Book Reviews

A Problem of Bias in Behavioral Research

The Volunteer Subject. ROBERT ROSENTHAL and RALPH L. ROSNOW. Wiley-Interscience, New York, 1975. xiv, 266 pp., illus. $14.95. Wiley Series on Personality Processes.

In each period of the history of behavioral science, some workers have been concerned with the nature of the processes used in its empirical research. Titchener's attempts to obtain systematic reports of inner experience raised questions about the orientation acquired by practiced and trained observers. In a neglected paper in 1933, Rosensweig considered the disruptive effects of an observer observing himself. A decade later, Cronbach pointed out that responses to tests and questionnaires are frequently determined in part by the set or style of the subjects responding. Orne and Riecken subsequently called attention to the fact that a psychological experiment has its own social psychology, of the relationship between the experimenter and the subject.

For some years, Rosenthal has worked on the various effects of the experimenter in behavioral research. Rosnow has studied biases introduced by the experimenter and the subject. Together, they edited a volume entitled *Artifact in Behavioral Research*. And now they have prepared a scholarly review of research on the characteristics of volunteer subjects and the effects associated with the use of such subjects.

This valuable volume is a small handbook. It provides carefully evaluated conclusions about a couple of dozen characteristics of the subject who volunteers for participation in behavioral research and about a variety of situational factors that seem to influence the extent of volunteering. Many, but not all, of these findings agree with one's intuitive expectations. The authors also show that people are rather consistent in their willingness or unwillingness to say they will be subjects, especially when a second request involves the same kind of research task as the first.

The topic is important only insofar as volunteers are not representative of the population of interest with respect to whatever behavior is being studied. While the authors have amassed hundreds of studies on the characteristics of the volunteer subject, they found relatively few on the differences between volunteers and nonvolunteers in their behavior in experiments, presumably for the obvious reason that it is difficult to study the behavior of nonvolunteers. The few results they do present are quite striking and indicate that the use of volunteer subjects can affect the researcher's findings and conclusions, at least in some areas of investigation.

Ethical issues are pointed out and discussed. While a researcher has obligations to inform the potential subject what he may be getting into, complete information about the research problem may invalidate the investigation.

Starting with the premise that behavioral data must always be interpreted within the motivational context in which the behavior occurred, the authors present a model indicating the several ways in which volunteer status can affect the behaviors observed by the researcher. They quite correctly conceptualize the behavioral experiment as an interaction in which the subject is expected to perceive appropriately the demands operating in the experimental situation, to acquiesce to them, and to be capable of enacting the role expected of him. Volunteer status can affect each of these mediating points. This model is designed to explain behavior in experiments. Can findings about that behavior be generalized if other behavior occurs in a different motivational context?

The authors have accomplished their purpose well in most respects. They have made clear the importance of the problem and have provided guidance for investigators wishing to minimize its effects. The book is clearly written. The summaries that are provided for most sections and for the total report will please those students and scientists who want to find out quickly what the authors have concluded. The authors assess the magnitudes of the reported effects. They not only draw conclusions but also indicate the degree of confidence which they believe is warranted for each one.

They are more analytic than critical in their consideration of each subtopic and of each experiment in their survey. They manifest the well-known effects of scholar bias: quite understandably, they were apparently convinced of the importance of the topic and of the prevalence of volunteer effects before they were well into their task.

They do not tell the reader enough about their criteria for locating and reporting research studies. Most of the studies they cite were written in English and published in this country, a distribution that probably reflects the actual body of data on this topic. Yet the reader cannot help wondering how much relevant research they could not find. The question becomes critical in considering some of the unusual patterns they report for findings on characteristics of volunteers: the median pattern is a set of 20 studies with 57 percent reporting significant results, of which 42 percent agree on one conclusion while the remaining 15 percent favor another conclusion, often the opposite one. Such a pattern, which is rather unusual in behavioral research, may stem from the complexity of the topic and the heterogeneity of the experiments in each set, as the authors usually assume. It could also be that the studies cited come from a population of a few hundred studies most of which had no significant results and hence did not get published because of authors' or editors' decisions. The reader wishes the authors had discussed this issue.

If the behavioral researcher seeks more than a science of laboratory behavior, he must be able to generalize his experimental findings. The controlled conditions of the laboratory, the subject's awareness that his behavior is being measured, and his motivations in volunteering contribute to the determination of his observed and recorded behavior. Yet the extent of these influences seems much greater for some kinds of research than for others. Unfortunately, the authors do not step back from their topic and consider in which areas these effects are more serious and in which they are trivial.

The volume and the topic illustrate much that is characteristic of content and research in behavioral science. Volunteering is probabilistic, not invariant. The concept of volunteering is not unitary, though the operation indicating it is fairly explicit. Determining the characteristics of volunteers is difficult because different measures of the same psychological or sociological characteristic may not give the same results. Since people like to do their own thing, few experiments in this part of behavioral science seek to replicate prior studies by others.

