

EXPERIMENTAL PSYCHOLOGY

METHODS OF RESEARCH
SIXTH EDITION

F. J. McGUIGAN

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Sixth Edition

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*To two charming ladies,
Constance and Joan*

PREFACE TO THE FIRST EDITION

Experimental psychology was born with the study of sensory processes; it grew as additional topics, such as perception, reaction time, attention, emotion, learning, and thinking, were added. Accordingly, the traditional course in experimental psychology was a course the content of which was accidentally defined by those lines of investigation followed by early experimenters in those fields. But times change, and so does experimental psychology. The present trend is to define experimental psychology not in terms of specific content areas, but rather as a study of scientific methodology generally and of the methods of experimentation in particular. There is considerable evidence that this trend is gaining ground rapidly.

This book has been written to meet this trend. Their methods no longer confined to but a few areas, experimental psychologists conduct research in almost the whole of psychology—clinical, industrial, social, military,

and so on. To emphasize this point, we have throughout the book used examples of experiments from many fields, illustrative of many methodological points.

In short, then, the point of departure for this book is the relatively new conception of experimental psychology in terms of methodology, a conception which represents the bringing together of three somewhat distinct aspects of science: experimental methodology, statistics, and philosophy of science. We have attempted to perform a job analysis of experimental psychology, presenting the important techniques that the experimental psychologist uses every day. Experimental methods are the basis of experimental psychology, of course; the omnipresence of statistical presentations in journals attests the importance of this aspect of experimentation. An understanding of the philosophy of science is important to an understanding of what science is, how the scientific method is used, and particularly of where experimen-

tation fits into the more general framework of scientific methodology. With an understanding of the goals and functions of scientific methodology, the experimental psychologist is prepared to function efficiently, avoiding scientifically unsound procedures and fruitless problems.

Designed as it is to be practical in the sense of presenting information on those techniques actually used by the working experimental psychologist, it is hoped for this book that it will help maximize transference of

performance from a course in experimental psychology to the type of behavior manifested by the professional experimental psychologist.

My great appreciation to my students who have furnished both valuable criticisms of ideas and exposition and the reinforcement required for the completion of this project. I am also particularly indebted to Drs. Allen Calvin, Victor Denenberg, David Duncan, Paul Meehl, Michael Scriven, Kenneth Spence, and Lowell Wine.

PREFACE TO THE SIXTH EDITION

Thanks to suggestions of colleagues and students, I have effected a fair amount of reorganization for this edition. The effort was intended to hasten the student along in order to increase comprehension and study efficiency. One major reorganization was to integrate into one chapter the topics of correlational research and experimental designs involving correlations. Consequently, the three chapters that were previously devoted to correlational research, the two-matched-groups design, and repeated treatments for groups designs were shortened and combined into Chapter 9. There are now 12 chapters instead of 14. The section on the use of apparatus in Chapter 5 was also considerably consolidated.

The important topic of error variance and how to reduce it was brought forward into Chapter 6 so that students can relate it to research involving all the experimental designs.

Several topics have been placed in appen-

dices to chapters so that the instructor may either assign them or skip them if emphasis on those topics is not desired. In particular, the sections on multibaseline group designs and statistical analysis of time-series designs were removed from the main body of Chapter 10. Similarly, the three possible effects of a treatment in time-series designs was appended to Chapter 11. Consequently, the instructor who considers these topics quite important may still assign them to students, or interested students may study them for themselves. As a result of some inefficient prose that developed through revisions over the previous five editions, I have now carefully processed each sentence throughout the entire text. This effort has “tightened up” the text and increased accuracy throughout.

To guide the student through the book more effectively I have added numerous section headings and printed major terms in bold print to highlight important topics.

The growing applications of computers in psychology are emphasized throughout the book, but particularly in the separate Appendix C on p. 319. Although computer statistical analysis is applicable to each design, the student must still understand what the computer is doing. Otherwise, blind use of computers results in numerous errors, and students compile statistics that are inapplicable, erroneous, inaccurate, and incomprehensible. By merely pushing certain buttons and selecting items from well-filled menus, students often end up with massive printouts that are not only unnecessary, but lead to violations of statistical assumptions and stated probability levels.

In this edition I continue to emphasize the mutual facilitation of pure and applied research and the wise application of effective research methods to benefit society. Strategies for the solution of societal problems are especially developed in Chapters 10 and 11. Psychology is going through changes and is in danger of losing the methodological sophistication that has propelled it to the forefront of social and biological sciences. Psychologists are leaders in business, industry, government, politics, and academia, and their research findings on topics important for the public are cited daily in the media. However, that preeminence may erode as

many psychologists neglect the study and use of sound research methodology. This book has always attempted to develop a broad perspective about where sound psychological research fits within areas of public interest as well as more generally within science.

The previous editions of this book have been widely used in undergraduate courses. However, they have also found places in graduate courses on research methodology as well as in guiding researchers in the conduct of their own work.

Finally, I want to express my great appreciation to all the colleagues who have contributed to this and previous editions of the book. In particular, reviewers for this edition were Margaret Gittis, Rick Wesp, Paula Goolkasian, and Bernardo J. Carducci. Among the reviewers of the fifth edition whose names I have now been able to retrieve I express my great appreciation to Frank Etscorn, Ronald L. Webster, and Randall Flory. Those whose names I have not been able to retrieve are still thanked for their contributions. Special thanks are offered to Jackie Fisher, Kit Ching, Deanna Khan and Michelle Mullane for their excellent help with the preparation of this manuscript.

FJM

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