

Advance Praise for *Spirituality and Health Research*

“Simply stated, Dr. Koenig’s book is as close to a one-stop research reference as you will find on the market today. Students *and* established scholars of religion and health will benefit from excellent chapters concerning the development of important research questions, the selection of appropriate research designs, measurements, and analytic strategies, and publishing, research funding, and grant writing. All disciplines should have such a comprehensive *and* practical *and* accessible reference.”

—Terrence D. Hill, Department of Sociology,
Florida State University

“Religious principles rest on faith—belief even in the absence of evidence, whereas scientific principles rest on skepticism—disbelief even in the presence of evidence. Beliefs can have significant effects on health whether or not the beliefs are true (e.g., placebo effects). Science, therefore, is especially well-suited for testing the effects of people holding religious beliefs or engaging in religious behaviors on health outcomes. In *Spirituality and Health Research*, Koenig provides a valuable guide for designing and executing such scientific investigations. The result is a worthwhile read for students and faculty alike.”

—John T. Cacioppo, Tiffany and Margaret Blake Distinguished
Service Professor, The University of Chicago

“Research methods are best learned within the context of a substantive field that is near to your heart. This impressive volume is indispensable for those who want to learn more about research methods on religion, spirituality, and health. This comprehensive survey of the field is unprecedented: it contains everything from finding funding to selecting a journal for publication. What a stellar accomplishment!”

—Neal Krause, Marshall H. Becker Collegiate Professor,
University of Michigan

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Religious Resources for Healing*

Faith in the Future: Healthcare, Aging, and the Role of Religion
Coauthored with Douglas M. Lawson, PhD
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*Spirituality in Patient Care:
Why, How, When, and What*
Second Edition

SPIRITUALITY AND HEALTH RESEARCH

SPIRITUALITY & HEALTH RESEARCH

*Methods, Measurement, Statistics,
and Resources*

Harold G. Koenig, MD



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To Bob, Martha, Katherine, and Allison Haley

Contents

Preface	ix
Acknowledgments	xi
Introduction	3
PART 1: Overview	
1. Overview of the Research	13
2. Strengths, Weaknesses, and Challenges	29
3. A Research Agenda for the Field	47
PART 2: Methods and Design	
4. Identifying a Research Question	75
5. Choosing a Research Design	85
6. Selecting a Sample	97
7. Qualitative Research	115
8. Observational Research	129
9. Clinical Trials	149
10. Clinical Trials with Religious Interventions	171
PART 3: Measurement	
11. Definitions	193
12. Measurement I	207
13. Measurement II	219
PART 4: Statistical Analyses and Modeling	
14. Statistics I: General Considerations	237
15. Statistics II: Statistical Tests and Approaches	253

16. Confounders, Explanatory Variables, and Moderators	289
17. Models and Mechanisms	309
18. Statistical Modeling	327
PART 5: Publishing and Funding Resources	
19. Publishing Results	347
20. Funding for Research	367
21. Writing a Grant	385
Final Thoughts	405
Notes	409
Glossary	433
Index	441

Preface

THIS BOOK IS for investigators at all levels of training and experience who wish to conduct research on religion/spirituality (R/S) and health. Researchers early in their careers and those who have only recently switched focus to this topic will want to read the chapters sequentially. Experienced researchers may wish to skip some of the more basic chapters and focus on the technical chapters involving measures, modeling, statistical analyses, and sources of funding support, as well as the chapter that provides an agenda of highest-priority research areas. Regardless of whether the reader is a novice or a seasoned investigator, this volume—based on nearly 30 years of experience conducting research—will provide invaluable information to increase the investigator’s likelihood of success in developing, getting funding for, executing, and publishing research in this area.

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The future of the field of R/S and health depends on at least two things: ideas and the testing of those ideas through research. Ideas, particularly novel ones, often come from careful, thoughtful reasoning by a single investigator deeply immersed in the subject. However, such ideas also often arise from discussion and debate within the research community, since they must withstand scrutiny and criticism from peers. Ideas, however, cannot verify themselves—regardless of how much agreement there is about them. Only careful, objective observation can test whether ideas correspond to reality. These ideas form and inform the hypotheses that research studies test through systematic observations and experiment.

