describe the procedures en	nployed to minimize risks.				
Editor Briefly Describe:					
SUGGESTIONS FOR WRITTEN TEXT Identify areas where you were able to reduce risks and justify any risks that remain. Justifications for risks typically need to show that an important research objective requires them. If you're having trouble justifying a risk, then perhaps you should get rid of it.					
	Return				

EQUITABLE SELECTION

The "Equitable Selection" hypertext phrase leads to this screen reminding us of the need for equitable selection and providing help in writing this section. Again, when you are done, press the "Return" button.

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A EQUITABLE SI	ELECTION			_ 🗆 ×
Che EQUITAI Justice in provide adh should not beneficiari "The se whether so or persons because of manipulabi For exam only black all people I <u>More on Equ</u> Editor	ck here when you 3LE SELECTION studies of human s <i>i</i> antages only to th unduly involve per- s of subsequent a lection of research me classes (e.g., w confined to institut their easy availabi- lity, rather than for nple, <u>The Tuskeger</u> men were subjecte senefit from the kn <u>itable Selection</u> Briefly Describe:	feel you have addressed this issue ad ubjects requires that "results of resea ose who can afford them(and) such sons from groups unlikely to be amon pplications of the research. subjects needs to be scrutinized in o elfare patients, particular racial and i ions) are being systematically selecte lity, their compromised position, or th reasons directly related to the proble <u>e syphilis study</u> was criticized in part I d to the substantial health risks of sy owledge.	equately rch not research g the rder to determ thnic minoriti d simply eir eir m being studi pecause phills while	ine es, ed."
SUGGESTIONS FOR WRITTEN TEXT —				
identify any	vulnerable group	s included.		
			F	Return

INFORMED CONSENT SOUGHT

This screen includes the requirements that must be met for informed consent. You can select the hypertext phrase for each of these requirements to view screen with more information about them.

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MINFORMED CONSENT SOUGHT		_ 🗆 🗙
Informed consent requires that respondents have the information requires for consent, that they comprehend this information, and that they voluteer to participate. All three of these conditions must be met for informed consent according to <u>The Belmont Report (1979)</u> .	Jired In-	Tutorial
SPECIAL CONDITIONS		
Image: mot competent to consent Image: third-party permission		
Editor Briefly Describe:		Return

For example, if you select the phrase, "information required" you will see the following screen.

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MINFORMATION	REQUIRED FOR IN	FORMED CONSENT		_ 🗆 ×
chec "Most codes to assure tha generally inn- anticipated the and a statem to withdraw proposed, in the research	k here when you t TION REQUIRED of research establ it <u>subjects</u> are giv clude the research benefits, alternativ ent offering the s at any time from t cluding how subj , etc." <u>The Belm</u>	feel you have addressed this issue adequ lish specific items for disclosure intender en sufficient information. These items a procedure, their purposes, <u>risks</u> and re procedures (where therapy is involved ubject the opportunity to ask questions a the research. Additional items have bee ects are selected, the person responsible ont Report (See Suggestions for Written Cons	iately T I I), nd for <u>sent Form</u>)	utorial
Editor	Briefly Describe:			
SUGGESTIONS FOR WRITTEN TEXT Try to anticipate what information you would want to know to make this decision. Often you will need to include a written disclosure form with this information. Make sure this is consistent with any changes you make in your planned research design.				
				Return 🚽

Using the same procedure you can get advice on the issues of comprehension and voluntariness. Similarly, if any of the special conditions might hold for your study, you can consider those now. To move this tutorial along, let's assume teenagers are not permitted to consent to the study by themselves, but we must also obtain consent from a third party (typically their parents); but that informing them will not likely threaten the validity of the study. Once all of these conditions are met, we will have met the criteria for seeking informed consent and can return to the "Nonexempt Human Subjects Research" screen.

REMINDER: Don't forget that these decisions and strategies need to be documented in the edited file as we make them so they will appear in our final document.

INFORMED CONSENT DOCUMENT

The next section of the program first helps you determine whether a written consent form is required and then helps you draft that consent form. The screen below helps determine if a written document is required.



Let's say we don't think either of the two conditions described in this screen apply to this study. In that case, we will need to create a written consent form and should select the hypertext phrase "Suggestions for Written Consent Form" in the bottom right of the screen. This brings us to the screen below.

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<u>Project</u> <u>Reports</u> <u>W</u> indow Debug <u>H</u> elp		
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SUGGESTIONS FOR WRITTEN CONSENT FORM		
A written consent document should address the following issues. All bu the first two are legal requirements for research involving human subject CONSENT DOCUMENT SI Lidentify the researcher Explain how selected Explain purpose of study Procedures and duration Forseeable risk/discomfort Benefits/feedback Voluntary/can withdraw Participation alternatives Privacy assurances/limits Compensation for injury Appropriate contact Give subject copy of form	ts. ⁰ECIFIED	Tutorial
Additional requirements specific to medical research are described in Title 45 Code of Federal Regulations 26.116.		
Editor		Return

This screen has a number of criteria for determining whether an adequate draft of the written consent form has been created. You can select the hypertext phrase for each of these and view screens containing additional information to help decide whether each of these criteria has been met. Remember as you do this to use the built-in editor or your own word processor to draft the document as you consider each section. By the time you have completed each of these sections and incorporated those elements into the draft consent form, your draft consent form should be ready to submit to the local IRB. Once this is done, press the "Return" key to return to the "Standards for Treatment of Human Subjects" screen.

MONITORING FOR SAFETY

Once back to the "Standards for Treatment of Human Subjects" screen, select the hypertext phrase "Monitoring for Safety" and you will then see the following screen. You can read the instructions

here. Let's select the "Editor" button to open the editor and enter a brief description of how we will monitor the subjects during the study. For example, enter the phrase: "Because the study is crosssectional, there is little need to monitor beyond the initial interview." Then close the editor (press [escape] and select "Yes" to save the changes). Next check the checkbox in the top left of the screen to indicate we believe we have dealt with this issue adequately. Then exit the screen by pressing [escape] or selecting the "Return" button.

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MONITORING I	FOR SAFETY			
MONITO Wheneve provisions fi In medical s study where treatment. contact pers periencing a Many IRBs a study to mo	ck here when you i RING FOR SAFETY r significant risks a or monitoring the s studies, for examp there are indicati Subjects should al sons whom they ca an adverse conseq liso require period nitor human subje	teel you have addressed this issue adequance present for subjects, there should be tudy to assure that harm does not occur. Le, patients are often dropped from the ons they are reacting adversely to the so be given access to the appropriate in inform if they believe they are exuence or wish to withdraw from the study ic reports from the investigators during a cts.	vately 7	
Editor	Briefly Describe:			
SUGGESTI Specify prod Assure that and welfare scientific int	ONS FOR WRITTE cedures to be used evidence of harm of the subjects wi regrity of the study	N TEXT to monitor subjects for adverse reaction will be immediately addressed and the h II be protected even if it jeopardizes the	s. ealth	
			Re	eturn 🚽

PRIVACY/CONFIDENTIALITY

Select the next hypertext phrase, "Privacy/Confidentiality," and you will see the screen below. Here you are asked to identify the level of risk for subjects (major risk for this example since we will be asking about substance abuse and other risky behaviors) and whether you will keep the data anonymous or confidential. If, as we decide to this in example, you will keep the data confidential, then you should next select the phrase, "strategies to maintain confidentiality."

