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Second Edition

Research Methods and Statistics in Psychology

S. Alexander Haslam and Craig McGarty

SAGE FOUNDATIONS OF PSYCHOLOGY

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1 Oliver's Yard
55 City Road
London EC1Y 1SP

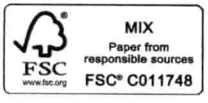
SAGE Publications Inc.
2455 Teller Road
Thousand Oaks, California 91320

SAGE Publications India Pvt Ltd
B 1/I 1 Mohan Cooperative Industrial Area
Mathura Road
New Delhi 110 044

SAGE Publications Asia-Pacific Pte Ltd
3 Church Street
#10-04 Samsung Hub
Singapore 049483

First published 2014

Editor: Michael Carmichael
Editorial assistant: Keri Dickens
Production editor: Imogen Roome
Copyeditor: Neville Hankins
Proofreader: Leigh Timmins
Indexer: Christine McCoy
Marketing manager: Alison Borg
Cover design: Wendy Scott
Typeset by: C&M Digitals (P) Ltd, Chennai, India
Printed and bound in Great Britain by Ashford Colour Press Ltd



Library of Congress Control Number: 2013941889

British Library Cataloguing in Publication data

A catalogue record for this book is available from the British Library

ISBN 978-1-4462-5597-1
ISBN 978-1-4462-5596-4 (pbk)

Research Methods and Statistics in **Psychology**

SAGE Foundations of Psychology

Series editors:
Craig McGarty, Murdoch University
Alex Haslam, University of Queensland

SAGE Foundations of Psychology is a series of texts intended to provide an introduction to key areas of psychology. Books in the series are scholarly but written in a lively and readable style, assuming little or no background knowledge. They are suitable for all university students beginning psychology courses, for those studying psychology as a supplement to other courses, and for readers who require a general and up-to-date overview of the major concerns and issues in contemporary psychology.

Published titles:

Statistics with Confidence
Michael J. Smithson

An Introduction to Child Development (2nd edition)
Thomas Keenan and Subhadra Evans

An Introduction to Personality and Intelligence
Nick Haslam

To our teachers, who, when we knew nothing of these things, gave us direction and purpose

Preface

Although we always had great ambitions for this book, when we set about writing it we had no idea how successful it would go on to be. Indeed, since completing *Doing Psychology* (the first instantiation of this text), between us we have written or edited 14 other books and although many of these have been very well received, none has had anything like the same popular appeal. Accordingly, when our colleagues at Sage asked us to put our heads together to produce another updated edition we felt that we owed it to the tens of thousands of readers of earlier versions to see if we could. Happily, this not only proved to be possible, but also served to remind us why we had been so enthusiastic about the original venture and, in the process, to rekindle much of our passion for the issues that this book explores.

Indeed, our own careers in the intervening years owe much to the content of this book and the thinking that went into it. This is because, while at one level this can be seen as a 'how to' text that explains the procedures involved in designing, conducting and reporting research, at another level it is also a 'why to' text that attempts to explain why doing certain things is important and why particular debates matter – encouraging readers to engage not just with the details of the research process but also with the bigger picture. In this sense the book is not so much a manual as a manifesto. Moreover, this is a manifesto that we have endeavoured to live out in our own careers as research scientists and in our collaborations with colleagues around the world.

Through all this, there are two key points on which the original idea for this book hinged, to which we have tried to remain faithful. The first is that *research in psychology matters*. It makes a difference to people's lives. We therefore have a responsibility to do it as well as we possibly can, and we have no choice other than to learn about the range of issues that this book addresses. The second is that *research in psychology is exciting* – or at least should be. For this reason, as you learn about research methods we want to you to engage with the points that we discuss not because you have to, but because you want to. Indeed, we are confident that if we can help you to engage in this way, you will experience this excitement yourself and become a far more effective researcher in the process.

