Contents

Pre	face

page xi

PART I INTRODUCTION

I	Moti	vation	3
	1.1	Data Processing and the Research Cycle	4
	1.2	What We Do (and Don't Do) in this Book	5
	1.3	Why Focus on Data Processing?	7
	1.4	Data in Files vs. Data in Databases	9
	1.5	Target Audience, Requirements and Software	II
	1.6	Plan of the Book	12
2	Gear	ing Up	14
	2.1	R and RStudio	14
	2.2	Setting Up the Project Environment for Your Work	16
	2.3	The PostgreSQL Database System	20
	2.4	Summary and Outlook	22
3	Data	= Content + Structure	23
	3.1	What Is Data?	23
	3.2	Data Content and Structure	24
	3.3	Tables, Tables, Tables	26
	3.4	The Structure of Tables Matters	30
	3.5	Summary and Outlook	35

PART II DATA IN FILES

4	Stor	ing Data in Files	39
	4.1	Text and Binary Files	40
	4.2	File Formats for Tabular Data	43

54

4.3 Transparent and Efficient Use of Files

	4.4	Summary and Outlook	57
5	Mai	naging Data in Spreadsheets	59
	5.1	Application: Spatial Inequality	60
	5.2	Spreadsheet Tables and (the Lack of) Structure	63
	5.3	Retrieving Data from a Table	64
	5.4	Changing Table Structure and Content	66
	5.5	Aggregating Data from a Table	67
	5.6	Exporting Spreadsheet Data	70
	5.7	Results: Spatial Inequality	70
	5.8	Summary and Outlook	71
6	Basi	c Data Management in R	74
	6.1	Application: Inequality and Economic Performance in the US	75
	6.2	Loading the Data	76
	6.3	Merging Tables	79
	6.4	Aggregating Data from a Table	82
	6.5	Results: Inequality and Economic Performance in the US	84
	6.6	Summary and Outlook	85
7	R ai	nd the tidyverse	87
	7.1	Application: Global Patterns of Inequality across Regime	
		Types	88
	7.2	A New Operator: The Pipe	89
	7.3	Loading the Data	90
	7•4	Merging the WID and Polity IV Datasets	92
	7.5	Grouping and Aggregation	93
	7.6	Results: Global Patterns of Inequality across Regime Types	96
	7.7	Other Useful Functions in the tidyverse	97
	7.8	Summary and Outlook	99
		PART III DATA IN DATABASES	
8	Intr	oduction to Relational Databases	103
	8.1	Database Servers and Clients	105
	8.2	SQL Basics	108
	8.3	Application: Electoral Disproportionality by Country	109
	8.4	Creating a Table with National Elections	110
	8.5	Computing Electoral Disproportionality	115
	8.6	Results: Electoral Disproportionality by Country	117
	8.7	Summary and Outlook	118
9	Rela	ational Databases and Multiple Tables	121
	9.1	Application: The Rise of Populism in Europe	122
	9.2	Adding the Tables	123
	9.3	Joining the Tables	125

Contents	

	9.4 Merging Data from the PopuList	127
	9.5 Maintaining Referential Integrity	129
	9.6 Results: The Rise of Populism in Europe	131
	9.7 Summary and Outlook	132
10	Database Fine-Tuning	135
	10.1 Speeding Up Data Access with Indexes	136
	10.2 Collaborative Data Management with Multiple Users	140
	10.3 Summary and Outlook	143

PART IV SPECIAL TYPES OF DATA

ΙI	Spatial Data	147
	11.1 What Is Spatial Data?	147
	11.2 Application: Patterns of Violence in the Bosnian Civil War	150
	11.3 Reading and Visualizing Spatial Data in R	151
	11.4 Spatial Data in a Relational Database	158
	11.5 Results: Patterns of Violence in the Bosnian Civil War	163
	11.6 Summary and Outlook	164
12	Text Data	166
	12.1 What Is Textual Data?	167
	12.2 Application: References to (In)equality in UN Speeches	169
	12.3 Working with Strings in (Base) R	170
	12.4 Natural Language Processing with quanteda	175
	12.5 Using PostgreSQL to Manage Documents	179
	12.6 Results: References to (In)equality in UN Speeches	183
	12.7 Summary and Outlook	184
13	Network Data	187
-	13.1 What Is Network Data?	187
	13.2 Application: Trade and Democracy	190
	13.3 Exploring Network Data in R with igraph	191
	13.4 Network Data in a Relational Database	197
	13.5 Results: Trade and Democracy	204
	13.6 Summary and Outlook	205

PART V CONCLUSION

14	Best Practices in Data Management	209
	14.1 Two General Recommendations	209
	14.2 Collaborative Data Management	212
	14.3 Disseminating Research Data and Code	214
	14.4 Summary and Outlook	216
Bib	oliography	219

I.d.	
inae	x

223

ix