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PRIVACY/CONFIDENTIALITY		- 🗆 ×			
PRIVACY/CONFIDENTIALITY Disclosure of information Could expose subjects to C no risk C minor risk C onfidential C major risk C neither	l as Tu	torial			
<u>Strategies to maintain confidentiality</u> □ have been specified	Strategies to maintain confidentiality have been specified				
Check off any limitations to confidentiality or anonymity that appl legal obligations to report suspicion of child abuse, etc. no legal protection if research records are subpoenaed other	y to this study.				
Editor Briefly Describe:					
SUGGESTIONS FOR WRITTEN TEXT Data must, if at all possible, be confidential or anonymous Specify procedures for maintaining confidentiality Specify any limitations of confidentiality to subjects					
	Retu	ım 🚽			

This screen contains a large number of strategies to maintain confidentiality that have been used in the literature.

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	141.1	V Dack
STRATEGIES TO MAINTAIN CONFIDENTIALITY		
Check all of the procedures you will use to protect confidentiality.		Tutorial
STRATEGIES TO MAINTAIN CONFIDENTIALITY		T
anonymity temporarily identified responses		
separately identified responses		
aliases to link data from same subject		
certificate of confidentiality		
separate identifiers from responses		
identifying information in locked file with restricted access		
identifiers to be destroyed if confidentiality appears threatened		
<u>change key information in reports to avoid inadvertent identification</u>	ion	
report information in aggregate to prohibit identification have all research staff sign a confidentiality agreement		
□ <u>other strategies</u> :		
Editor Briefly Describe:		
		Return

You can select any of these hypertext phrases for more details. The strategies you select can then be described in the editor. For example, below is the detail screen for aliases.

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ALIASES TO LI	NK DATA FROM SAI	ME SUBJECT		_ _ ×
chec ALIASES Instead of to or code they used to link identifying in remembered other than th subjects will of surveys cc alias and wo ruin the stud	k here when you I TO LINK DATA FR heir real names, s can easily remen their responses ow ndividual response d by subjects, uniq ne respondent-e.g need to be maint an be sent to them build not be suitabl ly results or place	believe you have adequately addressed OM SAME SUBJECT ubjects respond to the study with a name her for future responses. That code can er time for longitudinal studies without es. The code needs to be something eas ue, and not easily determined by someo , their mother's birthday. Names of ained separately so that additional wave . This relies on subjects to remember th e for studies where faulty memories coul subjects at greater risk.	this issue be ily ne s e d	Futorial
Editor	Briefly Describe:			
SUGGESTIONS FOR WRITTEN TEXT Justify your willingness to depend upon respondent memory and persuade the reader the code will produce unique aliases secure from outsider or investigator discovery.				
				Return

When you finish selecting strategies to maintain confidentiality (and noting your selections in the editor), select the "Return" button to get back to the "Standards for Treatment of Human Subjects" screen. When there, select the phrase, "vulnerable populations" and you will see the following screen. This screen identifies several common vulnerable populations that might be included in your study. You should indicate which of these you are including, indicate why they must be included, and consider any special provisions you may need to make for them such as thirdparty consent.

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<u>Project Reports Window Debug Help</u>		
Exit 🔂 Home 🚟 Glossary	MT	< Back
VULNERABLE POPULATIONS		_ 🗆 ×
VULNERABLE POPULATIONS- Some groups of people are more vulnerable than others to coercion undue influence. These people may already be overburdened or less a bear the burdens of research. In such cases, researchers should avoid including vulnerable populations. Where they are included they should not be called upon more than others and special safeguards may be required to further insure their protection. The Belmont Report (1979), p.7-9 INDICATE IF ANY OF THE FOLLOWING ARE INCLUDED AS SUBJECTS IN minors mentally disabled persons pregnant women prisoners other vulnerable groups (specify) no vulnerable populations inc	or Ible to d I THE STU	Tutorial
Editor Briefly Describe:		
SUGGESTIONS FOR WRITTEN TEXT If there are special reasons these populations must be included or i they are included only because they are present in the sample this is usually acceptable. Such populations should not be selected because t are more convenient for the researcher. In either case, special provisions to protect them including <u>third-party consent</u> are usually required.	if hey	
	Γ	Return

When you finish this screen, select the "Return" button to return to the "Standards for Treatment of Human Subjects" screen. You should now have completed consideration of all of these standards and they should all be checked off. When this is true, the checkbox at the top of the screen will automatically be checked to indicate that you have met these standards. This completes your consultation.

HUMAN SUBJECTS SUMMARY

When you finish the consultation and press the "Continue" button on the screen summarizing standards for treatment of human subjects, you will then see the following summary screen.

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HUMAN SUBJECTS SUMMARY			_ 🗆 🗵	
Human S	ubjects Summary	Т	utorial	
You have now completed your consid Based on your responses, you have indi	eration of the treatment of hun cated the following:	nan subjects	š.	
 ☐ The research does NOT involve human subjects ☐ The research appears to be exempt due to minimal risks ☑ The research meets all the standards for treatment of human subjects 				
Your edited human subjects report has been saved in the file HUMSUBJ. Your draft consent form (if applicable) has been saved in the file CNSNTDOC. We recommend you print these out now using the buttons below.				
In addition, you may want to save your answers to this consultation by selecting the "save consultation" button below.				
Print Human Subjects Report	Consultation Summary Report	t		
Print Draft Consent Form	Save Consultation			
E	xit			

This screen indicates which of the three set of criteria you meet (if any) and reminds you of the names of the files containing your human subjects draft report (humsubj) and your draft consent form (cnsntdoc).

GENERATING AND SAVING A REPORT

If your computer is attached to a printer and it is turned on, you can now print either of the two text files you may have created or a summary of the screens from the program's consultation. Selecting the "Print Human Subjects Report" button prints your report or proposal file. Selecting the "Print Draft Consent Form" prints the draft consent form. The "Consultation Summary Report" button prints all screens you have viewed in this consultation. Select the "Report" button now. The status box at the top of the screen will say "reporting." When the report is generated a message window will appear indicating that your report was written to the file "FTPF.RTF." You need a rich text format (rtf) capable word processor such as MS Word, Wordperfect, Word Pro, or Describe.

Each time you generate a report it is written to the same file, "FTPF.RTF." In order to save your report you need to rename the file. Select the "Report" menu item at the top of the screen and then the "Save" menu item from the drop-down menu that appears. A save file dialog box will appear allowing you to rename the report file (see chapter 1 on saving reports). Note, that the ".rtf" file extension needs to remain the same for the "rtf" word processors to recognize the file.

SAVING THE CONSULTATION AND EXITING

You have now completed the ETHX program. When you exit the program, you will be asked if you want to save your work. If you say "NO", all the values you have entered will be lost. Your report file remains on your hard disk and is not effected. If you are working with an ongoing project, you might want to save all the values you have entered for later reconsideration. To save your work simply select the "YES" button. ETHX will save your work and exit. See the section in Chapter 2 on managing projects.