There are practical reasons that research in this area is so important, is likely to have a high payoff in the years ahead, and is worth the investment by government and private funding

Given the role that R/S could play in preventing illness, speeding recovery, and motivating individuals to care for one another in the community (thereby reducing the need for expensive health services), research in this area will be of critical importance in addressing the escalating health-care costs in the United States and countries around the world.

agencies. As people in countries around the world are living longer due to medical advances, this has created a real quandary for government-funded health programs that will soon become swamped by the health-care needs of their aging populations. Given the role that R/S could play in preventing illness, speeding recovery, and motivating individuals to care for one another in the community (thereby reducing the need for expensive health services), research in this area will be of critical importance in addressing the escalating health-care costs in the United States and countries around the world. Because we still know very little about how R/S affects health in different situations or interacts with existing treatments, there is almost endless opportunity for novel research that could substantially impact public health.

In medicine and all segments of health care, research drives decision-making. Where to invest resources and time, what kinds of treatments to provide, and what approaches to health care to take—all are determined by scientific research. This is the day of *evidence-based* medicine. Research, then, will be an essential factor in determining what contributions (if any) R/S can make to the health and well-being of individuals and populations. This is one of the reasons that I chose to devote my academic career to conducting research in this area, and why I am so committed now to preparing others to do the same.

Acknowledgments

THIS BOOK WOULD not have been possible without the help and assistance of some very dear colleagues of mine, who reviewed and commented on several of the chapters. A sincere thanks to (in alphabetical order) Nancy Blasdel, Terrence Hill, Maragatha Kuchibhatla, Jason Newsom, Rene Oscarson, David Rosmarin, Lisa Satanovsky, Harold Scarbro, and Michael Sheridan. This does not mean, however, that all of these individuals have endorsed everything in this book.

SPIRITUALITY AND HEALTH RESEARCH

Introduction

IN THIS INTRODUCTION I describe the audience for the book and the contents of each chapter so that the reader will get a sense of the material covered in this volume. Each of the twenty-one chapters is short, highly focused, easy to read, and full of practical information designed to build the reader's knowledge base. The target audience for this book is anyone interested in conducting research on religion/spirituality (R/S) and health, or learning about how such research is done. This book is based on five-day research workshops that I've been teaching at Duke University during the summer for the past eight years. This workshop has now been taken by nearly five hundred individuals interested in learning about or conducting research on this topic.¹ Participants have ranged from interested laypersons to clergy and chaplains to students to tenured research professors at Harvard and Johns Hopkins. To my knowledge, this is the only place in the world where researchers can obtain formal training on how to conduct research on R/S and health. Many individuals who cannot take the time or cannot afford to attend the workshops have contacted me asking how they can get ahold of the material that I present in these workshops. This book is a response to those requests, and is now required reading for anyone attending the workshops.

As I indicated in the preface, those likely to get the most out of this book are graduate students, young faculty members (where young is anyone under seventy), and seasoned researchers who are interested in conducting R/S-health research. Much of the information presented here cannot be obtained in undergraduate or graduate courses on research methods, study design, or statistics. Rather, I present practical, basic informa-

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tion to help the researcher design a research study, obtain funding for the research, manage the project to completion, analyze the results, and publish it in an academic journal—all tailored to research on R/S and health. Others, particularly teachers and educators, will also find this book useful—perhaps even to teach courses on research methods more generally. Specific chapters can be taken out and used for instructing students on research design, statistics, or grant writing. Finally, I suspect that even the nonresearcher may find this book accessible and of interest. Be forewarned, though, that it doesn't read like a novel but rather like an almanac, full of facts and information.

Chapter 1 begins with an overview of the research on R/S and health. This is a concise review of what the nearly three thousand published quantitative studies to date have found. The majority of research so far has reported a positive relationship between R/S and both mental and physical health, although about 10 percent of studies suggest the opposite and about 25 percent indicate no association. So a lot remains unknown.

Chapter 2 examines the strengths and weaknesses of the research thus far. Among the strengths are the many different research designs used to examine these relationships, long observation periods in some studies, large random population-based samples, many different populations studied in geographical locations around the world, many different investigators reporting similar results, and improvements in research methodology during the past few years. There are also many weaknesses in the existing research, indicating much more work is needed. Valid concerns exist about the cross-sectional nature of much of this research, use of small nonrandom samples, poor methods, inadequate control for confounders, incorrect modeling of variables, overinterpretation of results, lack of clinical trials, lack of certainty about mechanism, lack of appreciation for the complexity of the R/S-health relationship, lack of consistency in the findings, relatively weak associations, failure to consider the time frame necessary for R/S to affect health, and failure to consider lifetime exposure. No doubt, there is plenty

of room and opportunity for research that addresses these problems.

