

CONTENTS

PROLOGUE

Who should read this book?	5
Five reasons why you should you read this book	5
Who wrote this book?	6

PART A: THE ANALYSIS OF STATISTICAL POWER

What is statistical power?	10
How do we prove things with statistics?	10
Why do Type I errors get all the attention?	13
What are four outcomes of any statistical test?	14
What are alpha and beta?	15
What is the wrong way to interpret a statistically nonsignificant result?	17
What is an appropriate level of power?	17
What is power analysis for?	19
What factors affect statistical power?	20
How does power analysis work?	21
When is the best time to do a power analysis?	22
How do I calculate the minimum detectable effect size?	23
How do I calculate the required sample size?	24
How do I calculate the statistical power of my study?	26
How do I calculate sample sizes using G*Power 3?	28
Why are most effects small?	30
What are the dangers of running an under-powered study?	32
How does low statistical power lead to Type II errors?	33
My study is under-powered, how can I increase statistical power?	33
What are the dangers of running an over-powered study?	35
Why can't I draw substantive conclusions from p values?	36
My study is highly-powered, how can I avoid the dangers of misinterpretation?	37
What is the tricky part of doing a power analysis?	37
What's wrong with retrospective power analyses?	39

PART B: THE STUNNING RESULTS OF POWER RESEARCH

What is the purpose of power research?	43
Which journals have had their average levels of statistical power assessed?	44
How does low statistical power lead to Type I errors?	46
What is HARKing?	46
How can I avoid the temptation to HARK?	47
What is the main takeaway of this book?	48
Appendix 1: 20 Power Exercises	50
Appendix 2: Ten Great but Slightly Inaccurate Quotes about Statistical Power	52
References	53