NOTE: If you entered ETHX from the PRE Program you also have the option of returning to the PRE Program at any time during the consultation or when you complete the consultation by selecting the "PRE" button in one of the menu bars at the top of the screen.

10. WHICHGRAPHTM

INTRODUCTION

WHY WHICHGRAPH IS NEEDED

Graphing data, when done correctly, presents data without distortion or bias in a manner which helps the viewer see the overall patterns and identify underlying relationships which might not have been evident in tables. When done incorrectly, graphs can be no more revealing than tables of numbers, they can confuse relationships, they can even distort and mislead. Data graphics are playing an increasing role today in research, business, and communications. There are dozens of powerful spreadsheets, presentation graphics packages, and statistical programs capable of producing striking graphical summaries of data. Yet, few people have received formal training in the use of graphics to present data, and dozens of books and articles describe ways graphics are commonly misused and misapplied (e.g., see Schmid, 1983; Tufte, 1983; Zelazny, 1985). WhichGraph is designed to address this problem by providing users with sound advice tailored to their graphic needs.

WHAT IS WHICHGRAPH?

WhichGraph is a thought tool. That is, it is a computer program designed to help users make better decisions regarding the appropriate graphic display of data. WhichGraph uses a combination of three important computer science technologies: expert systems, hypertext, and decision support systems.

WhichGraph is an expert system program using artificial intelligence strategies to guide the user to the appropriate graphical display of data. The strategy used by WhichGraph to determine the appropriate graph is suitable for a wide variety of situations in which graphs are used. These approaches are widely used in academic institutions, business, and industry

In its Consult Mode, WhichGraph is programmed to function much like a human expert. WhichGraph asks the user a series of questions, much as a human expert might, and based on the user's answers, suggests several appropriate kinds of graphs ranked by suitability . In each case, it explains what the graph does and how it does (or does not) fit the user's objectives and assumptions. The user still makes the final decision, but now he or she can be confident it is an informed one. WhichGraph assures that researchers know where they are going and which courses are available to get them there. WhichGraph does not generate these graphical displays, but it does what data graphcs packages cannot do. It helps researchers select the appropriate graph for their problem.

Included with WhichGraph is an extensive hypertext facility. Users can browse among descriptions of graphical techniques organized by major categories, examine references, explore an extensive glossary of statistical terms, and even study detailed advice on the presentation of data with graphics. In the "Browse" mode users have complete control over these facilities and can examine each of them to the level of depth they desire and in a sequence of their own choosing. In the "Consult" mode users can access hypertext definitions of terms, descriptions of graphical techniques, and graphes advice as they become relevant to the consultation. Users can even consult these hypertext facilities while viewing the report of WhichGraph's recommendations on their screen.

WHO SHOULD USE WHICHGRAPH?

While most researchers have access to powerful graphics in spreadsheets, statistical programs, or specialpurpose graphing programs, those programs offer little or no guidance on the appropriate use of graphs. WhichGraph is designed to provide a supplement to existing software packages to help users identify the appropriate graph for their problem and to design the graph in a manner which best highlights underlying relationships in the data and avoids distortion or bias. For users who don't often use graphs or who are unfamiliar with many types of data graphics, WhichGraph helps them make competent selections of graphs for their projects. Even for users with strong data graphics backgrounds, WhichGraph can be helpful. providing a reassuring check of their logic, insuring that important options are not overlooked, reminding them of the assumptions of the most likely techniques, offering a convenient way to review various graphs, graphical terms, and advice; and providing a useful summary and report to document their decision.

WhichGraph includes graphical advice for a wide range of problems of interest to diverse groups of users.

Business users will probably be most interested in the graphics spreadsheet section. Market researchers. geographers, and demographers will likely be most interested in WhichGraphs advice on mapping. Researchers in the medical sciences, social sciences, and biological sciences will probably be most interested in WhichGraphs advice on the use of graphics to accompany statistical analyses. Engineers and others interested in quality control and related issues will also likely be most interested in the statistical graphics section where many types of quality control charts are discussed. While many of the graphs are for the display of quantitative data, others (such as those for exploratory data analysis or mapping) help visualize qualitative data and may be more useful for qualitative researchers.

TEACHING APPLICATIONS

WhichGraph should be a useful aid in business courses, statistics courses, and science journalism courses to help teach the effective use of data graphics. It can serve as a supplement to the lectures, permitting students to try their hand at selecting appropriate forms of graphical presentation, then using the WhichGraph program in its consult mode to check their judgment. In its browse mode it serves as an electronic glossary and reference book providing definitions of graphical terms and descriptions of over one hundred graphical techniques. Students could use the program several times for initial problems to help them understand the logic of selecting appropriate graphs. The program may be particularly helpful for use outside the classroom for individualized self-study.

TUTORIAL

This chapter provides a detailed step-by-step tutorial demonstrating the use of WhichGraph. In approximately 30 minutes this tutorial can demonstrate to you what its like to apply WhichGraph to a graphing problem. In addition, you can learn about important features of the program which make it much easier for you to use. These features include understanding the browse and consult modes, using hypertext help, saving your results, quitting in the middle of the program to return later, and so on.

BEGINNING A WHICHGRAPH SESSION

Double-click the left mouse button on the "MTOOLS" icon on your desktop (see the "Getting Started" chapter on how to create a desktop icon). Alternatively, you can select the "Start" button, then the "Programs" menu item, then the "MTOOLS" menu item and then the "MTOOLS" option. The Methodologist's Toolchest version screen will appear. Click on the "Begin" to view the "Introduction" screen. Now click the left mouse button on the "WhichGraph" hypertext. This will start the program.

You will first be asked to specify a new project name or select an existing project to reload. For this tutorial, enter "wg1" in the field in the top left of this "Projects" window, then select the "OK" button to continue.

Next you will see the logo screen for WhichGraph. This screen has four buttons, "BEGIN", "EXIT", "ABOUT WHICHGRAPH", and "INSTRUCTIONS." "BEGIN" will take you to the main menu screen. "EXIT" exits the program. "ABOUT WHICHGRAPH" takes you to a screen showing the authors and copyright notice. "INSTRUCTIONS" will take you to a tutorial similar to the one you are now reading. Select the "BEGIN" button.

You will see the main menu screen below. If you have used the Statistical Navigator program, you will recognize this screen. Both WhichGraph and Statistical Navigator are arranged in the same format and perform their background computations using similar logic. This screen gives the user three options. You may enter the "Browse Mode" to browse through the hypertext definitions and descriptions of analyses. You may enter the "Consult Mode" to receive explicit advice from the program regarding the appropriate graphing technique for your problem. Or, you may exit the program.

ug Help		
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WhichGraph ™		
MAIN MENU		
ode of operation you wish to use.		
This mode lets you examine desc graphs, look at definitions of grap statistical terms, and view referen order you like.	riptions of various hical and ces in whatever	
This mode lets you consult with W like you would consult with an ex selecting the correct graphical pro research objectives and assumption	/hichGraph much pert for advice on ocedure for your ons.	
	Glossary Glossary WhichGraph ™ MAIN MENU ode of operation you wish to use. This mode lets you examine desc graphs, look at definitions of grap statistical terms, and view referen order you like. This mode lets you consult with W like you would consult with an ex selecting the correct graphical pri research objectives and assumpti	Glossary MT WhichGraph ™ MAIN MENU ode of operation you wish to use. Main Menu ode of operation you wish to use. Main menu This mode lets you examine descriptions of various graphs, look at definitions of graphical and statistical terms, and view references in whatever order you like. Minode lets you consult with WhichGraph much like you would consult with an expert for advice on selecting the correct graphical procedure for your research objectives and assumptions.