This volume is important not only for

the contribution it makes to the methodology of behavioral research by emphasizing a frequently overlooked source of potential bias, but also for what it demonstrates about the complexity of human behavior, especially behavior in the presumably restricted conditions of the laboratory. Yet it may not be just the number of factors, taken singly or in interaction, that makes behavioral research so difficult. In much behavior, although the total variation for a group of subjects seems to involve small average contributions from many factors, such as volunteer status, the contribution of any one factor may be large for some subjects and small for others. Perhaps behavioral scientists are too ambitious in seeking to understand all the myriad kinds of behavior they have observed. Perhaps it would be wiser to begin with the fundamentals, establishing definitively the relationships and parameters in those situations where the behavior is primarily determined by one or two factors. Perhaps behavioral scientists think in too large terms when they observe responses stemming from complex decision processes, when they study the relationship between sociability and volunteering, for example. Perhaps they are working at too abstract a level of analysis: there may be greater regularity in behavior analyzed at the level of moment-to-moment acts than in the longer sequences construed in the more global and multifaceted terms so prevalent today in both everyday and scientific descriptions of behavior.

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Applications of Formalism

Contemporary Developments in Mathematical Psychology. DAVID H. KRANTZ, R. DUNCAN LUCE, RICHARD C. ATKINSON, and PATRICK SUPPES, Eds. Two volumes. Vol. 1, Learning, Memory, and Thinking. xvi, 300 pp., illus. $9. Vol. 2, Measurement, Psychophysics, and Neural Information Processing. xviii, 468 pp., illus. $14. Freeman, San Francisco, 1974.

To many, "mathematical psychology" refers to a field of psychology informally founded in the 1950's by such people as R. R. Bush, C. H. Coombs, W. K. Estes, R. D. Luce, G. A. Miller, and P. Suppes. This field is concerned with mathematically based research on such matters as learning, concept identification, memory, latency, signal detection, and axiomatic formalisms in measurement, choice, and psychophysics. The *Journal of Mathematical Psychology* was founded in 1964, and the annual mathematical psychology meetings were begun in 1967. All four editors of the two volumes under review have been closely associated with both the journal and the meetings. It would seem quite natural that in 1974 a progress report detailing the knowledge gained in two decades of active research would appear. This book is not exactly that, however. The first volume does consist mostly of essays that concern research that is historically tied to the work in statistical learning theory of the 1950's done by C. J. Burke and W. K. Estes and by R. R. Bush and F. Mosteller, but the second and longer one covers more mathematically complex topics whose roots extend into the 1800's to the work of such notables as Francis Galton, Gustav Fechner, Hermann Helmholtz, Ewald Hering, and Ernst Mach. The first third of volume 2 deals with research in psychometrics, which is clearly outside the mathematical psychology established in the 1950's, and the last third deals with work in sensory psychology and neural modeling. Only the middle third, which concerns measurement and psychophysics, would be considered by most to represent approaches that evolved from the 1950's work, in this case from that of Suppes and Luce.

The aim of the two volumes, according to the editors, is to attempt to define by example the concept of progress in mathematical psychology. However, the 18 papers they contain range from general surveys, such as J. G. Greeno's comprehensive essay on Markov models for learning and memory, to expositions of new theoretical developments, such as M. V. Levine's interesting essay on geometrical interpretations of psychophysics. The lack of uniformity in level of presentation and the absence of editorial discussion of the essays leave the task of assessing "progress" to the reader. In addition, some of the essays reflect an unfortunate current tendency in psychology to encourage a profusion of book chapters that are largely rehashes of previous work. Without the demands of economy that a journal makes, it seems that some authors have lost the knack for succinctness. On the other hand, several of the essays are very nicely done.

In volume 1, the considerable literature devoted to how subjects identify Boolean hypotheses from classified instances and noninstances is discussed in three essays. The many "dichotomies" and "issues" that have emerged from this work and are frequently cited seem to this writer to leave us far from any convincing progress. However, because of the paucity of observable behaviors in relation to unobservable processes in memory and thinking, they are among the most difficult phenomena to model convincingly.

Noticeably absent or at a minimum in volume 1 is discussion of work in psycholinguistics. Both automata models and semantic network models have received and will continue to receive much attention. The idea that given models can or cannot *in principle* accomplish given behaviors, nicely illustrated in M. Minsky and S. Papert's work with perceptrons, may prove to be a more fruitful approach to "higher processes" than the traditional one of fitting the statistical details of data collected in simple settings. Many have tried to extend their models for simple settings to more complex ones with little success, and the resulting profusion of vaguely argued systems diagrams and flow charts suggests a need for another approach.

Rather curiously, Estes and Suppes present some of their work on the foundations of stimulus sampling theory which was done originally in the late 1950's and which, though well known to insiders, heretofore has been available only in technical report form. The presence of this essay in the *Contemporary Developments* volumes certainly will fuel the mind of a reader attempting to assess "progress" for himself. In a somewhat related essay, M. F. Norman impressively shows how some high-powered techniques of mathematical analysis can be brought to bear on several vintage issues in discrimination learning. Unfortunately the techniques seem limited to relatively simple learning paradigms.

In the first third of volume 2 the psychometric subjects of factor analysis, test theory, and multidimensional scaling are discussed in three essays. Although this writer is not well equipped to assess overall progress in that field, it is clear that great advances have been made in devising usable, informative, and widely applied multidimensional scaling methods.

D. H. Krantz's essay clearly makes the case that progress in providing axiomatic formalisms for many of the simple measurement, choice, and psychophysics paradigms has occurred. It also includes a pretty application of Grassmann structures to the color matching paradigm based on an analogy to the vector resolution of forces in three dimensions. The essay by J. C. Falmagne on foundations of Fechnerian psychophysics presents additional evidence for progress in this area. In addition, Falmagne presents several arguments to the effect that much prior work in psychophysics aimed at discovering a "scale of sensation" may have been frustrated by the possibility that subjects utilize different