

METHODS OF PSYCHOLOGICAL RESEARCH

Second Edition

James R. Craig Leroy P. Metze Brooks/Cole Publishing Company A Division of Wadsworth, Inc.

© 1986 by Wadsworth, Inc., Belmont, California 94002. All rights reserved. No part of this book may be reproduced, stored in a retrieval system, or transcribed, in any form or by any means-electronic, mechanical, photocopying, recording, or otherwise—without the prior written permission of the publisher, Brooks/Cole Publishing Company, Monterey, California 93940, a division of Wadsworth, Inc.

Printed in the United States of America 10 9 8 7 6 5 4 3 2

Library of Congress Cataloging in Publication Data

Craig, James Richard, [date] Methods of psychological research.

Includes index.

1. Psychology—Research—Methodology.

2. Experimental design. 3. Psychometrics. I. Metze, Leroy P. II. Title. BF76.5.C69 1985 150'.72

85-9656

ISBN 0 534 0535A D

Sponsoring Editor: C. Deborah Laughton Marketing Representative: Mark Francisco Editorial Assistant: Mary Tudor

Production Editor: Ellen Brownstein Manuscript Editor: Paul Monsour

Permissions Editor: Carline Haga Interior and Cover Design: Sharon L. Kinghan

Cover Illustration: David Aguero Art Coordinator: Judith Macdonald Interior Illustration: Maggie Stevens

Photo Editor: Judy Blamer Photo Researcher: Marquita Flemming

Typesetting: Bi-Comp, Inc., York, Pennsylvania

Printing and Binding: Maple Vail Book Manufacturing Group, York, Pennsylvania

Photo Credits: p. 44, University of Wisconsin Primate Laboratory; p. 110, Elizabeth Crews; p. 132, Community Substance Abuse Services; p. 165, Burt Glinn, Magnum Photos, Inc.; p. 204, Elizabeth Crews

Dedicated to the late Wayne H. Bartz and our wives Janet Craig and Barbara Metze

PREFACE

The book you hold is a product of our experiences in working with undergraduate students of research methods in psychology. In both our teaching and our writing, we have attempted to demonstrate that research methods are simply a set of structured procedures for observing the world and that there are logical reasons for that structure.

By keeping the format and content as simple as possible, we have tried to write a book that is easy to read and use. The writing style is uncomplicated and we have avoided complex constructions and unnecessary vocabulary. Topics, such as the scientific approach to problem solving, using the research literature, and defining variables, are presented in a straightforward manner. Examples from all areas of psychology illustrate the material being presented. Boxes are used to present special information. User-oriented aids, such as the steps in the use of a design and the method selection tree (inside the front cover), are frequently referenced and their uses demonstrated. Furthermore, questions and exercises are included at the end of each chapter to assist the reader in reviewing and understanding the material presented.

Outstanding features maintained from the first edition are:

- · Design checklists for implementing the various research designs,
- Student progress checks with answers,
- Frequent examples from specific research studies to illustrate different research designs,
- · A decision tree for selecting the right design alternative, and
- Boxed examples recapping important research studies.

Features new to the second edition are:

- The problems of doing a study in an area for which no research literature exists,
- Thorough and updated coverage of program evaluation,
- Expanded coverage of experimental error, which includes a more thorough review of the logic of control,
- Concepts and applications of multivariate analysis, and
- An updated description of report writing with a new sample research report (Chapter 14).

The content of the book represents a blend of the various group- and individual-research procedures used by most psychologists. Two chapters—research ethics and program evaluation—have been included that are not typically found in other research methods books. In addition, an effort was made to make the chapter on report writing (Chapter 14) more than just a reprint of the *Publication Manual* of the American Psychological Association. This chapter includes writing guidelines, examples, and report production hints and suggestions.

While writing this book, we received encouragement, support, and assistance from many relatives, friends, colleagues, and students. We would like to thank each and every one of them-especially our families and students—for putting up with us throughout the entire process: It was not always easy. A special thanks goes to our colleague and friend, Dr. Daniel L. Roenker, who read and criticized several chapters and who served as a general, hard-headed critic: His assistance is gratefully acknowledged. Likewise, we acknowledge the help of our reviewers: Peter Bedrosian, East Stroudsburg State University, East Stroudsburg, Pennsylvania; Stanley Cohen, West Virginia University at Morgantown; Steven Falkenburg, East Kentucky University at Richmond; Virginia Falkenburg, East Kentucky University at Richmond; Ilse Gayl, University of Colorado at Boulder; Stuart Karabenick, Eastern Michigan University at Ypsilanti; Lynne Werner Olsho, Virginia Commonwealth University at Richmond; W. Kirk Richardson, Georgia State University at Atlanta; Jon Roeckelein, Mesa Community College, Mesa, Arizona; Mark Sanders, California State University at Northridge; and Billy Smith, University of Central Arkansas at Conway, whose comments, criticisms, and insights were very helpful in completing this edition. Lastly, we thank Ms. C. Deborah Laughton, Psychology Editor for Brooks/Cole Publishing Company, for her encouragement and support and the various authors and publishers who have graciously granted us permission to reprint all or parts of their works. Certainly, any deficiencies that remain in this book are ours and should not be taken to reflect on anyone other than us.