With a view to bringing these features of the text to the fore, there are a number of substantial changes that we have made for this edition. Most obviously, we have updated the book through the inclusion of images and Research Bites. These are intended to provide a space to step back from the text and reflect on the ways in which it relates both to issues in the world at large and to contemporary debates in psychology. In order to reflect the instruction you are likely to receive in any classes you take, we have also replaced sections of the text in which statistical tests were performed by hand with instructions (and accompanying images) that explain how to perform these using a statistical program. As well as updating the coverage of experimental design, survey research and ethics, this edition also includes a much more expansive coverage of qualitative methods.

All of these various changes represent responses to the very large amount of feedback that we received on the previous edition. As well as being extremely detailed, this was also extremely encouraging. Indeed, above all else, it is the generosity of our colleagues in helping us to rise to the challenges of putting together a new edition that we most appreciate. But as well as acknowledging this, we also want to recognize the large number of people who helped in the production of previous editions.

When first writing *Doing Psychology* (which was published in 1998), Mike Calford, Wolfgang Grichting, Judith Harackiewicz, Kate Reynolds and Jennifer Sanderson provided comments on selected chapters for which we were extremely grateful. Others, including Mike Innes, Michael Platow and John Turner, provided very instructive input in specific content areas. Mariette Berndsen, Chris Cooper, Richard Jennings, Jason Mazanov, Penny Oakes, Rina Onorato and Russell Spears provided additional observations and suggestions that were helpful too. Ziyad Marar at Sage also deserves to be singled out for his constant encouragement and his commitment to the Foundations of Psychology series as a whole and for entrusting ongoing oversight of our work to the ever-attentive Michael Carmichael. The editorial work of Lucy Robinson, Jane Evans and Richard Leigh was also superb. However, at the time we reserved our highest category of thanks to Michael Cook, Catherine Haslam, Duncan Mclntyre and Mike Smithson who all worked very long and very hard to provide detailed and extremely insightful comments on entire drafts of the text.

When we put together the first edition of *Research Methods and Statistics in Psychology* (published in 2004) we again received very helpful input from a large number of colleagues including Steve Brown, Carole Burgoyne, Sue Burney, Kerry Chalmers, Barbara David, Nellie Georgiou-Karistianis, David Goble, Kristina Macrae, Elinor McKone, Annie Mitchell, Don Mitchell, Jonathan Potter, Judy Slee, Janet Tweedie and Andy Wills. We were grateful to Zoe Elliott at Sage and Bob Wilson at Footprint for their continued commitment to the book and their unwavering confidence in our efforts. Richard Leigh and Lauren McAllister provided extremely helpful input at proof stage, as did Lucy O'Sullivan who also compiled the indexes. Finally, we also wanted to thank the many students who had provided us with positive feedback on *Doing Psychology* and assured us that our continued endeavours were worthwhile.

Students also need to be thanked for motivating and helping us to improve this second edition. We are grateful too to our colleagues Andrew Livingstone, Blake McKimmie, Thomas Morton, Anna Rabinovich, Joe Sweetman, Anne Marthe van der Bles and Renate Ysseldyk for their thoughtful input. At the same time we would like to extend special thanks to Christine McCoy who carefully reread the entire manuscript and to Robin Lupton and her many great colleagues at Sage for their sterling work in guiding us through this process.

Finally, unlike previous editions, this one includes a formal dedication. This is to those teachers who initially fired up our passion for psychological research and who showed us how to do it better and how to have fun while we were at it. Thank you.

Alex Haslam and Craig McGarty (2013)

The Authors

Alex Haslam is Professor of Psychology and Australian Laureate Fellow at the University of Queensland. Together with colleagues, he has written and edited 11 books and over 200 research articles and chapters. His most recent books are *The New Psychology of Leadership: Identity, Influence and Power* (with Steve Reicher and Michael Platow, 2011), *The Social Cure: Identity, Health and Well-Being* (edited with Jolanda Jetten and Catherine Haslam, 2012) and *Social Psychology: Revisiting the Classic Studies* (edited with Joanne Smith, 2012). He is former Chief Editor of the *European Journal of Social Psychology*, former President of the Psychology Section of the British Science Association, and currently on the editorial board of eight journals (including *Scientific American Mind*). He is a Fellow of the Canadian Institute for Advanced Research and of the Association for Psychological Science. He is also a recipient of the European Association of Social Psychology's Kurt Lewin Medal for research excellence, the British Psychology Society's Award for Excellence in Teaching, and a National Teaching Fellowship from the Higher Education Academy.

