

Contents

List of tables	xxi
List of figures	xxiii
List of examples	xxv
Preface	xxix
A word about fonts, files, commands, and examples	xxxiii
1 Introduction	1
1.1 Replication: The guiding principle for workflow	2
1.2 Steps in the workflow	3
1.2.1 Cleaning data	4
1.2.2 Running analysis	4
1.2.3 Presenting results	4
1.2.4 Protecting files	4
1.3 Tasks within each step	5
1.3.1 Planning	5
1.3.2 Organization	5
1.3.3 Documentation	5
1.3.4 Execution	6
1.4 Criteria for choosing a workflow	6
1.4.1 Accuracy	6
1.4.2 Efficiency	6
1.4.3 Simplicity	7
1.4.4 Standardization	7
1.4.5 Automation	7
1.4.6 Usability	7

1.4.7	Scalability	8
1.5	Changing your workflow	8
1.6	How the book is organized	8
2	Planning, organizing, and documenting	11
2.1	The cycle of data analysis	13
2.2	Planning	14
2.3	Organization	18
2.3.1	Principles for organization	18
2.3.2	Organizing files and directories	19
2.3.3	Creating your directory structure	21
	A directory structure for a small project	21
	A directory structure for a large, one-person project	23
	Directories for collaborative projects	23
	Special-purpose directories	25
	Remembering what directories contain	27
	Planning your directory structure	29
	Naming files	30
	Batch files	30
2.3.4	Moving into a new directory structure (advanced topic)	31
	Example of moving into a new directory structure	31
2.4	Documentation	34
2.4.1	What should you document?	36
2.4.2	Levels of documentation	37
2.4.3	Suggestions for writing documentation	38
	Evaluating your documentation	39
2.4.4	The research log	39
	A sample page from a research log	40
	A template for research logs	42
2.4.5	Codebooks	43
	A codebook based on the survey instrument	43

2.4.6	Dataset documentation	44
2.5	Conclusions	45
3	Writing and debugging do-files	47
3.1	Three ways to execute commands	47
3.1.1	The Command window	48
3.1.2	Dialog boxes	49
3.1.3	Do-files	49
3.2	Writing effective do-files	50
3.2.1	Making do-files robust	51
	Make do-files self-contained	51
	Use version control	53
	Exclude directory information	53
	Include seeds for random numbers	55
3.2.2	Making do-files legible	55
	Use lots of comments	56
	Use alignment and indentation	57
	Use short lines	58
	Limit your abbreviations	61
	Be consistent	63
3.2.3	Templates for do-files	63
	Commands that belong in every do-file	63
	A template for simple do-files	66
	A more complex do-file template	66
3.3	Debugging do-files	68
3.3.1	Simple errors and how to fix them	68
	Log file is open	68
	Log file already exists	68
	Incorrect command name	69
	Incorrect variable name	69

	Incorrect option	70
	Missing comma before options	70
3.3.2	Steps for resolving errors	70
	Step 1: Update Stata and user-written programs	70
	Step 2: Start with a clean slate	71
	Step 3: Try other data	72
	Step 4: Assume everything could be wrong	72
	Step 5: Run the program in steps	72
	Step 6: Exclude parts of the do-file	74
	Step 7: Starting over	74
	Step 8: Sometimes it is not your mistake	75
3.3.3	Example 1: Debugging a subtle syntax error	75
3.3.4	Example 2: Debugging unanticipated results	77
3.3.5	Advanced methods for debugging	81
3.4	How to get help	82
3.5	Conclusions	82
4	Automating your work	83
4.1	Macros	83
4.1.1	Local and global macros	84
	Local macros	84
	Global macros	85
	Using double quotes when defining macros	85
	Creating long strings	85
4.1.2	Specifying groups of variables and nested models	86
4.1.3	Setting options with locals	88
4.2	Information returned by Stata commands	90
	Using returned results with local macros	92
4.3	Loops: foreach and forvalues	92
	The foreach command	94
	The forvalues command	95

4.3.1	Ways to use loops	95
	Loop example 1: Listing variable and value labels	96
	Loop example 2: Creating interaction variables	97
	Loop example 3: Fitting models with alternative mea- sures of education	98
	Loop example 4: Recoding multiple variables the same way	98
	Loop example 5: Creating a macro that holds accumu- lated information	99
	Loop example 6: Retrieving information returned by Stata .	100
4.3.2	Counters in loops	101
	Using loops to save results to a matrix	102
4.3.3	Nested loops	104
4.3.4	Debugging loops	105
4.4	The include command	106
4.4.1	Specifying the analysis sample with an include file	107
4.4.2	Recoding data using include files	107
4.4.3	Caution when using include files	109
4.5	Ado-files	110
4.5.1	A simple program to change directories	111
4.5.2	Loading and deleting ado-files	112
4.5.3	Listing variable names and labels	113
4.5.4	A general program to change your working directory	117
4.5.5	Words of caution	118
4.6	Help files	119
4.6.1	nmlabel.hlp	119
4.6.2	help me	122
4.7	Conclusions	123
5	Names, notes, and labels	125
5.1	Posting files	125
5.2	The dual workflow of data management and statistical analysis . . .	127
5.3	Names, notes, and labels	129