> James Craig Leroy Metze

CONTENTS

PART 1 INITIAL STEPS	1
CHAPTER 1 ALTERNATIVE STRATEGIES TO KNOWING	3
Ways of Knowing 4 Common Sense 4 Metaphysics 5 Authority 5 Magic 6 Science 7	
Comparing Science with Other Ways of Knowing 8 Science and Common Sense 8 Science and Metaphysics 9 Science and Authority 10 Science and Magic 10	
Science for Psychology 11	
The Scientific Method 13	
Does the Scientific Method Exist? 15	
Excerpts from "A Case History in Scientific Method" 16	
Summary 26	
Suggested Readings 26	
Exercises to Strengthen Understanding 27	
Answers to Exercises 27	

CHAPTER 2 RESEARCH PROBLEMS AND HYPOTHESES 2	9
Identifying a Research Problem 32 Observation 32 Brainstorming 32 Theoretical Predictions 33 Developments in Technology 34 Knowledge of the Research Literature 37	
Searching the Research Literature 38 Psychological Journals 38 Abstracts 40	
Hypotheses 44 Forming Research Hypotheses 44 Assessing Research Hypotheses 44 Null Hypotheses 45	
Summary 46	
Suggested Readings 47	
Exercises to Strengthen Understanding 47	
Answers to Exercises 48	
CHAPTER 3 DEFINITIONS, VARIABLES, AND CONSTRUCTS 49)
Definitions 50 Factual/Conceptual Definitions 50 Operational Definitions 51	
Variables 53 Stimulus, Organismic, and Response Variables 53 Independent, Dependent, and Extraneous Variables 54 Continuous and Discrete Variables 55 A Comparison of the Three Classifications of Variables 56	

Constructs 59

Constructs Defined 59 Hypothetical Constructs and Intervening Variables 59

Summary 63

Suggested Readings 63

Exercises to Strengthen Understanding 64

Answers to Exercises 64

CHAPTER 4

VARIABLE CONTROL

65

Controlling Independent Variables 66

Internal Validity 69

Variable Confounding 70

Randomization as a Variable Control Technique 70

Controlling Extraneous Variables 73

Constancy of Conditions 73
Blind and Double-Blind Controls 76
Expectancy Control Groups 77
Balancing 77
Counterbalancing 78

External Validity 79

Sampling through Random Selection 79 Problems in Randon Selection 80

Summary 82

Suggested Readings 83

Exercises to Strengthen Understanding 84

Answers to Exercises 84

PART 2 DESIGNING RESEARCH	87
CHAPTER 5 RANDOMIZED GROUPS DESIGNS	89
Models of Experimental Designs 90 Effect of the Independent Variable 90 Experimental Error 91	
Randomized Groups Design with Two Experimental Conditions 92 Random Assignment of Participants 92 Random Selection of Participants 93 Fixed- versus Random-Effects Models 94 Logic of the Design 94 Steps in Implementing the Design 97 An Example 98	
Randomized Groups Designs with More Than Two Experimental Conditions 100 Model for the Dependent Variable 101 Steps in Implementing the Design 102 An Example 102	
Experiments versus Systematic Observations 104	
Summary 106	
Suggested Readings 107	
Exercises to Strengthen Understanding 107	
Answers to Exercises 108	
CHAPTER 6	
RANDOMIZED BLOCKS DESIGNS	109
Blocking 110	

Randomized Blocks Design with Two Experimental Conditions: A Matched Groups Design 111

Logic of the Design 111
Selecting Participants and Assigning Them to Blocks 112
Participants Serving as Their Own Controls 112
Matching Participants 114
Steps in Implementing the Matched Groups Design 116
An Example 117

Randomized Blocks Designs with More Than Two Experimental Conditions 119

An Example 119

Deciding Which Design to Use: The Randomized Groups Design or the Randomized Blocks Design 122

