



RESEARCH

METHODS

A PROCESS

OF INQUIRY

3rd Edition

ANTHONY M. GRAZIANO / MICHAEL L. RAULIN

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# *Research Methods* *A Process of Inquiry*

THIRD EDITION

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**LONGMAN**

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*For*  
*Amy, Lisa, Michael, and Mark*

*For*  
*Loren and Jean Chapman*  
*Each a mentor, colleague, and friend to me*

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# *To the Instructor*

## PEDAGOGICAL CONSIDERATIONS—TEACHING CONCEPTS OF RESEARCH

***Research Methods: A Process of Inquiry*** has evolved over years of teaching. This text reflects our experience in teaching research methods, supervising student research, and conducting our own research. We worked hard to provide a solid text covering the expected content for a research methods course and also providing supportive material and organization to enhance students' learning. Pedagogical considerations guided every phase of the writing of this text and the preparation of the supplements.

This third edition builds on the success of the first two. Every change was designed to enhance the functioning, readability, and interest level of the text. We emphasize research concepts rather than cookbook-like strategies. We want students to develop an understanding of scientific research as an integrated process of thinking and an exciting enterprise and to appreciate that science involves the continuous interplay of rationalism and empiricism—a combination that makes stringent and unique demands on the nature of evidence and upon the methods used to arrive at conclusions about the universe. The first two chapters provide a basic foundation of scientific concepts and historical development to support the subsequent presentation of research methods.

## PROGRAMMATIC NATURE OF THE TEXT

We assume that difficult or unfamiliar concepts are best taught programmatically. Thus, complex concepts (e.g., validity) are introduced and defined early in the text but only to the degree needed for that introductory discussion. Concepts are then systematically reexamined throughout the text, new facets are added, and related concepts are brought together into a coherent model, progressively building more complete and sophisticated conceptualizations. This programmatic development of concepts:

- provides students with systematic, progressive mastery of ideas, beginning with basic levels and building to more complex and more complete concepts;
- results in sequential rather than independent chapters, each chapter building upon earlier material;
- requires repetition—the same concepts are discussed several times but at progressively higher levels of sophistication.

The programmatic approach avoids the encyclopedic style of many texts, making complex material more accessible and understandable to students. We have included a complete glossary and a detailed index to help students quickly locate specific material and discussions.

## TREATMENT OF STATISTICS

This text emphasizes that decisions regarding statistical analyses are an integral part of the design process and are not added after data collection. Basic statistical concepts are introduced early in the text (Chapters 4 and 5) and their integration into the design process is maintained throughout. Statistical procedures are presented conceptually with an emphasis on understanding what they can do, how to run them with computer analysis packages, and how to read and interpret the output. Choosing an appropriate statistical procedure often confuses students. We teach that the choice of appropriate statistical analyses follows systematically from the design characteristics of the study. Chapter 14 presents a unique addition to research methods texts—flowcharts that lead the student step-by-step through the characteristics of any basic research design to the choice of appropriate statistical analysis procedures.

In addition to Chapters 4, 5, and 14 (Measurement, Statistical Analyses, and Statistical Flowcharts), Appendix C lists statistical formulas, and Appendix D gives an introduction to the use of computerized statistical analysis packages (featuring *SPSS for Windows*). We have integrated computerized statistical analysis throughout the text. As the course instructor, you can determine how much of the statistical material to emphasize, depending upon the level and type of course you teach and whether your students have had a statistics course.