Chapter 3 identifies and prioritizes a future research agenda for the field. Research should focus on high-priority, high-pay-off studies with public health impact, common disorders influenced by psychosocial and behavioral factors, evaluation of disease detection and health promotion within faith communities, effects on use of health services, and effects of addressing R/S needs in clinical practice on patient and clinician outcomes. Low-priority studies and dead ends are also discussed, and researchers are encouraged to avoid them.

Chapter 4 is the first of six chapters on research design, and appropriately focuses on identifying a research question. The research question and accompanying hypothesis determine all aspects of a research study, including the background for the study, the preliminary research and pilot work, the choice of research design, the type and size of sample, the size of the research team, and the funding requirements, all of which must flow naturally and logically from that primary question. Investigators are encouraged to identify a research question that captures their interest and passion, and is feasible, novel, ethical, and relevant. I also point out that ethical concerns are often used to justify not doing research on R/S and health. Lack of a clear understanding of what is and is not ethical can serve as a barrier to doing important research.

Chapter 5 discusses how to choose a research design specific to the research question. Research designs are divided into observational and experimental, which in turn can be divided into qualitative and quantitative for observational studies and controlled and uncontrolled for experimental studies. Other factors that influence choice of design include the investigator's experience with a particular design, the funding support, the availability of subjects, and the participation of consultants with expertise in that design.

Chapter 6 examines the different types of research samples, describes how to identify the right sample for a research question, reviews methods for selecting a sample, and discusses issues related to response rate for observational studies. For

intervention studies, inclusion and exclusion criteria are addressed, and the challenge of finding a right balance between the homogeneity and heterogeneity of subjects is discussed.

Chapter 7 provides an overview of qualitative methods. This design is often ideal for R/S and health research, where relationships cannot be fully described by relying on quantitative methods alone. Qualitative research seeks to answer questions related to social experience, how it is created, and how it gives meaning to life. This approach is crucial early on in a research program to obtain a deeper and richer understanding of a phenomenon. It is also important later on when the results of quantitative studies need interpretation and application to clinical practice. The different kinds of qualitative research are described, and the differences between qualitative and quantitative methods are outlined.

Chapter 8 focuses on observational designs such as case-control, cross-sectional, retrospective cohort, and prospective cohort studies. The strengths and weaknesses of each design are discussed, with an emphasis on cross-sectional and prospective studies. Cross-sectional designs are the easiest and least expensive, but emphasis must be placed on systematically or randomly identifying a sample, use of reliable and valid measures to assess variables, and efforts to maximize response rate and account for all nonresponders. Prospective cohort designs are more expensive and time-consuming, but almost always preferred over cross-sectional studies. In prospective designs, the emphasis is placed on using validated measures, ensuring interviewer consistency, maximizing follow-up of all enrolled subjects, minimizing contact between interviewers and subjects that affect health outcomes, and accounting for all dropouts. How to conduct an observational study is reviewed from start to finish, and then a specific example of a prospective study is provided and the challenges involved in executing that study discussed.

Chapter 9 examines the randomized clinical trial, a powerful design capable of determining whether an R/S intervention actually causes changes in a health outcome. The strengths of this design are discussed along with the many weaknesses that can result in misleading findings. Basic features of clinical trials are then discussed, including the standardization of the inter-

vention, choosing a control group, selecting subjects, measuring outcomes, types of informed consent, types of randomization, types of blinding, and statistical methods for analyzing results.

Chapter 10 provides examples of randomized clinical trials involving R/S interventions, demonstrating that such studies are quite possible. Clinical trials are described in subjects with mental disorders (depression and anxiety) and physical disorders (breast cancer, congestive heart failure, malignant melanoma). Both Western and Eastern religious interventions are discussed, along with studies examining the efficacy of chaplain interventions. Many lessons can be learned from the experiences of investigators who have attempted studies of this kind. Those that have been successful teach us a lot. Those that have failed due to lack of funding support, difficulty recruiting subjects, or inadequacies in design teach us even more.