Lets begin our tutorial by examining the Browse mode. Use the mouse or keyboard commands to select Browse Mode.

BROWSE MODE

The Browse Mode of WhichGraph works much the same as the Browse Mode in Statistical Navigator Professional. The Browse Mode is designed to permit the user to quickly scan through hierarchical menus and lists of items to get an overview of the knowledge offered by the program. Users can choose to stay at a broad level to get an overview, or select successively more detailed information on a specific topic. All of this is under the user's control and the knowledge base is designed to include useful summary menus and lists to help users quickly navigate through the knowledge base to understand the knowledge which is included and to view information on topics of particular interest at the level of detail they desire.

The Browse mode of WhichGraph gives the user a variety of paths they can take through the knowledge base shown in the image below.



If you select the "Glossary" button you will see an alphabetized list of over 400 graphical and statistical terms (this is the same as selecting the "Topics" button at the top of the screen). If you select References hypertext term you will see an alphabetized list of over 100 books and articles on the presentation of data using graphs. These references include general handbooks on data graphics, empirical research on the perception of graphs, and articles offering standards for the presentation of graphics of various sorts. The Types of Graphs hypertext term will take you to a menu screen letting you select from the broad types of graphs covered by WhichGraph, including spreadsheet graphics, statistical graphics, and maps. Selecting Graphical Advice will display a menu of broad types of graphical advice offered by WhichGraph. Topics include advice on the use of color in graphs, three-dimensional drawings, ways to present data accurately, the effective use of labels, and so on. If you select Annotated Graph, you will see an example column graph with labels attached to its components to clarify for you the various components of graphs and terminology used to describe them.

Select the "Types of Graphs" hypertext term.

You will now see a screen with buttons for each of the broad categories of graphs. Select the first button, "Spreadsheet or Business Graphics." Now you will see a screen listing types of charts such as area,pie, and 3D charts. Select the "pie chart" hypertext term. You will now see a list of different types of pie charts. Select the "3D Pie Chart" term. You should now see a screen with a 3D pie image and a detailed discussion of when and how to use a 3D pie chart. This screen is shown below.

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📌 3D PIE CHART		_ 🗆 🗵
	Help	<u> </u>
3D PIE CHART		
Description:		
Pie charts represent a total population or sample as a circle with wedge-shaped "pieces" of the circle		
representing the proportion or frequency of particular components. The area of each component is proportional to the magnitude of that component. (Excel)	t	
A 3D pie chart is a three-dimensional drawing of a <u>pie chart</u> and has many of the same advantages and disadvantages. However, 3D pie charts generally should be avoided because the third dimension is not a meaningful dimension, but merely one used to make the chart more visually appealing. When drawn so the pie has an oval shape rather than a circular shape, it can be more difficult to interpret a 3D pie chart than a regular two-dimensional pie chart.		
Variants/Examples • see <u>example pie charts</u> • see <u>example 3D charts</u> • An alternative to pie charts which is very similar to them is the <u>d</u> (Balogun, 1978; Schmid, 1983).	ecagraph	<u>_</u>

The Browse Mode is organized around screens of textual and graphical information with hypertext phrases or words highlighted visually on the screen. Users can read as much as they like of the information on each screen, then select the hypertext phrases or words to view more detailed information on topics of interest to them. You can keep following these hypertext trails as deeply as you wish.

When you are done viewing definitions of terms, use the [Esc] key to back out of a window (each press of the [Esc] key backs you out of one more window). Do this now until you return to the Browse Menu. Note that the hypertext term "Types of Graphs" is now a different color. This is to remind you of paths you have already taken. Now select the "Return to Main Menu" button and we will try the Consult Mode of WhichGraph.

CONSULT MODE

The Consult Mode of the WhichGraph program is designed to guide the user through the process of selecting appropriate graph for their problem. In successive an screens, it asks users to identify their research objectives, assumptions, and potential audience receptivity. Based on that information, the program rank-orders graphs based on their suitability for the problem described by the user, identifies the four best graphs, and provides a detailed report with its recommendations. The report can be saved in a disk file for future use. The user can view it on the screen and print it to a printer. The report includes a detailed description of the recommended graphs, identifies common statistical, spreadsheet, and data graphics packages which will construct those graphs from data, and gives a point-by-point explanation of how each graph does or does not fit the users problem.

The Consult Mode structures your interaction with WhichGraph more than the Browse Mode. In the Consult Mode you will be taken through a series of screens asking for information required by the program to recommend appropriate graphs for your problem. You have only limited control of the sequence of these screens once they are begun. You do, however, have the opportunity to change answers before going to the next screens, and you have access to hypertext help on each screen appropriate for that context.

BEGINNING A NEW CONSULTATION

Select the "Consult Mode" button from the main menu and you are taken to the first menu of the consult mode shown here.

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CONSULT MODE				_ 🗆 ×
	WhichGraph ™	4		
	CONSULT MEN	U		
WhichGraph can provide advice on the selection of appropriate graphs for each of the three following areas. To select which of these three broad types of graphs for which you wish to receive advice, simply click on that category.				
	Advice on Spreadsheet or Busines	ss Graphics		
	Advice on Statistical Graph	nics		
	Advice on Mapping			
	Reconsider Last Consultat	ion		
	Retrieve Saved Consultati	ion		
	Return to Main Menu			

You can select from the broad categories of graphs, spreadsheet or business graphics, statistical graphs, or mapping graphs. "Advice on Statistical Graphs" takes you through a decision tree based on the type of statistical model you have choosen (Statistical Navigator can help you chose the best statistical techniques). The other two "advice" buttons step you through a process similar to Statistical Navigator's consult mode.

SCREENING FOR TYPE OF GRAPHS

For this tutorial we will select the mapping graphics advice. A consultation in the spreadsheet and business graphics path behaves in exactly the same way. Select the "Advice on Mapping" button.

CONSULT MODE FOR MAPPING GRAPHICS

OBJECTIVES SCREEN

The next screen you should see is the Objectives Screen.



The screen above is used to describe your research objectives. Each objective appears as a single-line prompt on the screen. You are asked to enter a number between 0 and 10 indicating the importance you attach to that objective. The prompt on the right is a hypertext term. If you are unsure of the meaning of the prompt or how it relates to your mapping problem then click on the term with the mouse. This will pop-up a definition window that further explains the concept. This window may also have hypertext terms that take you to additional information. You can continue selecting hypertext until you run out of terms or sufficiently understand the concept. For a first pass, if you remain unsure of the significance of a concept to your problem you can enter a neutral value of 5. You can later reconsider your responses as you gain insight into your graphing problem.