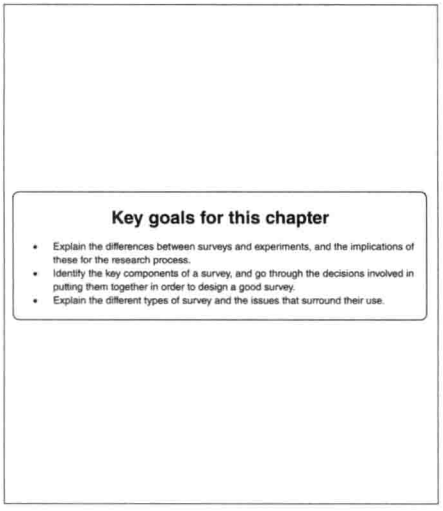
Craig McGarty is Professor of Social and Political Psychology at Murdoch University. He received his undergraduate training in psychology at the University of Adelaide and his PhD from Macquarie University in 1991 (where he was a tutor from 1985 until 1989). He

Photos P.1 and P.2 A study in developmental psychology: The authors in 1988 and 2013 (Alex on the left, Craig on the right).

spent 1990 as a lecturer in social psychology/social interaction at the University of Western Sydney and moved in 1991 to the Australian National University as a research associate. He was Reader and Head of the School of Psychology before moving to Murdoch University in Western Australia as the Director of the Centre for Social and Community Research and then Director of the Social Research Institute. He has worked on a wide range of topics in experimental social psychology and his current research includes a social audit of the aspirations and solutions of a remote Indigenous community and studies of the reconciliation process in post-genocide Rwanda. His books include *Stereotypes as Explanations* (with Vincent Yzerbyt and Russell Spears, 2002) and *Categorization and Social Psychology* (1999).

Key Features of this Book

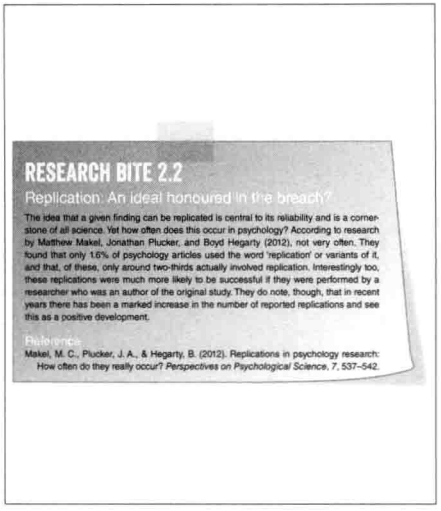
Engaging text – designed to encourage understanding of, and interest in, the process of conducting research in psychology.



Key goals for this chapter

- Explain the differences between surveys and experiments, and the implications of these for the research process.
- Identify the key components of a survey, and go through the decisions involved in putting them together in order to design a good survey.
- Explain the different types of survey and the issues that surround their use.

Key goals for each chapter – designed to structure your approach to the material it addresses.



RESEARCH BITE 2.2

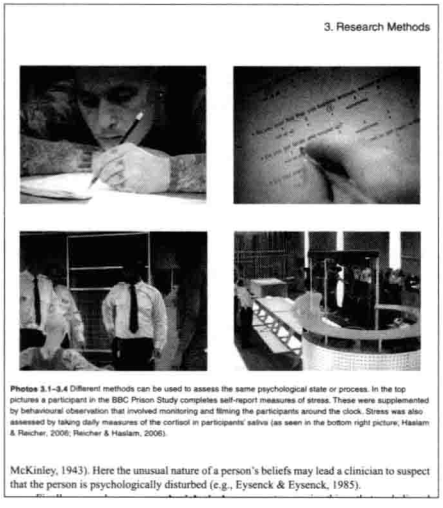
Replication: An ideal honoured in the breach?