Chapter 11 is the first of three chapters dealing with measurement. This first chapter addresses the thorny topic of definitions. First discussed are the optimal criteria for definitions of terms such as religion, spirituality, and secularism when used in research settings vs. clinical settings. The definitions of these terms depend on the unique needs of the setting. Issue is taken with the now popular and widely used definition of spirituality (especially dominant in academic circles) that views it as much broader than religion and that even includes those who are completely secular. Examples are provided of what happens when there is definitional confusion, in particular the development of spirituality measures contaminated with health outcomes that lead to tautological relationships. Finally, definitions for religion, spirituality, and secularism are provided and suggestions made on when to use them.

Chapter 12 discusses various approaches to quantitative measurement that include self-administrated scales, interviewer-administered scales, and novel methods of measurement that seek to increase objectivity and accuracy. Sixteen dimensions of religion or religiousness are first presented and then reduced into three basic categories of religious belief and activity. Then examined are religion-specific scales developed for studying religious groups including Jews, Muslims, Hindus, Buddhists, and members of New Age religions.

Chapter 13 describes the most commonly used scales today and discusses their strengths and weaknesses. Nineteen scales are reviewed, and recommendations are made on the best scales to use depending on the investigator's need—the best overall measure, the briefest measure, the most comprehensive measure, and the best combination of measures. The chapter is rounded out with a discussion of how to develop a scale from scratch if none exists that assesses what the researcher wants to measure.

Chapter 14 is the first of five chapters that focus on statistical analyses, including the development of statistical models and the separation of confounders from mediators and explanatory variables. This chapter covers the fundamental rules of statistical methods, presents guidelines on how to take a systematic approach toward analyzing data, and discusses the steps involved in preparing a data set for analysis. Recommendations are made on how to analyze R/S variables in statistical models and on ways of addressing the problem of multiple comparisons.

Chapter 15 provides a detailed guide on statistical tests for most every situation and describes when a test is indicated, illustrated with examples of R/S research questions that these tests can answer. The chapter starts out by examining the different forms that response categories can take (levels of measurement) that determines choice of statistical test: categorical, continuous, and ordinal. Based on level of measurement and study design, the chapter describes specific statistical tests for analyzing data in observational and experimental studies, depending on whether samples are independent or matched. Included here is a review of statistical methods for longitudinal studies, which is a priority now in R/S-health research. The chapter ends with a discussion of situations when a statistician is needed.

Chapter 16 is a key chapter that describes the different classes of variables (predictors, outcomes, confounders, mediators, moderators) and focuses on the widespread problem of confusing confounders and explanatory variables. The importance of carefully separating confounders from explanatory variables is emphasized and contrasted with the common practice of lumping them all into a single category. This practice can lead

to an underestimation of the relationship between R/S variables and health outcomes. Also addressed is the challenge of distinguishing confounders from explanatory variables, and baseline physical health is used as an example.

Chapter 17 prepares the reader for a discussion of statistical modeling by presenting hypothetical causal models for explaining how R/S might affect health. Having such a model is important for specifying research questions, designing research studies to address them, and setting up statistical analyses that fully capture the effects that R/S may be having. A model is developed from a Western religious perspective that explains how R/S may directly and indirectly influence physical health through psychological traits, lifestyle choices, health behaviors, mental and social health, and basic physiological functions. That model is then adapted for Eastern religious and secular humanistic perspectives. An emphasis is placed on the effects that genetic, environmental, and epigenetic factors have on constructs at every level, underscoring the tremendous complexity of the R/S-health relationship.

Chapter 18 presents several examples of published research where investigators did not model their variables appropriately, resulting in an underestimation of the effects that R/S factors had on a health outcome and a misinterpretation of the results. Also provided are examples of published studies where investigators modeled their variables correctly, and considered both the direct effect of R/S on the outcome and the indirect effects through intervening explanatory variables, while appropriately recognizing R/S as the source of the effect. Also provided are illustrations of how to model the effects of an R/S predictor on a health outcome, first with a single explanatory variable and then with multiple explanatory variables.

Chapter 19 focuses on why publishing research is so important, provides resources on how to improve writing and grammar skills, discusses how to structure a research report, describes how to submit a research report to a journal, provides detailed instructions on how to respond to journal reviewers, makes recommendations on what to do when a paper is rejected, suggests academic journals in which to publish R/S-health research, describes how to publish via online Open Access journals, and

suggests other ways of getting research findings into print. Getting research published is a skill that can and must be learned, and this chapter provides the details of that process.