For WhichGraph to compute consultation recommendations, you must fill in each of the input lines. This pattern of inputs will be compared to a similar pattern for each graphing technique in a pattern-matching strategy to determine which technique is most appropriate for this problem. Go ahead and enter these values in order (0,9,0,0,0,0,0). (You can use the [tab] key to move to the next input line.

Once you have filled in all of the input lines, WhichGraph will perform some computation. One result of the computations is to make a new hypertext term appear at the bottom of the screen prompting you to continue. Click the mouse on the term.

ASSUMPTIONS SCREEN

Next you should see the Assumptions screen shown below. The assumptions screen is just like the objectives screen except that it asks different questions. These questions pertain to the assumptions you are willing to make about your data. It operates the same way.
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MAP ASSUMPTIONS		
ADVICE FOR MAPS: ASSUMPTIONS		Instructions
CONFIDENCE Specify your confidence in each of the following assum	ptions	
data are measured on an interval or ratio scale		
data are measured on an ordinal scale		
large number of values		
small number of categories		
areal units are discrete and categorical		
data values distributed homogeneously across area		
continue		

Enter values in the assumptions screen in the following order (0,10,8,0,10,10,5,10). (You can use the [tab] key to move to the next input line). Again, when you are done a continue hypertext prompt for the "Summary Screen" will appear. Select it now.

SUMMARY SCREEN

This screen summarizes your WhichGraph consultation. One the top left are the four graphing techniques the best match the responses you gave to the objectives and assumptions questions.

Notice that these terms are hypertext. You can examine each for detailed descriptions of the technique.

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SUMMARY SCREEN			- 🗆 ×
			-
GENERAL CATEGORY OF GRAPHS MAP			
TECHNIQUES	PANKI	165.	
The 4 hest Techniques are:	-Objectives-	-Assumptions	_
1. prism map	0.986	0.913	
2. area cartogram	0.986	0.913	
3. choropleth map	0.843	0.913	
4. dasymetric map	0.414	0.538	
┌ OPTIONS			
Generate Report Return to Main Menu Save Co	onsultation		
Note: The best possible score is 1.0, the worst is 0.			
GOOD SOLUTIONS:			
Technique(s) 1 and 2.			
Each of these techniques provides a good fit to both	your		_
objectives and assumptions, having a fit of .90 or be	tter for both.		<u> </u>

On the top right are the summary scores WhichGraph has assigned for each technique on the left. These scores, between 0 and 1, are comparisons of your responses in the objectives and assumptions sections to ideal values for each technique. A value of 1 is the highest score and indicates a perfect match.

You can scroll down the screen to see WhichGraph's recommendations. A "Good" solution would have a match of 0.90 or better for both the objectives and assumptions. An "Acceptable" solution would be when the match is between 0.70 and 0.90 for both the objectives and assumptions. If the scores are not good or acceptable, WhichGraph will indicate that it cannot recommend any technique.

This section ends with a series of optional warnings. These warnings only appear when they are appropriate. A common warning occurs when one or more techniques which meet the graphing objectives relatively well does a poor job of meeting the assumptions. In such cases, WheihGraph point this out and reminds the user that they need to be particularly careful in considering the assumptions because they will be critical for deciding among the techniques.

OPTIONS

At this point you have completed a consultation. You have several options. You can generate a report that includes this summary screen, and details for each graphing technique, including how each response you made to the objectives and assumptions questions match the technique. You can return to the "Main Menu" to consider a new consultation or review this last one again. This is also a good time to save your consultation to review at a later time (select the "Save Consultation" button).

NOTE: The "Summary Screen" can be sent to your printer. Select the "Window" menu option at the top of the screen and then select the "Print Current" menu option. Be sure your printer is on and connected.

GENERATING A REPORT

Let's go through the steps to generate a report. Select the "Generate Report" button in the Options box. This will take you to the "Report Setup" screen.

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A REPORT SETUP		_ 🗆 ×
This screen is to help you design a final report of your Which Graph consultation.		
1. Your Name:		
Report Title:		
2. Do you want to include detailed results for a specific		
technique in addition to the four best ones.		
YES		
3.		
Generate Report Main Menu (No Report)		

Enter your name and the title you want to appear on the report. You can generate the report now if you wish by selecting the generate report button or return to the Main Menu without creating a report. WhichGraph automatically includes the four techniques with the best fit that appeared in the "Summary Screen." You can include other techniques that had lower scores in the report. Select the "Yes" button in step 2 to select additional techniques for the report.

ADDING TECHNIQUES TO THE REPORT

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Project Reports Window Debug Help	ut land
Exit The Home E Glossary	MI < Back
ADDITIONAL TECHNIQUES	
REPORT	MAIN MENU
Select any additional techniq	ues you want added to the report
and select the report i	button when you are done.
TECHNIQUES	PANKINGS-
The 4 best Techniques are:	Objectives Assumptions
	enjeentee insemiliaens
🔽 prism map	0.99 0.91
🔽 area cartogram	0.99 0.91
🗹 choropleth map	0.84 0.91
🗹 dasymetric map	0.41 0.54
🗌 graduated symbol map	0.32 0.61
dot-distribution map	0.41 0.41
isarithm map	0.41 0.29
🗆 point symbol map	0.18 0.39

This screen shows all the techniques for this particular type of graphs(in this case-Mapping). Other categories of graphing would have different lists of specific techniques. Notice that they are ordered in descending order of their pattern matching scores with the top four techniques already checked. Check any additional techniques you wish to add to the report. As a warning, adding all the techniques may produce a report file that is too large to be viewed in the WhichGraph program.

Go ahead and click the mouse on one of the unchecked checkboxes and then click on the report button in the top right corner. WhichGraph will begin generating a report (note the status box at the top right of the screen indicates "Reporting"). When the report is completed two windows will appear. The message window indicates that your report was written to a rich text format (rtf) file for import into an RTF capable word processor such as MS-Word, Wordperfect, etc. This file allows you to insert the WhichGraph consultation report into your research documents. The other window allows you to view a shortened version of the report as a text file in a scrollable window.

REPORT WINDOW

Maximize the report window by clicking on the up arrow button in the top right of the window. Now scroll down through the report. A text image of the summary screen appears first showing WhichGraph's recommendations. Next appears a detailed description of each of the top four techniques and any additional techniques that you specified. It is worth taking a closer look at the details provided in the report for each technique.

DETAILED REPORT OF TECHNIQUES

Appearing in bold below is one of the techniques as it appears in the report. The report begins with the title of the technique and a detailed decription. Next comes a listing of the references to the literature where the user can find out more about the technique, and wherever possible, a listing of commonly available graphing packages which perform that type of graph.

