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Roger Bakeman and John M. Gottman
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Observing interaction
Second edition

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Observing interaction: An introduction to sequential analysis

Second edition

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Preface to the second edition

Since the first edition of *Observing Interaction* appeared in 1986, the technology supporting recording and systematic coding of behavior has become less expensive, more reliable, and considerably less exotic (Bakeman, in press; revised chapter 3, this volume). Cumbersome videotape and cassette recorders have given way to video camcorders. Visual time codes are routinely recorded as part of the picture, and equipment to write and read machine-readable time codes is readily available at reasonable cost. Increasingly, computers assist coding, making routine what once was labor intensive and time-consuming. Even physiological recording devices can be added to the computer's net (Gottman & Bakeman, in press). Thus an increasing circle of investigators can avail themselves of the methods detailed in this book without mortgaging their careers, their lives, or the lives of their associates.

At the same time, the way we think about sequential data has developed. This is reflected in a standard format for sequential data (Bakeman & Quera, 1992, 1995a; revised chapter 5, this volume). SDIS – the Sequential Data Interchange Standard – has greatly facilitated the analysis of sequential data. Again, an enterprise that formerly was time-consuming and cumbersome has yielded to appropriately designed computer tools, as described in my and Quera's *Analyzing Interaction* (1995), which should be regarded as a companion to this volume. This revised version of *Observing Interaction* still explains how to conceptualize, code, record, organize, and analyze sequential data, but now *Analyzing Interaction* provides the tools to do so easily.

Another area of considerable development, and one responsible for many of the differences between the first and second editions of *Observing Interaction*, concerns techniques for analyzing sequential data (chapters 7–9, this volume; these chapters are extensively modified versions of chapters 7–8 from the first edition). Formerly many of the analytic techniques proposed for sequential analysis were somewhat piecemeal and post hoc, yet, waiting in the wings, log-linear analysis promises a coherent analytic view for sequential phenomena (Bakeman & Quera, 1995b). This revised

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edition moves log-linear techniques (which can be thought of as a multidimensional extension of chi-square tests; see Bakeman & Robinson, 1994) center stage. This simplifies matters and, at the same time, integrates lag-sequential analysis with an established and well-supported statistical tradition.

In the preface to the first edition, I suggested that far more people deserve thanks than can be named explicitly. That is still so. Nonetheless, I would like to thank three colleagues from the University of Barcelona: Maria Teresa Anguera and Angel Blanco, who translated the first edition of *Observing Interaction* into Spanish, and Vicenç Quera, who has collaborated with me these past several years in thinking about sequential analysis and in developing the SDIS and the sequential analysis program we call the Generalized Sequential Querier (GSEQ). I would also like to thank Debora Gray, who emerged from her mountain fastness to redraw one last figure for this second edition, and all those students in my observational methods class, winter quarter 1996, who offered comments. Finally, I would like to correct an error from the first edition's preface. Mildred Parten did not disappear. She lived her life as a bureaucrat in Washington, D.C., at a time in our history when such jobs were among the few open to women who wanted both to work and to use their brains.

ROGER BAKEMAN

References

Bakeman, R. (in press). Behavioral Observations and Coding, In H. T. Reis & C. K. Judd (Eds.), *Handbook of research methods in social psychology.* New York: Cambridge University Press.

Gottman, J. M., & Bakeman, R. (in press). Systematic observational techniques or building life as an observational researcher. In D. Gilbert, S. Fiske, & G. Lindzey (Eds.), *Handbook of social psychology* (4th Ed.). New York: McGraw-Hill.

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Preface to the first edition

Sometimes even a rather lengthy series of thoughts can be associated in memory with a single, dominant image. For me (RB), when I reflect on the writing of this book, the image of Mount Rainier, seemingly floating on the late afternoon haze, is never far from my mind. This is a personal image, of course, but it is understandable if I explain that John Gottman and I first met at a conference, organized by Jim Sackett, held at Lake Wilderness in Washington State. Thus some of the conversations that laid the groundwork for this book took place against the backdrop of Mount Rainier, dominating the horizon at the other end of the lake.

The conference was concerned with the Application of Observational/Ethological Methods to the study of Mental Retardation, a title that suggests both some of the research traditions that have influenced our writing and some of the kinds of readers who might find this book useful. Throughout this century, some of the most systematic and productive observers of social interaction have been ethologists, especially those concerned with primates, and developmental psychologists, especially those concerned with infants and young children.