Chapter 20 explores ways of obtaining external funding for conducting research, beginning first with how to do research without such support. Lack of external funding should not stop anyone from doing R/S and health research. This chapter describes what it takes to get external research funding, emphasizing that while external funding support is hard to get, it is not impossible. Provided here are many possible sources of external funding, from government programs to private foundations to individual donors. Ways of maximizing success are described based on experience learned over the past eighteen years raising more than \$10 million for research on R/S and health.

Chapter 21 provides details on how to write a grant to obtain research support. Described here are the preliminary steps that researchers need to take before starting to write a grant, and the importance of making the grant easy to read using a plain and direct writing style with simple short sentences. A detailed description is provided on how to structure a grant, section by section, referring to the results of a survey of grant reviewers on the most common weaknesses in the grants they reviewed. Applicants are encouraged to ensure that each grant section contains the content and detail that reviewers expect and are warned about what happens when reviewers are surprised or irritated. Grant writing is brutal business and time-intensive, but necessary for sustaining a research program.

The book concludes with some final thoughts on the needs of this growing field and the challenges that investigators will face when conducting research in this area. Despite these obstacles, all should be encouraged by the tremendous opportunity that exists for research on R/S and health and the tremendous need for well-trained researchers in this area. This book will be an invaluable resource for those wanting to use the methods of science to discover how and why R/S and health are connected, and for those wanting to develop and test R/S interventions that utilize those connections.

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PART 1

Overview



CHAPTER 1

Overview of the Research

OUTLINE

I. MENTAL HEALTH

1. Positive Emotions
 - a. Well-Being
 - b. Hope and Optimism
 - c. Meaning and Purpose
 - d. Self-Esteem
 - e. Sense of Personal Control
2. Negative Emotions
 - a. Depression
 - b. Suicide
 - c. Anxiety
 - d. Alcohol Use/Abuse
 - e. Drug Abuse

II. SOCIAL HEALTH

1. Human Virtues
2. Social Support
3. Social Capital

III. PHYSICAL HEALTH

1. Health Behaviors
 - a. Exercise
 - b. Diet
 - c. Weight
 - d. Risky Sexual Activity
 - e. Smoking
2. Physical Disorders
 - a. Heart Disease
 - b. Hypertension
 - c. Cerebrovascular Disease
 - d. Dementia
 - e. Immune Dysfunction
 - f. Endocrine Dysfunction
 - g. Cancer
 - h. Overall Mortality

IV. RELATIONSHIPS WITH HEALTH

V. SUMMARY AND CONCLUSIONS

FOR THOUSANDS OF years, as far back as historical records go, people around the world have held religious beliefs and engaged in religious practices. Why would humans spend their time and energy on such activities? Why would such beliefs and practices persist and even flourish in some of the most developed countries of the world and among well-educated and informed people? For example, recent national polls of the United States by the Gallup and Pew organizations have found that 55 to 65 percent of Americans indicate

Overall, there now exist about three thousand original data-based studies on R/S and health.

that religion is an important or very important part of their daily life.¹ What function does religion serve that keeps people believing and practicing? One possibility is that it helps to preserve health.

In this first chapter I briefly review research on the relationships between religious involvement and mental, social, and physical health. That research has been rapidly increasing in volume, especially over the past twenty years. Figure 1.1 shows the number of peer-reviewed articles on religion/spirituality (R/S) and health appearing in Medline and PsychINFO from 1965 to 2009. Note that the figures are noncumulative, referring to the number of articles published during each five-year period. Although only about 5 to 10 percent of these articles are research related, the number of research studies is rapidly accumulating. Overall, there now exist about three thousand quantitative original data-based studies on R/S and health. The review in this chapter sets the stage for the remainder of this book, which focuses on a critique of the research and, in particular, on a discussion of how to conduct, analyze, interpret, publish, and fund research on religion, spirituality and health.

MENTAL HEALTH

The majority (70 to 75 percent) of research on R/S and health has focused on mental health (Figure 1.2). I summarize this research by dividing it into studies on positive emotions and studies on negative emotions. The summaries presented here (see Table 1.1 on page 19) are from systematic reviews of the literature contained in the appendices of two editions of the *Handbook of Religion and Health*; all studies referred to below are reviewed there in detail.²

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Positive Emotions

R/S has been linked to a number of positive psychological emotions that represent the opposite of the negative emotions and mental disorders that I discuss in the next section.