

英文版

教育部高等学校心理学教学指导委员会推荐用书

Designing and reporting  
**experiments in psychology**

**心理学实验的设计与报告**

第 二 版

[英] Peter Harris 著  
彼得·哈里斯

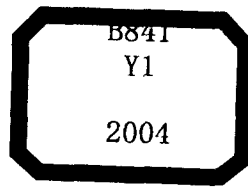
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**Designing and Reporting Experiments in Psychology**, 2th Edition

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# 总序

中国心理学有一个很早的开端,却有不长的历史。从1900年京师大学堂开设“心理学概论”课程,1917年北京大学成立中国第一个科学心理学实验室,到随后清华大学、杭州大学等一批学校成立心理学系,说起来有一个多世纪了。但由于20世纪战争与和平的较量以及文化意识形态领域里的跌宕起伏,相当多的时间被耽误了,学科发展被拖了后腿,算起来,真正用心做学问的时间大约不过半个世纪。

中国心理学有一个不错的开端,却有坎坷的历程。早在1908~1910、1912~1913年,蔡元培先生两度在德国游学,两度选修了冯特的“实验心理学”课程,这对他后来极力推动北京大学心理学的发展起了很大的影响。更有20世纪二三十年代,唐钺、孙国华、陈立、潘菽、曹日昌、朱智贤、周先庚等一批学者在美国哈佛、斯坦福、康奈尔、芝加哥大学等名校留学归来,投入国内心理学建设,形成了北方、南方诸多学校心理学齐发展的格局。但由于经费困难,后来的战乱,五六十年代对心理学的不公正对待和后来的文化大革命,中国心理学“几起几落”。

改革开放以来,中国心理学迎来了大发展的春天,教学和研究迅速普及,师资队伍和学生规模始终呈加速度扩张。在1980年,国内只有北京大学、北京师范大学、华东师范大学和杭州大学4所学校设有心理学系,到90年代初中期增加到了约20余所学校,再到21世纪初这几年增加到了100多所学校,几乎是每10年翻两三番!发展速度可谓惊人。

然而,高速发展也产生发展中的瓶颈。一方面,众多学校建设心理学系,开展心理学教学和研究,同时国内社会经济与文化的发展对心理学的需求越来越旺盛;另一方面,国内心理学的总体水平相对西方发达国家还比较落后,教学研究队伍并不壮大,教学研究水平仍急待提高。这种需求与供给、速度与质量的矛盾,不断激化,要保证国

内心理学的健康发展,必须寻求一些有效的方法和途径。

“西学东渐”、“洋为中用”是可以推荐的诸多方法之一。教育部高教司近年来大力提倡引进外版教材和开展双语教学,这无疑对内地心理学教学的发展产生巨大的推动作用。心理学诞生在西方。据统计,美国每年授予博士学位人数最多的学科是心理学,可见心理学在美国的重要和普及程度。心理学的高等教育在西方积累了较丰富的经验,教材在内容、形式上都比较成熟,而且快速有效地跟进国际心理学科学发展的前沿趋势,对于保持高等教育的水平有举足轻重的作用。相比之下,我国内地一些地区心理学师资匮乏,一些自编教材低水平重复,对教、学质量均有很大负面影响,情况堪忧。

教育部高等学校心理学教学指导委员会是国家教育部设立的心理学高等教育指导、咨询机构,负责制定国家心理学高等人才培养的宏观战略和指导规范。根据教育部发展高等教育的有关精神,我们与国内外多家出版机构合作,作为一个长期的工程,有计划、分期分批地引进外版教材,以期推动我国心理学教学的快速高效发展。

麦格劳-希尔出版公司在出版心理学教材方面富有经验,此次引进的教材均是麦格劳-希尔多年再版,被实践证明为适合高等学校教学的优秀教材。特别是,这些教材均经过国内著名专家学者鉴定并大力推荐,这对引进教材的质量起到了重要的把关作用。在此谨对这些专家学者表示特别的感谢和敬意!

希望这套教材对高校的心理学教学有所帮助,并祝愿我国的心理学高等教育事业蓬勃发展!