Summary 123

Suggested Readings 124

Exercises to Strengthen Understanding 124

Answers to Exercises 125

CHAPTER 7 FACTORIAL DESIGNS

126

Interaction 128

2 × 2 Factorial Designs 133

The Additive Model 133
Steps in Implementing the Design 136
An Example 137

Two-Variable, Multilevel Factorial Designs 138

Multivariable, Multilevel Factorial Designs 140

Summary 146

Suggested Readings 146

Exercises to Strengthen Understanding 147

Answers to Exercises 147	
CHAPTER 8 QUASI-EXPERIMENTAL DESIGNS	14
Single Group Pretest-Posttest Design 149 Logic of the Design 149 Selecting and Assigning Research Participants 15 Weaknesses of the Design 153	3
Nonequivalent Control Group Design 154 Logic of the Design 155 Selecting and Assigning Research Participants 15 Weaknesses of the Design 155	5
Multiple Time-Series Design 156 Logic of the Design 157 Selecting and Assigning Research Participants 157 Weaknesses of the Design 157 An Example 157	7
Steps in Implementing a Quasi-Experimental Design 158	
Summary 158	
Suggested Readings 160	
Exercises to Strengthen Understanding 160	
Answers to Exercises 160	
CHAPTER 9 FIELD RESEARCH	162
Field Experiments 163	
Naturalistic Observation 164 Unstructured Naturalistic Observation 165	

Structured Naturalistic Observation 166 Information Obtained by Using Observational Techniques 166

Surveys 167

Questionnaires 167 Interviews 168 Preparation of Questionnaires and Interviews 169

Correlation 172

The Cross-Lagged Panel Technique 173

Steps in Implementing Field Research 174

Summary 175

Suggested Readings 176

Exercises to Strengthen Understanding 177

Answers to Exercises 177

CHAPTER 10

SINGLE CASE RESEARCH

Single Case Methods 179

The Case Study 179 The A-B Design 183 The A-B-A Design 185

Extensions of the A-B-A Design 186

The A-B-A-B Design 186
The A-B-A-B-A-B Design 188
The A-B-C-A Design 188

Multiple Baseline Designs 189

Group or Single Case Designs 189

Steps in Implementing Single Case Research 191

Summary 192

Suggested Readings 193

178

Summary 231

V171	
~ V I	

Exercises to Strengthen Understanding 194			
Answers to Exercises 194			
CHAPTER 11 RESEARCH AND PROGRAM EVALUATION	195		
Program Evaluation Defined 196			
Purposes of Program Evaluation 200			
Context of Program Evaluation 201 Responsible Individuals and Organizational Units 201 Key Features of the Social Context 201			
Components of Program Evaluation 202 Theoretical Concepts 203 Evaluative Processes 206			
Summary 209			
Suggested Readings 209			
Exercises to Strengthen Understanding 210			
Answers to Exercises 210			
PART 3 FINAL STEPS	213		
CHAPTER 12 RESEARCH ETHICS	215		
Ethical Conduct of Animal Research 216			
Ethical Conduct of Human Research 217			
Conclusions 230			

Suggested Re	eadings	231
--------------	---------	-----

Exercises to Strengthen Understanding 231

Answers to Exercises 232

CHAPTER 13

CONDUCTING A STUDY: A CHECKLIST

234

Selection and Statement of a Research Problem (Chapter 2) 235

Errors Commonly Made by Students 235

Formation and Statement of Hypotheses (Chapter 2) 235 Errors Commonly Made by Students 236

Definition of Variables (Chapter 3) 236

Errors Commonly Made by Students 236

Specification of the Population, Selection of Sample, and Assignment of Individuals to Groups (Chapters 4, 5, 6, 7, 8, 9, and 10) 236

Errors Commonly Made by Students 237

Selection of Research Designs (Chapters 5, 6, 7, 8, 9, and 10) 237

Errors Commonly Made by Students 238

Description of Research Methods (Chapter 4) 238

Selection of Control Techniques 238
Selection of Measurement Procedures 239
Step-by-Step Procedure 239
Errors Commonly Made by Students 239

Administration and Observation of the Levels of the Independent Variables and Observation and Measurement of the Levels of the Dependent Variables (Chapters 4, 5, 6, 7, 8, 9, and 10) 239 Errors Commonly Made by Students 240

Comparison of Groups or Individuals 240

Errors Commonly Made by Students 240

Reporting the Study (Chapter 14) 240

Errors Commonly Made by Students 240

Summary 241

CHAPTER 14 THE REPORT

242

289

The Written Report 243

The Publication Manual of the American Psychological Association 245
Editorial Style 247
Writing Style 247
Hints for Writing Reports 255

The Oral Report 254

An Example Report 255

An Example of a Published Research Report 282

Summary 285

Suggested Readings 286

Exercises to Strengthen Understanding 286

Answers to Exercises 287

APPENDIX A

PSYCHOLOGICAL SCALING AND MEASUREMENT

A1: Psychological Scaling 289

A2: Signal Detection Theory 296

A3: Psychometric Scaling 299

REFERENCES 306 AUTHOR INDEX 315 SUBJECT INDEX 319

INITIAL STEPS

1