The idea that a given finding can be replicated is central to its reliability and is a cornerstone of all science. Yet how often does this occur in psychology? According to research by Matthew Makel, Jonathan Plucker, and Boyd Hegarty (2012), not very often. They found that only 1.6% of psychology articles used the word 'replication' or variants of it, and that, of these, only around two-thirds actually involved replication. Interestingly too, these replications were much more likely to be successful if they were performed by a researcher who was an author of the original study. They do note, though, that in recent years there has been a marked increase in the number of reported replications and see this as a positive development.

Reference

Makel, M. C., Plucker, J. A., & Hegarty, B. (2012). Replications in psychology research: How often do they really occur? *Perspectives on Psychological Science*, 7, 537–542.

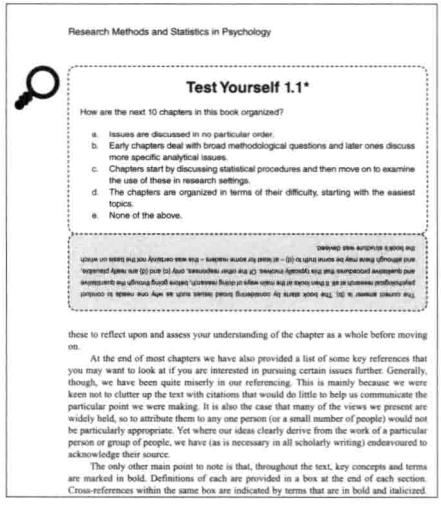
Research Bites – designed to provide you with practical insights that arise from contemporary discussions of research practice.



Photos 3.1–3.4 Different methods can be used to assess the same psychological state or process. In the top pictures a participant in the BBC Prison Study completes self-report measures of stress. These were supplemented by behavioural observation that involved monitoring and filming the participants around the clock. Stress was also assessed by taking daily measures of the cortisol in participants' saliva (as seen in the bottom right picture; Haslam & Reicher, 2006; Reicher & Haslam, 2006).

McKinley, 1943). Here the unusual nature of a person's beliefs may lead a clinician to suspect that the person is psychologically disturbed (e.g., Eysenck & Eysenck, 1985).

Photographs – designed to reinforce key points and encourage critical reflection.



Test Yourself 1.1*

How are the next 10 chapters in this book organized?

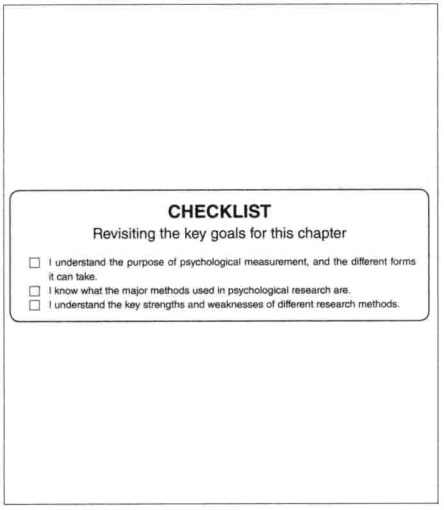
a. Issues are discussed in no particular order.
b. Early chapters deal with broad methodological questions and later ones discuss more specific analytical issues.
c. Chapters start by discussing statistical procedures and then move on to examine the use of these in research settings.
d. The chapters are organized in terms of their difficulty, starting with the easiest topics.
e. None of the above.

these to reflect upon and assess your understanding of the chapter as a whole before moving on.

At the end of most chapters we have also provided a list of some key references that you may want to look at if you are interested in pursuing certain issues further. Generally, though, we have been quite miserly in our referencing. This is mainly because we were keen not to clutter up the text with citations that would do little to help us communicate the particular point we were making. It is also the case that many of the views we present are widely held, so to attribute them to any one person (or a small number of people) would not be particularly appropriate. Yet where our ideas clearly derive from the work of a particular person or group of people, we have (as is necessary in all scholarly writing) endeavoured to acknowledge their source.