## A COHERENT MODEL OF THE RESEARCH ENTERPRISE

Research is not presented in piecemeal fashion in this text. Rather, a coherent descriptive model of the universe of research is developed that integrates inductive

and deductive reasoning, empirical observation, concepts of validity, and the phases in the conduct of a research project. The concept of levels of constraint is introduced. It refers to the degree of control that the researcher can exercise over the research process. Valuable research can be carried out at any level of constraint—a point on which we differ from some other textbook authors. Experimental research (Chapters 8-12) is the most rigorous and allows us to answer questions of causality. But other research questions are also important—questions about the strength and direction of relationships among variables, about differences between already-existing groups, about single individuals, or about observations leading to the formation rather than the testing of causal hypotheses. All are properly scientific approaches to study relationships among variables. It is important for students to learn that appropriate scientific research design is largely dependent upon the nature of the questions asked and that research at all levels—whether naturalistic, case-study, correlational, differential, quasi-experimental, or experimental—is appropriate and useful. The text builds conceptual foundations leading to experimental research by developing each of the other levels of constraint, thereby providing students with a full spectrum of research knowledge and skills. We have devoted three chapters (6, 7, & 13) to nonexperimental research procedures. Although we believe strongly that the nonexperimental designs are valuable tools for the psychologist, we take great care to emphasize their limitations and to impart an appropriate level of caution to students.

## RESEARCH ETHICS

When we decide to use living organisms as subjects, we must be concerned with their welfare and must ensure that our procedures do not violate the health, safety, or rights of subjects. Because of the importance of ethical issues, this topic has been introduced early and, consistent with the text's general organization, returned to at later points for further discussions of the ethics of human and animal research.

## LEARNING AIDS INTEGRATED WITHIN THE TEXT

Consistent with our pedagogical concerns, this text provides numerous learning aids for the student, including:

- Internal and end-of-chapter summaries
- A list of Key Terms and extensive Review Exercises at the end of each chapter (with answers to selected exercises provided in an appendix)
- Informational boxes set off from the chapter content
- A unique approach using diagrams to explain ANOVA procedures
- Unique decision-tree flowcharts to teach how to select appropriate statistical analyses
- A Pre-Data Checklist of items that must be completed before data collection (similar to the preflight checklists used by pilots)
- A Glossary with almost 400 terms defined for the student

- Suggested Readings for further study
- Appendices on:
  - Writing a Research Report in APA Style
  - Table of Random Numbers
  - Statistical Computation Procedures
  - Statistical Analyses Using *SPSS for Windows*
  - Selected Answers to Exercises
  - Conducting Library Research

In addition, as noted above, the text's organization includes:

- Programmatic development of concepts
- Presentation of a coherent model of research
- Extensive use of examples—several of which are repeated to provide continuity to the presentation

## SUPPLEMENTS

The adoption package includes an Instructor's Manual, a Study Guide, and a Computerized Test-Item File with over 2,500 multiple-choice items. The Instructor's Manual provides:

- A brief outline of the focus of each chapter and the topics covered
- Identification of controversies in the field, with appropriate background reading
- A selected bibliography
- Over 2,500 multiple-choice test items, keyed to text pages where the material is discussed

The Study Guide provides for each chapter:

- A chapter summary
- A list of key terms
- Sample examination questions (fill-in blanks, true/false, multiple-choice, and essay)
- Chapter exercises
- Suggested Reading list
- Answers to sample examination questions

The computerized test-item file utilizes the TestMaster Program, which allows instructors to select from over 2,500 multiple-choice items, modify or write new items, and construct examinations.

## THE THIRD EDITION

The first two editions of this text were very successful, and the same basic approach outlined above has been continued in this third edition. In addition, we have made the following improvements:

- A completely updated final chapter on new directions in research methodology
- A de-emphasis on manual computation of statistics in favor of emphasizing computerized statistical analysis
- An extensive revision of the appendix on using computerized statistical analyses (featuring *SPSS for Windows*)
- An expanded presentation of conducting library research
- Over 30 new figures to illustrate difficult concepts
- Addition of a pre-data checklist listing all the steps necessary before one begins to collect data
- New informational boxes throughout the text
- Updated examples and references
- More extensive integration of the role of theory in research
- Expanded treatment of research ethics
- More information on the history of psychology
- An introduction to regression
- A reorganization of the section on survey research
- An expanded glossary
- An expanded test-item file