王 垒

北京大学心理学教授

教育部高等学校心理学教学指导委员会主任

# 序

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沈模卫

心理学实验在心理学科的发展进程中具有不可替代的作用。以冯特 (Wundt, W.) 在德国莱比锡大学创建世界上第一个心理学实验室为标志, 心理学科脱离了传统的哲学轨道, 成为一门独立的科学。此后, 心理学工作者凭借心理学实验这一探索心理现象的规律及其机制的主要手段, 累积了丰富的研究成果, 由此推动了心理学科的蓬勃发展。

心理学研究报告 (或论文) 是心理学研究成果最重要的表达形式之一。心理学研究报告的撰写既涉及与研究课题的理论背景、研究假设等相关的科学知识, 又涉及与实验设计、统计相关的实验结构知识和与心理学科科技论文写作规范相关的知识。这种论文撰写能力的形成和提升尚需要一个不断训练、不断实践的过程。就我国高等院校的心理学专业目前所开设的诸如: 普通心理学、认知心理学、实验心理学、心理统计等专业基础课程而言, 似无法独立完成对学生的这种综合训练, 因此有必要开设相应的课程或专题。

近年来, 我国已出版了有关科研论文写作规范的国家标准——《科学技术报告、学位论文和学术论文的编写格式》(GB-7713-87), 中国心理学会也编写了《心理学论文写作规范》, 然而仍然缺乏相关的教材或教学参考书。麦格劳-希尔教育出版公司 (McGraw-Hill Education) 和人民邮电出版社北京新曲线出版咨询有限公司在中国合作出版哈里斯 (Harris, P.) 的《心理学实验的设计与报告》可解燃眉之急。该书以如何撰写实验报告为主线, 参照《美国心理协会出版手册》(Publication Manual of the American Psychological Association, fifth edition), 详细介绍了一篇规范的心理研究报告所包含的各部分内容, 以及各部分的撰写中应注意的问题。书中还针对心理学实验研究中经常采用的几种基本的实验设计方法以及相关的统计方法做了概要的介绍和评价。该书的第一版自 1986 年至 2000 年重印了 11 次, 于 2002 年再版, 可见其倍受国外心理学专业学生的欢迎。该书语言简练、易读易懂, 对

学生在撰写研究报告过程中所遇到的实际问题给出了操作性很强的指导,可作为我国高等院校心理学专业学生(包括本科生和研究生)的教材或教学参考书,也可作为心理学工作者撰写心理学研究报告(或论文)的参考手册。

沈模卫

浙江大学心理与行为科学系系主任

2004年10月

# 内容简介

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许多心理学课程都要求撰写实践报告。然而，这项任务对于刚开始学习心理学的学生而言往往显得很困难。本书为学生在设计心理实验和撰写实验报告方面提供了指导。这一版本还添加了最新的术语，并且所提供的例子与最新的 APA 手册相一致。

在这一版中，实验处理与统计问题得到了进一步的扩展，其中包括了统计检验力、效应大小等问题。另外，这些问题的引入并没有降低第一版的清晰性以及对学生的吸引力。这一版也涉及了使用表格及图表方面的材料，以及如何起草报告的材料。应第一版读者的要求，本版将实验设计和报告扩展至单变量以上，并提供了特定的例子，以此提醒学生如何报告统计数据，以及在报告时所要注意的问题。学生可以登陆网站 [www.openup.co.uk/harris](http://www.openup.co.uk/harris)，在那里，他们可以看到与本书有关的更丰富的材料。

总之，实验心理学方向和心理学其他领域的学生会发现，本书对于他们完成本专业的学习有着重要的意义。

# 作者简介

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彼得·哈里斯是英国谢菲尔德大学心理系的讲师，他曾在萨塞克斯大学、赫特福德大学和诺丁汉大学工作过，也曾曾在阿姆斯特丹大学和牛津大学做过访问学者。他主要的研究方向是社会和健康心理学。





# Preface

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## To students

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Writing reports of practical work is an important part of many courses in psychology, from school level to degree work. This book provides advice on how to go about writing these reports, focusing especially on the reports that you will most often be asked to write – reports of *experiments*.

It is a guide to *design* as well as to report writing. Why? Because these elements are inextricably linked. It is hard to write a good report of an experiment without understanding the whys and wherefores of its design. In order to fully understand what is required of you in the report, therefore, it helps to have an idea of the function that the report of a study serves in the scientific world. This, in turn, requires you to understand something about the nature and purpose of empirical studies – such as experiments. Moreover, many of the problems and difficulties that you may face with report writing involve questions such as how to report the features of your design, or how to report adequately the outcomes of your statistical analyses. The answers to such problems depend on knowledge both of the conventions of report writing and the logic and terminology of design. Consequently, this book attempts to provide an introduction to both aspects of your practical work.

## How to use this book

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My aim as author of this book has been to write something that will not only serve as an *introduction* to design and report writing, but that can also be used as a handy reference source throughout your career as a student of practical psychology. I see it being used much

like a thesaurus or dictionary – something that you turn to and read as the need arises. In particular, you may find yourself having to go over some of the sections a number of times before full understanding dawns. Don't be above doing this – it's what the book is for. Moreover, although you should never let yourself be overawed by the lab report, don't underestimate the task that confronts you either. Report writing is not easy – but I hope that this book will make it easier.