The only other main point to note is that, throughout the text, key concepts and terms are marked in bold. Definitions of each are provided in a box at the end of each section. Cross-references within the same box are indicated by terms that are in bold and italicized.

Test Yourself questions – designed to test your understanding as you progress through each chapter.

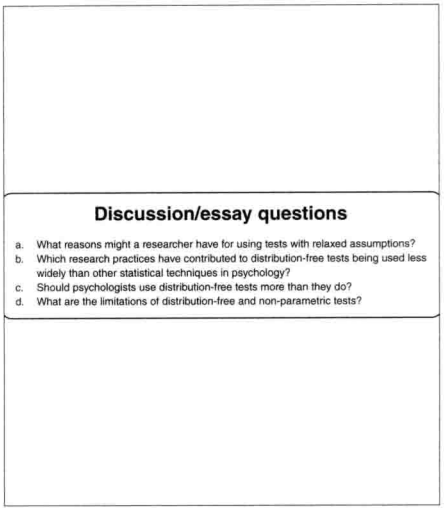


CHECKLIST

Revisiting the key goals for this chapter

- ☐ I understand the purpose of psychological measurement, and the different forms it can take.
- ☐ I know what the major methods used in psychological research are.
- ☐ I understand the key strengths and weaknesses of different research methods.

End of chapter checklist – designed to confirm that you have achieved each chapter's key goals.



Discussion/essay questions

a. What reasons might a researcher have for using tests with relaxed assumptions?
b. Which research practices have contributed to distribution-free tests being used less widely than other statistical techniques in psychology?
c. Should psychologists use distribution-free tests more than they do?
d. What are the limitations of distribution-free and non-parametric tests?

Discussion questions – designed to stimulate reflection on the key issues addressed in each chapter.

Exercises

a. A team of developmental psychologists measures the moral reasoning of children, giving each a score from 0 to 100, where 100 indicates a higher level of reasoning. The mean reasoning of 12 children in four age groups is presented in this way and the scores are given as follows:

Table 10.10

Age 7	77	71	69	74	81	79	77	73	83	69	75
Age 9	73	79	83	76	69	71	75	83	79	77	81
Age 11	79	83	77	83	79	69	71	75	77	81	83
Age 13	83	79	83	77	79	83	77	79	73	83	79

The researcher hypothesizes that older children will have higher levels of moral reasoning but before they can conduct specific tests of the hypothesis they want to conduct analysis of variance to see whether there is any evidence of an overall effect such that moral reasoning differs across age groups.

i. What would an ANOVA table for this analysis look like?
ii. Would ANOVA provide the researchers with the evidence they require? Explain your answer on levels of p and α.

b. Imagine that a group of twins from four groups of different ages: the above data had been gathered from 10–11-year-olds and 12–13-year-olds from two different groups, one with a high crime rate (HC Hi and one with a low crime rate (LCR) as before.

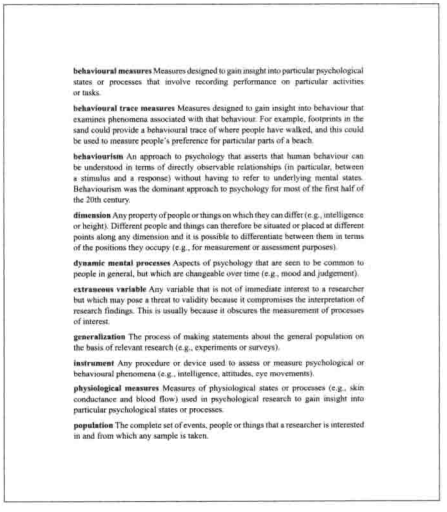
Table 10.11

HCR	Age 10–11	72	64	74	81	79	77	73	83	69	75
	Age 12–13	73	79	83	76	69	71	75	83	79	77
LCR	Age 10–11	79	83	77	83	79	69	71	75	77	81
	Age 12–13	83	79	83	77	79	83	77	79	73	83

The researchers again hypothesize that older children will have higher levels of moral reasoning, but they also suspect that there might be differences in the moral reasoning of children who live in areas with different crime rates, and that these might interact with children's age.

i. What would an ANOVA table for this analysis look like?
ii. Would ANOVA provide the researchers with any evidence to support their hypotheses? (State your answer on levels of p and α.)