## INTERNET RESOURCES

We are now developing a World Wide Web (WWW) page for the text, which will contain additional materials for the instructor. These materials can be downloaded at will. The WWW will provide a repository for a constantly updated pool of teaching resources available to you as the instructor. We also want to maintain contact with the instructors who use this text. We have set up a list server to permit virtual discussions among the users of the text on any matter related to teaching research methods. Although we are both on this list, we hope that the conversations and exchange of ideas will be of the round-table variety. If you wish to be added to this list, send an e-mail request to [rauln@acsu.buffalo.edu](mailto:rauln@acsu.buffalo.edu), and we will see to it that you are added immediately. Feel free to e-mail either of us at any time with questions, comments, and suggestions. The instructors using this text have been our single best source of ideas for improvement. Our e-mail addresses are:

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# *To the Student*

We often imagine scientists wearing white coats and spending time peering at complicated equipment in shining and mysterious laboratories. But scientific work can be done while sitting under a tree in the woods, thinking through a problem, and using apparatus no more technical than a pad and a pencil. This image is important, for it emphasizes that the essence of science is its logic—science is above all else *a way of thinking*. The laboratories, the equipment, the computers, and the hardware are just tools used to promote and support the scientist's central activity—creative, systematic thinking. That intellectual activity is incorporated into a process of inquiry in which the scientist asks and answers questions about nature. That process of inquiry is what we mean by scientific research, and it is the focus of this text.

People ask questions every day. We tend to rely on our hunches, already existing ideas, and respected authorities for answers to many questions. Seldom do we seek answers in the systematic manner of science. Although thinking scientifically is unfamiliar to most people, one can learn to think scientifically. This is the major challenge in this course. A research methods course is demanding, but the concepts are not difficult. The difficult part is learning to think critically and systematically, to phrase questions clearly, and to demand strong evidence for your ideas. Excitement, hunches, and flashes of insight are very much a part of science, and so are plodding hard work; rigorous, systematic thinking; and procedures that put

our ideas to many demanding tests. All contribute to the creative and exciting endeavor of scientific research. You will learn to have more confidence in ideas that survive the rigors of scientific scrutiny and to discard those that do not.

This text has been designed for your *active* rather than passive use. Questions are posed in both the chapters and in the exercises at the end of each chapter. There is an index and a glossary. Work through the problems and exercises, consult the glossary when necessary, and if you need more information on a concept, use the index to direct you to additional discussion on that topic in the text. The chapter footnotes and the text's references are good sources for further reading.

A Study Guide is available to aid in your mastery of the material. The Study Guide organizes the information from each chapter and structures the studying of the material. The Study Guide starts by summarizing material and identifying key terms for each chapter, and then goes on to encourage you to test your knowledge with actual test questions. Answers are provided for all questions so that areas of confusion can be easily identified and corrected before the course examinations.

We welcome your comments and evaluation of this text and urge you to use the evaluation sheets that have been included in the Study Guide, or you can contact us through e-mail (amgraz@acsu.buffalo.edu; raulin@acsu.buffalo.edu). Our mailing address is: Psychology Department; SUNY at Buffalo; Buffalo, NY 14260-4110.

*Anthony M. Graziano*  
*Michael L. Raulin*

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# Chapter 1

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## *Curiosity, Creativity, and Commitment*

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SCIENCE IS A WAY OF THINKING  
ASKING QUESTIONS  
SCIENCE AND ART  
COMMON METHODS OF ACQUIRING KNOWLEDGE  
    Tenacity  
    Intuition  
    Authority  
    Rationalism  
    Empiricism  
    Science  
EMERGING MODERN SCIENCE  
    Early Civilization  
    Greek Science  
    Medieval Science  
    The Scientific Revolution  
THE SCIENCE OF PSYCHOLOGY  
SUMMARY  
REVIEW EXERCISES

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