PRISM MAP		
	Prism Map	Help

Description:

The prism map or "block map" is a special case of the choropleth map. Each areal unit is treated as a homogeneous unit with the assumption that varying magnitudes of a phenomena distributed evenly across each area. Rather than shading areas to display the value of a feature of interest, the map is presented in an oblique orientation. The areas appear 3-D (presented with height) with the height of the areas made proportional to the value of interest. Using a three-dimensional representation of the value produced dramatic effects, but can diminish the ability to make adequate comparisons from area to area. An area with a large value will tend appear tall and when there are areas behind which have smaller values, the larger value area will mask the display. Thus, area bias is not minimized. It is wise to give considerable consideration to the potential masking of values when using any 3-dimensional drawings.

Also see general Graphical Advice

References: Campbell (1984). Monmonier & Schnell (1988)

Software Options: Statistical Packages: SAS (a) Spreadsheets: Data Graphics Programs: Mapping Programs:

a = automatic, p = programmable, t = different terminology

example maps

Finally, for each technique, there is a detailed breakdown of the factors which should be considered for both analysis goals and assumptions. The preferences and assumptions score indicates how closely your responses in the objectives and assumptions screens come to an ideal pattern for this particular technique. Below, for first the objectives and then the assumptions, for each of those factors we identify the ideal score for that technique and the reported score provided by the user. Using this information, the user can identify those goals or assumptions of the technique which are consistent with the user's goals and assumptions and those which are not.

Preferences: 0.99		
Assumptions: 0.97		
OBJECTIVES and ASSUMPTIONS		
ANALYSIS OBJECTIVES	Optimal Rep	ported
display a single feature at a single discrete location	on ['] 0'	0
display the magnitude of a feature or phenomeno	on 10	9
display a distribution of values	0	0
display values in terms of density	0	0
display multiple subjects	0	0
retain precision of information or data	0	0
retain precision of geographic unit	0	0
	-	-
ANALYSIS ASSUMPTIONS	Optimal Rep	ported
data are measured on an interval or ratio scale	0	0
data are measured on an ordinal scale	10	10
data are measured on a nominal scale	10	8
large number of values	0	0
small number of categories	10	10
areal units are discrete and categorical	10	10
data/information is continuously distributed	10	5
data values distributed homogeneously across a	rea 10 ⁻	10
· · ·		

These scores can be helpful if you decide to reconsider this consultation. Note especially those concepts

in which your response differs greatly from the ideal and you perhaps did not feel sure of your response. You might want to explore the hypertext details for these concepts to gain a greater understanding of how this concept relates to your graphing problem.

PRINTING THE REPORT

You can print this text report by selecting the "File" menu item at the top of the screen and then select the "Print" menu item. A print dialog box will appear allowing printer options. Select the OK button when you are ready to print. Keep in mind that the full report was written to the "FTPF.RTF" file in the directory in which WhichGraph is running. To print that file you will need to open it in your RTF capable word processor. See chapter 1 on printing.

SAVING A REPORT

Each time you create a report, it is written over the last report. To save a report you must rename the report file. Select the "Report" menu item and then the "Save Report" menu item. Then in the Save file dialog box that will appear, enter a name for your report that you will later recognize. Note that the "rtf" file extension must not be changed (see chapter 1 on reports).

FINISHING A CONSULTATION

When you are done viewing the report, you can exit it by pressing the [esc] key. Repeat pressing the [esc] key until you return to the "Report SetUp" screen or the "Summary Screen." In either of these windows there is a button to return to the main menu. Note also, you can exit, save the desktop, or go to a particular screen but using the menu and buttons at the top of the screen (see chapter 1 on getting around).

SAVING THE CONSULTATION FILE (SAVE DESKTOP)

After going through a complex consultation and viewing the recommendations of the WhichGraph program you may want to save the information you provided so that you can come back to this problem in the future; perhaps performing a sensitivity analysis, considering how changes in one or more of your answers influences the programs' consultation containing recommendations. This file information you provided should not be confused with the or recommendation file containing the report recommendations of the program.

When you exit the program, you will be asked if you want to save your work. If you say "NO", all the values you have entered will be lost. Your report file remains on your hard disk and is not effected. If you are working with an ongoing project, you might want to save all the values you have entered for later reconsideration. To save your work simply select the "YES" button. WhichGraph will save your work and exit. See chapter 2 on Working with Projects.

11. HYPER-STATTM

INTRODUCTION

WHY HYPER-STAT IS NEEDED

Hyper-Stat provides the world's first electronic hypertext dictionary of statistical, graphical, and methodological terms. It can be used in conjunction with your statistical package, data graphics program, spreadsheet, or other Idea Works programs in the Methodologist's Toolchest to provide hypertext help for terms used in those programs. Or it can be used as a stand-alone program, providing an on-line dictionary of statistical terms available at your work station.

Surprisingly, available statistical programs do not offer on-line definitions of terms, much less hypertext definitions with links to related terms. Most statistical texts have very limited glossaries which often lack the terms of interest. And the few printed dictionaries of statistical terms are not widely available, are often out of date, are relatively expensive, are written at too technical a level for the typical applied user of statistics, and don't include many of the statistical, graphical, and methodological terms most often encountered in applied research.

Hyper-Stat provides convenient, inexpensive, and friendly access to these commonly used technical terms so

important for understanding today's statistical and graphical procedures in both applied settings and in the classroom.

WHAT IS HYPER-STAT?

Hyper-Stat is an extensive hypertext dictionary. Hypertext is a term used to describe textual materials which permit the user to navigate their own path through those materials.

To illustrate, in Hyper-Stat, some of the text displayed on most definition screens can be selected by the user. That text is represented on the screen as a hot region which the user can select using the mouse. When a particular hypertext phrase is selected, a new window is opened and the definition of that term is displayed. That definition, in turn, usually has additional hypertext items within it. Thus, the user can continue to invoke new displays, following his or her own path through the information in the program.

WHO SHOULD USE HYPER-STAT?

Hyper-Stat is designed to be useful to researchers working with existing statistical packages, spreadsheets, data graphics packages, and research design programs. Hyper-Stat provides easily accessible definitions of key terms which can make these other programs more useful and your use of them more effective. Hyper-Stat is also designed to be used directly from within other Idea Works programs in the Methodologist's Toolchest. For these programs, Hyper-Stat provides a comprehensive help facility with definitions of the full range of statistical, graphical and methodological terms necessary to make most effective use of the other programs in the Methodologist's Toolchest. By providing these definitions in this comprehensive program including extensive hypertext links among the terms, Hyper-Stat provides a powerful help facility suitable for the complete range of existing statistical, graphical, and methodological programs. Thus, Hyper-Stat can serve as a useful supplement to existing statistical and graphics packages.

TEACHING APPLICATIONS

Hyper-Stat can be particularly helpful in a teaching setting where students will be able to gain far more understanding from their use of statistical, graphical, and methodological programs when they have ready access to definitions of terms. By making these definitions accessible on-line, Hyper-Stat encourages students to learn as they use these other programs and make more effective decisions based on a clearer understanding of key concepts. Hyper-Stat may be of even greater use for students working outside the classroom in individualized self-study.