Exercises – designed to test your knowledge in an active and practical way.



behavioural measures Measures designed to gain insight into particular psychological states or processes that involve recording performance on particular activities or tasks.

behavioural trace measures Measures designed to gain insight into behaviour that examines phenomena associated with that behaviour. For example, footprints in the sand could provide a behavioural trace of where people have walked, and this could be used to measure people's preference for particular parts of a beach.

behaviourism An approach to psychology that asserts that human behaviour can be understood in terms of directly observable relationships (in particular, between a stimulus and a response) without having to refer to underlying mental states. Behaviourism was the dominant approach to psychology for most of the first half of the 20th century.

dimension Any property of people or things on which they can differ (e.g., intelligence or height). Different people and things can therefore be situated or placed at different points along any dimension and it is possible to differentiate between them in terms of the positions they occupy (e.g., for measurement or assessment purposes).

dynamic mental processes Aspects of psychology that are seen to be common to people in general, but which are changeable over time (e.g., mood and judgement).

extraneous variable Any variable that is not of immediate interest to a researcher but which may pose a threat to validity because it compromises the interpretation of research findings. This is usually because it obscures the measurement of processes of interest.

generalization The process of making statements about the general population on the basis of relevant research (e.g., experiments or surveys).

instrument Any procedure or device used to assess or measure psychological or behavioural phenomena (e.g., intelligence, attitudes, eye movements).

physiological measures Measures of physiological states or processes (e.g., skin conductance and blood flow) used in psychological research to gain insight into particular psychological states or processes.

population The complete set of events, people or things that a researcher is interested in and from which any sample is taken.

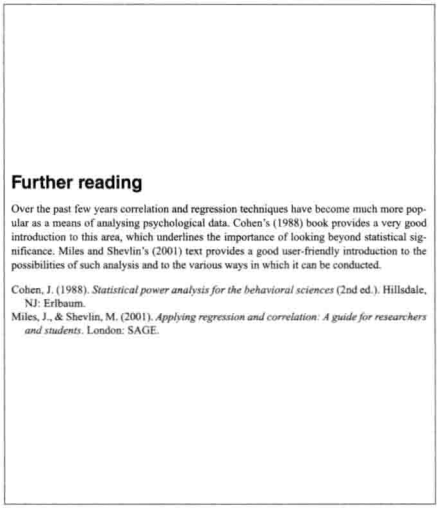
Glossary – designed to clarify the definition of key terms as they are introduced in each chapter.

