## Applied Meta-Analysis for Social Science Research

NOEL A. CARD

## Contents

## PART I. THE BLUEPRINT: PLANNING AND PREPARING A META-ANALYTIC REVIEW

1	• Ar	Introduction to Meta-Analysis	3
	$\overline{1.1}$	The Need for Research Synthesis in the Social Sciences 3	
		Basic Terminology 4	
		A Brief History of Meta-Analysis 8	
	1.4	The Scientific Process of Research Synthesis 9	
	1.5	An Overview of the Book 12	
	1.6	Practical Matters: A Note on Software and Information	
		Management 13	
	1.7	Summary 14	
	1.8	Recommended Readings 14	
2	• Q:	vestions That Can and Questions	16
_		at Cannot Be Answered through Meta-Analysis	. 0
	2.1	Identifying Goals and Research Questions	
		for Meta-Analysis 17	
	2.2	The Limits of Primary Research and the Limits	
		of Meta-Analytic Synthesis 19	
	2.3	Critiques of Meta-Analysis: When Are They Valid	
		and When Are They Not? 23	
	2.4	Practical Matters: The Reciprocal Relation between Planning	
		and Conducting a Meta-Analysis 29	
	2.5	Summary 31	
	2.6	Recommended Readings 32	
3	• Se	arching the Literature	34
	3.1	Developing and Articulating a Sampling Frame 34	
		Inclusion and Exclusion Criteria 38	
	3.3	Finding Relevant Literature 42	
		Reality Checking: Is My Search Adequate? 52	
		<b>Practical Matters:</b> Beginning a Meta-Analytic Database 55	
		Summary 58	
		Recommended Readings 58	
		<u> </u>	

	RT II. THE BUILDING BLOCKS: DING INDIVIDUAL STUDIES	
4	Coding Study Characteristics	63
	<ul> <li>4.1 Identifying Interesting Moderators 64</li> <li>4.2 Coding Study "Quality" 68</li> <li>4.3 Evaluating Coding Decisions 73</li> <li>4.4 Practical Matters: Creating an Organized Protocol for Coding 77</li> </ul>	
	4.5 Summary 82	
	4.6 Recommended Readings 82	
5	Basic Effect Size Computation	85
	5.1 The Common Metrics: Correlation, Standardized Mean Difference, and Odds Ratio 85	
	<ul> <li>5.2 Computing r from Commonly Reported Results</li> <li>5.3 Computing g from Commonly Reported Results</li> <li>5.4 Computing o from Commonly Reported Results</li> <li>114</li> </ul>	
	<ul> <li>5.5 Comparisons among r, g, and o 118</li> <li>5.6 Practical Matters: Using Effect Size Calculators and Meta-Analysis Programs 121</li> <li>5.7 Summary 122</li> </ul>	
	5.8 Recommended Readings 122	
6	Corrections to Effect Sizes	126
	<ul> <li>6.1 The Controversy of Correction 127</li> <li>6.2 Artifact Corrections to Consider 129</li> <li>6.3 Practical Matters: When (and How) to Correct: Conceptual, Methodological, and Disciplinary</li> </ul>	
	Considerations 142 6.4 Summary 144	
	6.5 Recommended Readings 144	
7	Advanced and Unique Effect Size Computation	147
	<ul> <li>7.1 Describing Single Variables 147</li> <li>7.2 When the Metric Is Meaningful: Raw Difference Scores 154</li> <li>7.3 Regression Coefficients and Similar Multivariate Effect Sizes 156</li> <li>7.4 Miscellaneous Effect Sizes 161</li> <li>7.5 Practical Matters: The Opportunities and Challenges</li> </ul>	
	of Meta-Analyzing Unique Effect Sizes 166 7.6 Summary 169	