OVERVIEW OF HYPER-STAT FEATURES

Hyper-Stat provides an extensive on-line dictionary of statistical, graphical, and methodological terms. Users can view selected definitions by selecting items from the list of terms or by typing in a word or phrase. Hyper-Stat contain over 1,900 terms in the Hyper-Stat dictionary including over 1,400 distinct definitions and approximately 500 synonyms. Hyper-Stat also includes almost 4,000 hypertext links connecting definitions to definitions of related terms. Users can follow these hypertext links until they reach the depth they require to understand the concepts.

COMPATIBLE WITH OTHER IDEA WORKS PROGRAMS

Hyper-Stat is an intregal part of all the programs in the Methodologist's Toolchest. Hyper-Stat provides a single comprehensive dictionary of statistical, graphical, and methodological terms which are accessible directly from within any Methodologist's Toolchest program. This permits users to browse unimpeded through the full range of definitions, rather than being restricted by the boundaries of particular Toolchest programs.

TUTORIAL

Perhaps the best way to become comfortable using Hyper-Stat for your own research problems is to participate in a step-by-step tutorial session. In approximately 5 minutes you can learn to access a wealth of statistical, graphical, and methodological knowledge.

BEGINNING A HYPER-STAT SESSION

Double-click the left mouse button on the "MTOOLS" icon on your desktop (see the "Getting Started" chapter on how to create a desktop icon). Alternatively, you can select the "Start" button, then the "Programs" menu item, then the "MTOOLS" menu item and then the "MTOOLS" option. The Methodologist's Toolchest version screen will appear. Click on the "Begin" to view the "Introduction" screen. Now click the left mouse button on the "Hyper-Stat" hypertext. This will start the program running.

GLOSSARY (TOPICS)

Unlike the other programs in the Methodologist's Toolchest, Hyper-Stat does not have a hierarchy of screens and menus. Each screen is like an entry in a dictionary. Some screens will refers to others through hypertext links but each is intended to stand alone. What appears when you "begin" your Hyper-Stat session is the glossary list, shown below. From this point on, you use the glossary as described in Chapter 2 under "Glossary."



The glossary is a list of all the topics available in Hyper-Stat in alphabetical order. When you first open the glossary (clicking on the "Topics" button also opens the glossary), the input box at the top will contain the first entry in the list marked for easy replacement with your search term. Click the mouse on this box and holding the left mouse down slide the mouse across the box completely marking the text. Now begin typing "BOX". Type slowly and notice that the list scrolls to match each character as you type. Now click the mouse on the highlighted line in the list, "Box-and-wisker plot."

The glossary will disappear and the "Box-And-Whisker Plot" screen will appear. This screen contains a definition of a box-and-whisker plot along with hypertext links to related topics. Select one of the hypertext terms. The screen for that term will appear on top of the old one. If you want to see both of them at the same time, click and hold down the left mouse button with the arrow on the top blue portion of the window and drag the window down. Now both windows will be visible. You can also resize the window by moving the arrow to the edge of the window until it turns into a double arrow. Now hold down the left mouse button and drag the window to the size you want.

To close windows, press the [escape] key. If all of the windows are closed, the glossary will reappear. You can also open the glossary at any time by selecting the "Topics" button.

The report and printing facilities for Hyper-Stat are exactly as described in Chapter 2 of this manual.

To Exit Hyper-Stat simply select the "Exit" button at the top of the screen or from the "File" menu submenu.

12. TROUBLE-Shooting

A COMMON-SENSE APPROACH

Ideally, a software program should install and run without any difficulties. Realistically however, computer software and hardware represent one of man's most complicated Both software creations. (commercial applications, operating systems, device drivers. configuration, and initialization files), and hardware (CPU, video and audio cards, networks, removable media, and hard disks) are numerous and changing rapidly. The greater the differences between the system you are using and the system on which the software was developed, the more likely that incompatibilities may occur.

The software reproduction process is also susceptible to imperfections. Disk media can become physically damaged at any point from the manufacturer to the moment you try to install a program on your machine. Data stored on magnetic media are susceptible to the magnetic fields that exist around us everywhere.

We have attempted at every point in the manufacturing and duplication process to insure perfection in our products. But, honestly, things can go wrong. We have tried to anticipate any difficulties you may encounter. This chapter is the first resource you should use for help with any Methodologist's Toolchest programs. If after thoroughly reviewing the appropriate sections, you are still unable to resolve a problem please give our technical assistance experts a call at:

> Voice: 573-445-4554 or Fax: 573-445-4242.

INSTALLATION

NOTHING HAPPENS

The CD comes with an "Autorun.inf" file which if this feature is enabled on your computer will automatically start the "InstallMe1st" program. If this feature is turned off then you must double-click on the "InstallMe1st" icon to begin the installation. The "InstallMe1st" program looks for a "mtinstall.log" file in your "Windows" folder ("Winnt" for NT users). If this file does not exist then it is created and the "Setup" program is called to complete the installation. If, however, the file does exist and you have previously run the Methodologist's Toolchest, then the "InstallMe1st" program determines that the Toolchest has already been successfully installed and does not call the "Setup" program.

This installation checking process can be fooled if you have previously installed the Toolchest and then did not properly uninstall it (e.g. you dropped the "Mtools" folder in the "Recycle Bin" without running the "Uninstall" program (see "Uninstalling the Toolchest" in the "Getting Started" chapter). During the normal uninstall process, the "mtinstall.log" file is erased so that the "InstallMe1st" program will then call the "Setup" program. Look in your "Windows" (or "Winnt") folder for the "mtinstall.log" file and drag it to the "Recycle Bin." Now try reinstalling the Toolchest.

INSUFFICIENT DISK SPACE

The installation program checks your hard disk(s) to determine if there is sufficient room to install the needed files. You will be notified if there is not enough room and the installation program will then halt. You will need to erase or move files on your hard disk to make enough room. The entire Methodologist's Toolchest requires approximately 25 MB of disk space and each program requires approximately 3MB each. Repeat the installation process once you have made enough space on your hard disk.

DISK READ ERRORS

Whether you are installing from a CD-ROM disk or from floppy disks errors can occur. You may have received a message describing a device or data read error has occurred. First, try to reseat the disk in the drive and retry the last operation. Next, check to see that the disks and drives are free of dirt and lint. There are commercially available drive cleaners that every computer owner should have and use regularly. If these steps fail then it is possible that the disk has been damaged or that the software copying process caused an error. At this point you should contact your sales person(s) for an exchange.

START UP

INSUFFICIENT MEMORY

The Methodologist's Toolchest programs do not specifically manage the memory of your machine. This is usually handled adequately by the WINDOWS operating system. If, however, your machine's actual RAM (fast) memory plus the virtual memory (see your windows manual) are less than about 24MB (16MB RAM + 8MB virtual memory) you may not be able to run one or more of the programs. You can improve this by increasing your virtual memory or adding more RAM memory.