5.4	Naming do-files	129
5.4.1	Naming do-files to re-create datasets	130
5.4.2	Naming do-files to reproduce statistical analysis	130
5.4.3	Using master do-files	131
	Master log files	133
5.4.4	A template for naming do-files	134
	Using subdirectories for complex analyses	135
5.5	Naming and internally documenting datasets	136
	Never name it final!	137
5.5.1	One time only and temporary datasets	137
5.5.2	Datasets for larger projects	138
5.5.3	Labels and notes for datasets	138
5.5.4	The datasignature command	139
	A workflow using the datasignature command	140
	Changes datasignature does not detect	141
5.6	Naming variables	143
5.6.1	The fundamental principle for creating and naming variables	143
5.6.2	Systems for naming variables	144
	Sequential naming systems	145
	Source naming systems	145
	Mnemonic naming systems	146
5.6.3	Planning names	146
5.6.4	Principles for selecting names	147
	Anticipate looking for variables	147
	Use simple, unambiguous names	148
	Try names before you decide	151
5.7	Labeling variables	151
5.7.1	Listing variable labels and other information	151
	Changing the order of variables in your dataset	155
5.7.2	Syntax for label variable	155

5.7.3	Principles for variable labels	156
	Beware of truncation	156
	Test labels before you post the file	157
5.7.4	Temporarily changing variable labels	157
5.7.5	Creating variable labels that include the variable name	158
5.8	Adding notes to variables	160
5.8.1	Commands for working with notes	161
	Listing notes	161
	Removing notes	162
	Searching notes	162
5.8.2	Using macros and loops with notes	162
5.9	Value labels	163
5.9.1	Creating value labels is a two-step process	164
	Step 1: Defining labels	164
	Step 2: Assigning labels	164
	Why a two-step system?	164
	Removing labels	165
5.9.2	Principles for constructing value labels	165
	1) Keep labels short	165
	2) Include the category number	166
	3) Avoid special characters	168
	4) Keeping track of where labels are used	169
5.9.3	Cleaning value labels	170
5.9.4	Consistent value labels for missing values	171
5.9.5	Using loops when assigning value labels	171
5.10	Using multiple languages	173
5.10.1	Using label language for different written languages	174
5.10.2	Using label language for short and long labels	174
5.11	A workflow for names and labels	176
	Step 1: Plan the changes	176

5.4	Naming	Step 2: Archive, clone, and rename	177
5.4.1		Step 3: Revise variable labels	177
5.4.2		Step 4: Revise value labels	177
5.4.3		Step 5: Verify the changes	178
5.11.1		Step 1: Check the source data	178
5.4.4		Step 1a: List the current names and labels	178
		Step 1b: Try the current names and labels	181
5.11.2		Step 2: Create clones and rename variables	182
		Step 2a: Create clones	183
5.5.1		Step 2b: Create rename commands	183
5.5.2		Step 2c: Rename variables	184
5.11.3		Step 3: Revise variable labels	185
5.5.4		Step 3a: Create variable-label commands	185
		Step 3b: Revise variable labels	186
5.11.4		Step 4: Revise value labels	187
5.6	Naming	Step 4a: List the current labels	188
5.6.1		Step 4b: Create label define commands to edit	189
5.6.2		Step 4c: Revise labels and add them to dataset	193
5.11.5		Step 5: Check the new names and labels	194
5.12	Conclusions		195
6	Cleaning your data		197
6.1	Importing data		198
6.1.1	Data formats		198
	ASCII data formats		198
	Binary-data formats		200
6.1.2	Ways to import data		201
	Stata commands to import data		201
	Using other statistical packages to export data		203
	Using a data conversion program		203