7.6 Summary 1697.7 Recommended Readings 169

## PART III. PUTTING THE PIECES TOGETHER: COMBINING AND COMPARING EFFECT SIZES

8	•	Basic Computations: Computing Mean Effect Size and Heterogeneity around This Mean	175
		8.1 The Logic of Weighting 176	
		8.2 Measures of Central Tendency in Effect Sizes 180	
		8.3 Inferential Testing and Confidence Intervals of Average Effect Sizes 182	
		8.4 Evaluating Heterogeneity among Effect Sizes 184	4
		8.5 <b>Practical Matters:</b> Nonindependence among Effect Sizes 191	
		8.6 Summary 195	
		8.7 Recommended Readings 195	
9	•	Explaining Heterogeneity among Effect Sizes:	198
		Moderator Analyses	
		9.1 Categorical Moderators 199	
		9.2 Continuous Moderators 207	
		9.3 A General Multiple Regression Framework for Moderation 210	
		9.4 An Alternative SEM Approach 218	
		9.5 <b>Practical Matters:</b> The Limits of Interpreting Moderators	
		in Meta-Analysis 222	
		9.6 Summary 226	
		9.7 Recommended Readings 226	
10	•	Fixed-, Random-, and Mixed-Effects Models	229
		10.1 Differences among Models 230	
		10.2 Analyses of Random-Effects Models 234	
		10.3 Mixed-Effects Models 239	
		10.4 A Structural Equation Modeling Approach to Random- and Mixed-Effects Models 245	
		to Random- and Mixed-Effects Models 245 10.5 <b>Practical Matters:</b> Which Model Should I Use? 250	
		10.6 Summary 255	
		10.7 Recommended Readings 255	
		10.7 Recommended Readings 235	
11	•	Publication Bias	257
		11.1 The Problem of Publication Bias 257	
		11.2 Managing Publication Bias 260	
		11.3 Practical Matters: What Impact Do Sampling Biases Have	
		on Meta-Analytic Conclusions? 275	
		11.4 Summary 276	
		11.5 Recommended Readings 276	

	<u> </u>
(V)	Contents
<b>**</b>	COMONIS

XVI	Contents	
12	Multivariate Meta-Analytic Models	279
	<ul> <li>12.1 Meta-Analysis to Obtain Sufficient Statistics 280</li> <li>12.2 Two Approaches to Multivariate Meta-Analysis 286</li> <li>12.3 Practical Matters: The Interplay between Meta-Analytic Models and Theory 300</li> <li>12.4 Summary 305</li> <li>12.5 Recommended Readings 306</li> </ul>	
	T IV. THE FINAL PRODUCT: ORTING META-ANALYTIC RESULTS	
13 4	Writing Meta-Analytic Results	313
13 (	Writing Meta-Analytic Results  13.1 Dimensions of Literature Reviews, Revisited 313  13.2 What to Report and Where to Report It 317  13.3 Using Tables and Figures in Reporting Meta-Analyses 329  13.4 Practical Matters: Avoiding Common Problems in Reporting Results of Meta-Analyses 337  13.5 Summary 342  13.6 Recommended Readings 342	313
13 (	<ul> <li>13.1 Dimensions of Literature Reviews, Revisited 313</li> <li>13.2 What to Report and Where to Report It 317</li> <li>13.3 Using Tables and Figures in Reporting Meta-Analyses 329</li> <li>13.4 Practical Matters: Avoiding Common Problems in Reporting Results of Meta-Analyses 337</li> <li>13.5 Summary 342</li> </ul>	313 345
13	<ul> <li>13.1 Dimensions of Literature Reviews, Revisited 313</li> <li>13.2 What to Report and Where to Report It 317</li> <li>13.3 Using Tables and Figures in Reporting Meta-Analyses 329</li> <li>13.4 Practical Matters: Avoiding Common Problems in Reporting Results of Meta-Analyses 337</li> <li>13.5 Summary 342</li> <li>13.6 Recommended Readings 342</li> </ul>	
13	<ul> <li>13.1 Dimensions of Literature Reviews, Revisited 313</li> <li>13.2 What to Report and Where to Report It 317</li> <li>13.3 Using Tables and Figures in Reporting Meta-Analyses 329</li> <li>13.4 Practical Matters: Avoiding Common Problems in Reporting Results of Meta-Analyses 337</li> <li>13.5 Summary 342</li> <li>13.6 Recommended Readings 342</li> <li>References</li> </ul>	345

\*