It is essential that you take an active part in assimilating the text rather than being a passive receiver of information. After all, you are in an extremely good position to diagnose what you already know and what you need to learn. This book will have been a complete failure if the information remains on the page rather than ending up in your head. To help you with your learning, you will find that the chapters in Part 1 typically begin with a number of “diagnostic questions” with which you should test yourself to see whether you already have the required knowledge to tackle the chapter. If you have any difficulties answering these questions then you will be directed to another section of the book for assistance. Throughout the book you will also find **self-assessment questions (SAQs)** at various points in the text. Attempting these SAQs will give you feedback on your learning and a better general understanding, and will help you to be more of an active participant than a passive reader. The answers to these questions are given at the end of the book.

The summaries at the end of each section recapitulate the main points and so provide a useful aid to revision. The index of concepts that appears at the end of the book indicates the place in the text where each concept is introduced and defined. Entries in the index are in bold print in the text.

Part 1 is about writing reports. There are chapters for each of the principal sections of the report. Part 2 is about design. There is a progression to the chapters in Part 2. That is, each chapter in Part 2 has been written on the assumption that you are familiar with the material in the previous chapter. So, make sure that you are happy with the material in each chapter before you move on to the next one. In particular, make sure that you are familiar with the material in Chapters 9–11 before tackling the remaining chapters.

Although the book deals with a number of aspects of analysis and design, it does not deal with the computation and underlying rationale of specific statistical tests. You will need also to consult a decent textbook of statistics at various stages in the process of design, analysis and reporting. Nevertheless, I hope that this book offers you useful guidance on the issues that you will need to study in greater depth in methods and statistics and provides helpful accounts of most

of the basic issues. You can find recommended reading at the rear of the book and also on the Web site (see below).

To help you to develop and extend your knowledge of report writing and design, I have included towards the back of the book a separate commentary on various issues and points in the text. There is also a Web site that accompanies this book.

The commentary is designed to extend your understanding by expanding on points and issues that I don't have space to cover in detail in the core text or by clarifying something that I've written. The presence of commentary is indicated in the core text with superscript numbers. The Web site is likewise intended to help you to develop your knowledge of how to design studies and write reports. You should find yourself looking to the Web site for material more and more as you become more experienced and need to write more sophisticated reports. You will find on the Web site fuller coverage of some of the material in this book and also coverage of issues that I have not been able to talk about in the book. For example, on the Web site there is further advice on how to use and report specific statistics and also how to write reports in which you have used lengthy questionnaires. I have indicated in the text at various points some of the issues covered on the Web site. *Do* log on and find out what is there. You can find the Web site at [www.openup.co.uk/harris](http://www.openup.co.uk/harris). Tell your fellow students about it.

I hope that you will find this book useful and that it helps you to produce good reports. However, please remember that it is designed to *supplement* adequate supervision – not to replace it. The advice in this book is based on the conventions in the *Publication Manual of the American Psychological Association*, fifth edition (American Psychological Association [APA], 2001). You will find this referred to in the text as the *APA Publication Manual* (APA, 2001). Nevertheless, it is quite possible that I will have written or recommended something with which your tutors disagree. If so, I hope that your tutors will make clear to you what they want from you instead and that they will not experience fits of apoplexy or direct at me torrents of abuse in the process. So, be alert to places where your tutors expect you to depart from my suggestions.

Please *do* give me feedback. Let me know whether you like the book or not, about the bits that you found useful and any bits that you found hard to follow. This will help me when I come to produce any further editions. It will also help me to develop the material on the Web site.

## To tutors

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The aims of this second edition are of course substantially those of the first. However, they have also broadened, in part from a desire to extend the usefulness of the book and in part because of the changes that have taken place since the quieter times in which I wrote the original. The book is designed both for use as an introductory text for those having to write reports and think about experiments for the first time, and also as a resource for students as they progress through the years of a degree course. As with the first edition, it focuses primarily on experiments. However, there is material to assist students with reporting other types of study, on the Web site that accompanies this book.

The academic world has changed significantly since I wrote the first edition. In the UK the number of students studying psychology has expanded enormously and the number that we admit on to degree courses is many times greater than it once was. This has inevitably changed the ways in which we teach our students. If my experience is anything to go by, students receive less experience of report writing and less feedback on their efforts than was once the case. The need for a guide such as this has therefore increased.

Changes in technology have also transformed the facilities available to students when producing their reports. The book has been updated throughout to incorporate these developments with, among other things, new material on producing word-processed reports, on using statistical software and graphing packages and on finding references using electronic resources.

Above all, there have been a number of changes in custom and practice that required changes to the recommendations in the first edition. Some of these are clear – such as the move away from describing people as subjects. Others – such as the challenge to significance testing – are, at the time of writing, less clear-cut in their implications for what we teach our students. I have tried to anticipate the way that things will develop – particularly the move in published work towards dealing with issues of power and effect size and the need, therefore, to educate and train our students in dealing with and reporting these issues.