Research methods: A checklist for research evaluation and improvement

Table 3.1

Potential problem	Question to ask	Potential improvement
Poor or limited choice of measure	Have researchers used an appropriate measure to investigate the psychological process or state in which they are interested?	Consider the different types of measure that could be used to investigate the issue at hand (e.g., behavioural, self-report, physiological). Consider the advantages and disadvantages (as well as the practicalities) of using different types of measure or different measures of the same type. If appropriate, design and conduct research that involves these alternative measures.
Extraneous variables	Are research findings contaminated by factors that are not of immediate concern to the researchers?	Think broadly about factors that are not addressed in the research but which may be affecting the findings (and their interpretation). Take steps to eliminate these (for more detail, see Chapters 4 and 5) or to compensate for them by using multiple methods.
Unrepresentative sampling	Is the experimental sample representative of the sub-population from which it is drawn and is the sub-population representative of the general population of interest?	Consider the implications of any unrepresentative sampling that has occurred. If necessary, take steps to improve the sampling procedure (e.g., by using random sampling; for more detail see Chapter 5) and then attempt to replicate the research findings.
Confounding	Is assignment to experimental conditions associated with an additional variable that is not of immediate interest to researchers (and which they had not intended to manipulate) but that could be having an impact on the findings?	Take steps to eliminate the impact of confounding variables by controlling for them. This is typically done by manipulating the independent variable of interest under conditions where the level of the confound is held constant.
Lack of experimental control (in quasi-experiments and surveys)	Is the interpretation of a relationship between an IV and a DV compromised by a failure to manipulate the IV experimentally?	Consider ways in which it might be possible to manipulate an IV experimentally. If none is feasible, and an IV has not been manipulated experimentally, try to generate alternative explanations of the relationship and be careful to avoid the correlational fallacy of implying that the IV caused the DV (for more detail, see Chapter 10).
Poor or limited choice of method	Have the researchers used an appropriate method to investigate the psychological process or state in which they are interested?	Consider the different types of method that could be used to investigate the issue at hand (experimental, quasi-experimental, survey, case study). Consider the advantages and disadvantages (as well as the practicalities) of using alternative methods to supplement and extend the research. If appropriate, design and conduct research that involves these alternative methods.

Research evaluation and improvement checklist – designed to provide you with an easy-to-access summary of best practice that you can refer to in the future.



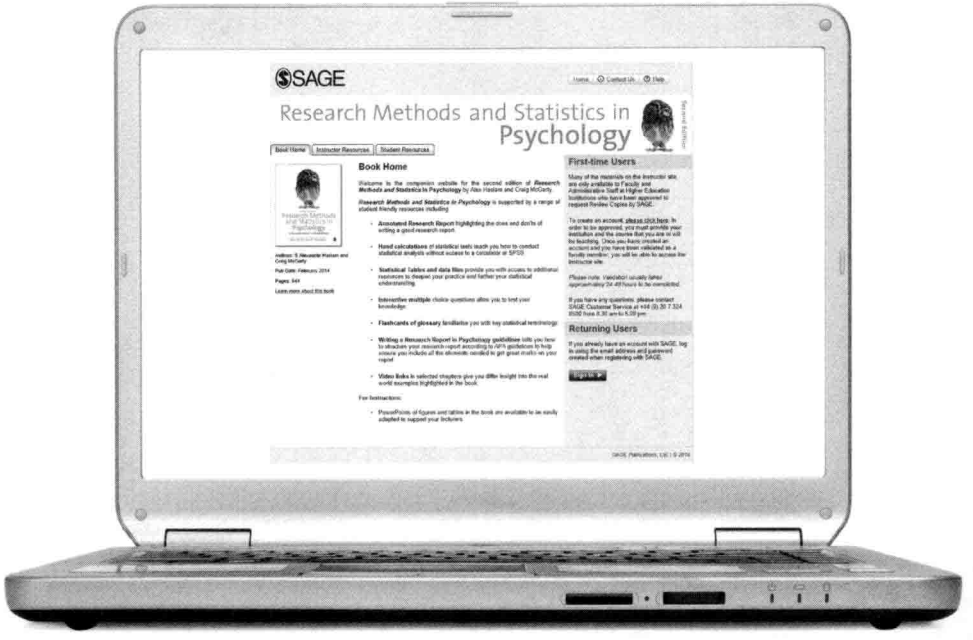
Further reading

Over the past few years correlation and regression techniques have become much more popular as a means of analysing psychological data. Cohen's (1988) book provides a very good introduction to this area, which underlines the importance of looking beyond statistical significance. Miles and Shevlin's (2001) text provides a good user-friendly introduction to the possibilities of such analysis and to the various ways in which it can be conducted.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.

Miles, J., & Shevlin, M. (2001). *Applying regression and correlation: A guide for researchers and students*. London: SAGE.

Further reading – designed to point you in the right direction when you want to know more about a given topic.



Companion Website – providing supplementary material for instructors and students, including an annotated research report, details of hand calculations of statistical tests, statistical tables and data files. www.sagepub.co.uk/haslamandmcgarty2e

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