6.1.3	Verifying data conversion	203
	Converting the ISSP 2002 data from Russia	204
6.2	Verifying variables	210
6.2.1	Values review	211
	Values review of data about the scientific career	212
	Values review of data on family values	215
6.2.2	Substantive review	216
	What does time to degree measure?	216
	Examining high-frequency values	218
	Links among variables	220
	Changes in survey questions	225
6.2.3	Missing-data review	225
	Comparisons and missing values	225
	Creating indicators of whether cases are missing	228
	Using extended missing values	228
	Verifying and expanding missing-data codes	229
	Using include files	236
6.2.4	Internal consistency review	238
	Consistency in data on the scientific career	238
6.2.5	Principles for fixing data inconsistencies	241
6.3	Creating variables for analysis	241
6.3.1	Principles for creating new variables	242
	New variables get new names	242
	Verify that new variables are correct	243
	Document new variables	244
	Keep the source variables	244
6.3.2	Core commands for creating variables	244
	The generate command	245
	The clonevar command	245
	The replace command	246

6.3.3	Creating variables with missing values	247
6.3.4	Additional commands for creating variables	249
	The recode command	249
	The egen command	250
	The tabulate, generate() command	252
6.3.5	Labeling variables created by Stata	253
6.3.6	Verifying that variables are correct	254
	Checking the code	255
	Listing variables	255
	Plotting continuous variables	256
	Tabulating variables	258
	Constructing variables multiple ways	259
6.4	Saving datasets	260
6.4.1	Selecting observations	261
	Deleting cases versus creating selection variables	261
6.4.2	Dropping variables	262
	Selecting variables for the ISSP 2002 Russian data	263
6.4.3	Ordering variables	263
6.4.4	Internal documentation	264
6.4.5	Compressing variables	264
6.4.6	Running diagnostics	265
	The codebook, problems command	265
	Checking for unique ID variables	267
6.4.7	Adding a data signature	269
6.4.8	Saving the file	270
6.4.9	After a file is saved	271
6.5	Extended example of preparing data for analysis	271
	Creating control variables	271
	Creating binary indicators of positive attitudes	274
	Creating four-category scales of positive attitudes	277

6.6	Merging files	279
6.6.1	Match-merging	280
	Sorting the ID variable	281
6.6.2	One-to-one merging	281
	Combining unrelated datasets	281
6.6.3	Forgetting to match-merge	283
6.7	Conclusions	285
7	Analyzing data and presenting results	287
7.1	Planning and organizing statistical analysis	287
7.1.1	Planning in the large	288
7.1.2	Planning in the middle	289
7.1.3	Planning in the small	291
7.2	Organizing do-files	291
7.2.1	Using master do-files	292
7.2.2	What belongs in your do-file?	294
7.3	Documentation for statistical analysis	295
7.3.1	The research log and comments in do-files	295
7.3.2	Documenting the provenance of results	296
	Captions on graphs	298
7.4	Analyzing data using automation	298
7.4.1	Locals to define sets of variables	299
7.4.2	Loops for repeated analyses	300
	Computing t tests using loops	300
	Loops for alternative model specifications	302
7.4.3	Matrices to collect and print results	303
	Collecting results of t tests	303
	Saving results from nested regressions	306
	Saving results from different transformations of articles	308
7.4.4	Creating a graph from a matrix	310
7.4.5	Include files to load data and select your sample	311

7.5	Baseline statistics	312
7.6	Replication	313
7.6.1	Lost or forgotten files	313
7.6.2	Software and version control	314
7.6.3	Unknown seed for random numbers	314
6.3.5	Bootstrap standard errors	314
6.3.6	Letting Stata set the seed	315
	Training and confirmation samples	316
7.6.4	Using a global that is not in your do-file	318
7.7	Presenting results	318
7.7.1	Creating tables	319
	Using spreadsheets	319
	Regression tables with esttab	321
7.7.2	Creating graphs	323
	Colors, black, and white	324
	Font size	326
7.7.3	Tips for papers and presentations	326
	Papers	326
	Presentations	327
7.8	A project checklist	328
7.9	Conclusions	328
8	Protecting your files	331
8.1	Levels of protection and types of files	332
8.2	Causes of data loss and issues in recovering a file	334
8.3	Murphy's law and rules for copying files	337
8.4	A workflow for file protection	338
	Part 1: Mirroring active storage	338
	Part 2: Offline backups	340
8.5	Archival preservation	343
8.6	Conclusions	345

9	Conclusions	347
A	How Stata works	349
A.1	How Stata works	349
	Stata directories	350
	The working directory	350
A.2	Working on a network	351
A.3	Customizing Stata	353
A.3.1	Fonts and window locations	353
A.3.2	Commands to change preferences	353
Options that can be set permanently		353
Options that need to be set each session		355
A.3.3	profile.do	355
Function keys		356
A.4	Additional resources	356
	References	359
	Author index	363
	Subject index	365