I found that the first edition was used by more advanced students than I had expected. (I even know of postgraduates who used it to help them to prepare their theses.) Certainly it was not uncommon to find final-year students using it extensively to help them to write their projects. In the light of this I have added a commentary and other pointers to help such students move towards writing the more

sophisticated reports expected of them. A key element in this is the Web site that accompanies this second edition. The Web site can be found at [www.openup.co.uk/harris](http://www.openup.co.uk/harris). I have placed there fuller coverage of various issues discussed in this book and also material relevant to more advanced students. The Web site also contains advice on how to report studies involving questionnaires and non-experimental studies.

Please note that each chapter in Part 2 has been written on the assumption that students are familiar with the material in the previous chapter. The material in Chapters 9–11 covers the core material on design and analysis contained in a “traditional” introductory course on these issues. This book can therefore be used with such courses by omitting the material in Chapters 12 and 13.

I have taken this opportunity to bring the recommendations in the book into line with those in the fifth edition of the *Publication Manual of the American Psychological Association* (APA, 2001). Although not a primer in APA style per se, the aim is to encourage students from the outset to produce reports that are consistent with the style that now predominates. Those tutors for whom this is less of a concern will, I hope, find that much of what I have to recommend here nevertheless still suits their purposes. I would appreciate feedback on what works and what I might do differently.

One minor but nevertheless problematic issue was to choose terms to replace the outmoded design terminology of between- and within-subjects independent variables. There is currently no consensus on this issue, as a quick trawl of contemporary statistics textbooks will show. I have chosen the terms *unrelated samples* (for between subjects) and *related samples* (for within subjects) as these seem to be among the commoner alternatives used currently, and have the advantage of being consistent with each other and of signalling meaningfully the distinction that they denote. However, for those who wish to use alternatives, I have highlighted this issue (Section 10.2) and described the principal alternatives. I have also tried to write in such a way that my chosen terms could be easily replaced without students losing sight of the conceptual and methodological issues involved in choosing between these types of independent variable.

At the time of writing, the debate on the future of statistical significance testing continues. I have written this book on the assumption that most of the students who use it will still be asked to test for statistical significance, albeit perhaps within a broader understanding of issues to do with estimation, power and effect size. Nevertheless, it should be possible to use this book even if you do not want your students to test for statistical significance. There is also material (Section 13.8) on alternative labels for independent and dependent variables for those uncomfortable with the assumptions underlying these

terms. In the interests of clarity and simplicity, especially for introductory students, I have assumed that they will generally be testing the traditional “no effect” null hypothesis rather than “minimum-effect” ones (see, for example, Murphy & Myors, 1998).

Those who are familiar with the first edition of this book will find lots of other changes. The obvious changes are the additions of a chapter in Part 1 on producing the report and a chapter in Part 2 on effect size and power. Part 1 now also contains specific advice on how to report some of the more commonly used statistics. In Part 2 I have also expanded the coverage of designs involving two or more independent variables and introduced material on graphing interactions. Part 2 also contains additional material on controlling variables, now covers internal and external validity and has an expanded section on ethics. There is also a new appendix – Appendix 3 – which covers how to use tables of critical values of inferential statistics, given that students are now likely to be less familiar with the use of these and yet will still need to refer to them from time to time.

Material on the Web site covers statistics, from using and reporting chi-square through to multiple linear regression. This is designed to be of use both to relative beginners and more advanced students who may need to run and report statistics of effect size, multiple comparisons, tests of simple effects and so on. For each statistic there is a section on things for the student to watch out for when using it or reporting the outcome of the analysis. Although this part of the Web site is not intended to replace an adequate statistics textbook, it should provide the student with a useful additional source of material and help them to have a reasonable go at reporting the statistics that they are most likely to encounter as undergraduates.

Although I have written this book primarily for students of psychology, I should imagine that many of the rules and conventions are shared by related disciplines – such as biology – and so it may prove useful to students of these subjects too.

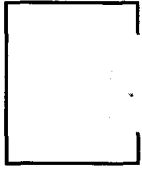
I hope that much that was good in the first edition of the book remains and that at least most of the changes are improvements. To be frank, I didn’t get much feedback on the first edition, although as an old empiricist I take its sales figures to mean that I largely got it right. Very occasionally at a conference or other function someone came up to me and said something nice about the book but sometimes also asked me to change something next time round. Wherever I’ve been able to remember such advice, I’ve tried to incorporate it. Most gratifying of all were those times when letters arrived from students who’d found the book useful and wanted to let me know and especially those occasions when they came up to me and told me the same thing. These experiences made me feel warm and happy, but in

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the event contributed to how daunted I became at the prospect of revising it.

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