THE SOFTWARE INSTALLED BUT WON'T RUN

When you double-click the mouse on the program icon in WINDOWS, or select a program from the WINDOWS "Start" button, the operating system starts the program and passes any arguments associated with the icon. First open the "MTOOLS" window by clicking the right mouse button on the "Start" button on your desktop. Select the "Open" menu item from the pop-up menu and the "Start Menu" window will appear. Now double click on the "Programs" icon to open the "Programs" window. In this window find and double-click to open the "MTOOLS" window. To see what is associated with an icon, click the mouse once on the "MTOOLS" icon so that it is highlighted. Now from the "FILE" menu option at the top of the screen select the "PROPERTIES" submenu item. You will see a new window that describes the location of the program to be run and any arguments passed to it. If you have installed the program in the normal fashion, this will be the program "FTWR.EXE" in the directory in which it was installed e.g. "C:\MTOOLS\FTWR.EXE". the arguments will be a short set of letters associated with your program, e.g. "MT" for Methodologist's Toolchest. If you have moved the files

created in the install process to another directory (either by explicit copy commands or by dragging icons from one location to another) then you must change the property settings to match the new directory, see the Getting Started chapter on working with files. NOTE: the working directory for all Idea Works programs must be the same directory in which the "FTWR.EXE" program is installed.

Once the program starts to run, it looks up settings for the individual program such as Statistical Navigator in the "FTWR.INI" file. This *.ini file must be in the same directory as the "FTWR.EXE" file, otherwise you will receive a message that the "FTWR.INI" was not found and that the program cannot startup. You may view and edit this file with any text editor such as NOTEPAD. Again, if you move any of the database files associated with your programs to another directory, you need to edit the "FTWR.INI" file. Modify the "[DATABASE] =" line to match the path to the database files (usually in the "Dbases" folder on the CD).

If you have installed the program and made no changes in the location of files or the properties settings or to the ftwr.ini file then everything will have the default settings. If the program will not run, and you are confident that none of the issues in the above paragraphs applies, then write down any messages that the program or the Windows operating systems gives you, and call our technical support staff.

REPORTS

Each program in the Methodologist's Toolchest allows you to create a report of your work. There are basically two report files, "snpwg.rep" and "ftpf.rtf." The "snpwg.rep" file is stored in the same directory as the "FTWR.EXE" file used to run the program (see the "properties" values for the program icon for the complete path). This file can be viewed, printed, and modified in any text editor such as NOTEPAD. The file is written over each time you create a consultation report in Statistical Navigator or WhichGraph.

The "ftpf.rtf" file is created in the project directory for programs that ask you for a project and in the same directory as the "FTWR.EXE" file is located for non-project programs. You can only view this file properly with a rich text format (rtf) capable word processor. This file is also written over every time you create a report.

See if your problem is one of the following.

1. "I CAN'T FIND THE REPORT FILE FROM MY WORD PROCESSOR."

FOR NON-PROJECT PROGRAMS

Click once on the "MTOOLS" icon. Now select the "File" menu at the top of the screen and the select the "Properties" submenu item from the popup menu. A dialog box will appear. In the box labeled "command line" will be the complete path to your "FTWR.EXE" program, e.g. "C:\MTOOLS\FTWR.EXE" plus additional characters.

You can also use the "FIND" command from the "Start" button to search for the "FTWR.EXE" file. From your word processor select the "File" and the "Open" menu items. Usually you will see a file open dialog box that allows you to locate a file on your hard disks. Change the fields in the dialog box so that you can see the files in the directory where "FTWR.EXE" is located, e.g. "C" drive and directory "MTOOLS." Now select the "ftpf.rtf" file in the files list. Note, if you saved your report with another name then select that file.

For project programs:

If your program asked you for a project directory when it first started running, then your report file is stored in that directory. If you do not recall the path to the project then rerun the program and reselect the same project. As you select the project you will see the complete path to that project. You can also select "Project" and then "Current" from the menu to see the project path. Use this path to find you file from your word processor.

2. "I DON'T SEE ANY OF THE LINE DRAWINGS IN THE REPORT THAT WERE ON THE SCREEN."

Each word processor is different, but several allow you to view a document in several different modes. Be sure you are in the mode that displays drawing lines (e.g. in MS-Word you must be in "Page Layout View").

3. "LINES SEEM TO BE GARBLED OR MOVED DOWN."

The screens you see in the Toolchest program sometimes fill most of the screen. When we write those

screens to the report we try to keep the same format. In your word processor longer lines may be word-wrapped making the end of one line appear at the first of the next line and line drawings will be pushed down. Use the margin controls in your word processor to maximize the width of your view of the document and minimize word-wrapping.

PRINTING

The Idea Works programs use the printer and settings setup for your Windows Print Manager program. The Idea Works does not install or provide any printer driver software. We only change the fonts and sizes while printing is in process and all settings return to their preprinting values. You will receive a "wrong printer selected" message if you try to print to a printer that is not connected or is nonfunctional (e.g., turned off, out of paper, etc).

Check that the printer is working properly and then retry your last print activity. If printing a window fails try saving the window as an "RTF" file and then print it from your "RTF" capable word processor.

PROGRAMS USED TO RUN BUT WON'T NOW

If after a time in which the programs have been running smoothly and then suddenly will not run, consider each of the following problems.

1. "I GET MESSAGES SAYING I CAN'T WRITE A FILE OR I'M OUT OF DISK SPACE."

Several of the programs create files on your hard disk that may grow larger over time, especially programs that require project directories. You can move your projects to another disk drive that has more space, then when the program asks you for a project directory, change to the new drive and directory where you moved the project. Note, you should keep the project directory name the same when you move it.

Also, you may keep saving your reports and these files could be filling your hard disk. You should erase or archive report files that you are not using.

2. "THE PROGRAM WON'T START UP ANY MORE OR CRASHES ONCE IT GETS STARTED."

Your programs runtime files are stored on your hard disk which is a magnetic medium. These systems generally have low data corruption rates, but it can happen. You should run one of the disk maintenance utilities, such as ScanDisk, to detect and repair any defects on your hard disk.

Once you have done this, reinstall the Methodologist's Toolchest. Reinstallation will not destroy any projects you already have in progress, but it is always wise to make backups of your work regularly.

NETWORKS

The Methodologist's Toolchest was not specifically designed for networks and the individual license agreements specifically prohibit distribution or operation of these programs over a network. This help section is to address those situation where your system may be attached to a network but you are running the Toolchest programs locally from your hard disk.

All of the programs and files required to run any of the Methodologist's Toolchest programs must be local. By this we mean, you cannot have the Toolchest installed on one machine and try running it from another machine. Also, the operating system and it's files must be local. The Windows operating system and the "windows" subdirectories must exist and be accessed from the local hard disk.

You should contact you network administrator to insure that you are meeting the requirements of locality when you start a Toolchest program.

COLORS

If your machine only shows 16 colors or less, the images may appear faded. This does not effect the operation of the program and is not generally noticeable

WINDOWS WON'T SCROLL

Windows95, Windows98, and Windows-NT operating systems use task bars to indicate and access programs that are

currently loaded or running. If the task bar remains visible, your Methodologist's Toolchest program may show an additional scroll bar on the right. This scroll bar may partially overlap the scroll bar for the smaller windows within the programs. While you can still use the partially covered scroll bar, it may be awkward and may require you to resize your windows occasionally. If this becomes a problem for you, you may want to hide the task bar to improve usability. (See your Windows help files or manual for instructions on how to do this.)