Although students of primate and children's behavior have been largely responsible for the development of systematic observational methods, they are not the only kinds of researchers who want to study social behavior scientifically. Among others, this book should interest investigators in all branches of animal behavior, in anthropology, in education (including those concerned with classroom evaluation as well as early childhood education), in management, in nursing, and in several branches of psychology (including child, community, developmental, health, organizational, and social), as well as investigators concerned with mental retardation.

As the title implies, this book is a primer. Our intent is to provide a clear and straightforward introduction to scientific methods of observing social behavior, of interest to the general practitioner. Avoided are arcane byways of interest primarily to statistical specialists. Because the dynamics of people (and other animals) interacting unfold in time, sequential approaches to observing and understanding social behavior are emphasized.

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We assume that most readers of this book will be researchers (either advanced undergraduates, graduate students, or established investigators already seasoned in other methods) who want to know more about systematic observational methods and sequential analysis. Still, we hope that those readers who are already experienced in observational methods will recognize what they do clearly described here and may even gain additional insights.

We further assume that most readers will have a rudimentary knowledge of basic statistics, but, we should emphasize, an advanced knowledge of statistical analysis is not required. Instead, throughout the book, conceptual fundamentals are emphasized and are presented along with considerable practical advice. Our hope is that readers of this book will be equipped to carry out studies that make use of systematic observational methods and sequential analysis.

Writers of acknowledgments frequently admit that far more people deserve thanks than can be explicitly named. In this, I am no exception. I am very much in debt, for example, to students and other researchers who have consulted with me regarding methodological issues, because their questions often forced me to consider problems I might not otherwise have considered. I am also in debt to those mothers, infants, and children who served as subjects in my own research, because the studies in which they participated provide many of the examples used throughout this book. Finally, I greatly appreciate those graduate students in my observational methods course who read and commented on an earlier draft of this book.

Debora Gray is responsible for many of the figures included here. I enjoyed working with her and very much appreciate her vision of what the careful students's notebook should look like. I also want to thank Melodie Burford, Connie Smith, and Anne Walters, who diligently ferreted out errors in a near-final copy of the manuscript.

Chief among the people whose encouragement and support I value is Jim Sackett. Early on, even before the Lake Wilderness conference in 1976, he urged me to pursue my interest in observational methods and sequential analysis. So did Leon Yarrow and Bob Cairns, to whom I am similarly indebted for encouraging comments at an early point in my career.

Sharon Landesman-Dwyer also helped us considerably. Along with Kathy Barnard and Jim Sackett, she arranged for us to spend a month at the University of Washington in July 1983, consulting and giving lectures. Not only did this give us a chance to discuss this book (with Mount Rainier again in the background), it gave us a chance to present some of the material incorporated here before a live, and very lively, audience.

I have been fortunate with collaborators. Most obviously, I appreciate

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the collaboration with John Gottman that has resulted in this book, but also I have benefited greatly from my collaboration, first with Josephine Brown, and more recently with Lauren Adamson. Their contribution to this book is, I hope, made evident by how often their names appear in the references. I would also like to thank my department and its chair, Duane M. Rumbaugh, for the support I have received over the years, as well as the NIMH, the NIH, and the NSF for grants supporting my research with J. V. Brown and with L. B. Adamson.

Finally, I would like to acknowledge the seminal work of Mildred Parten. Her research at the University of Minnesota's Institute of Child Development in the 1920s has served as a model for generations of researchers and is still a paradigmatic application of observational methods, as our first chapter indicates. How much of a model she was, she probably never knew. She did her work and then disappeared. In spite of the best efforts of Bill Hartup, who until recently was the director of the Institute, her subsequent history remains unknown.

Parten left an important legacy, however – one to which I hope readers of this book will contribute.

ROGER BAKEMAN

A small percentage of current research employs observational measurement of any sort. This is true despite the recent increased availability of new technologies such as electronic notepads and videotape recording. It may always be the case because it is more costly to observe than to use other methods such as questionnaires.

We were motivated to write this book because we believe that observational methods deserve a special role in our measurement systems. First, we think the descriptive stage of the scientific enterprise is extremely productive of research hypotheses, models, and theory. This ethological tradition is full of examples of this fact, such as Darwin's classic work on emotional expression. Second, the time is ripe for a reconsideration of observational techniques because we now know a lot more about what to observe, how to construct reliable measurement networks, and how to analyze data to detect interaction sequences. Recently, we have been making new headway on old problems with these new technologies.

We are optimistic that this book will fill a gap and stimulate new research that employs useful (and not superficial) observational systems.

I (JMG) would like to acknowledge grants MH29910, MH35997, and RSDA K200257 and sabbatical release time during 1984–1985.

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