



Hubert M. Blalock, Jr.

Ann B. Blalock

Methodology in Social Research

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Edited by

HUBERT M. BLALOCK, JR.

Professor of Sociology

University of North Carolina

ANN B. BLALOCK

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Preface

This text was conceived in order to fill a need for a fairly sophisticated higher-level general work on methodology which would be appropriate for advanced graduate students in sociology, social psychology, political science, and anthropology. The focus of the book is on measurement, design, and analysis. We have assumed that students are familiar with many of the data-collection techniques usually dealt with in courses for advanced undergraduates and first-year graduate students and that they have completed one or two semesters of applied statistics.

Many advanced topics in methodology are sufficiently technical that they should be deferred until the student possesses enough knowledge of statistics to give real meaning to the kinds of questions which they raise. The field of methodology, particularly in its quantitative aspects, has become cumulative in nature. Therefore relatively more time must be devoted to methodological training at the advanced graduate level. The purpose of the present work was to construct a reasonably well-rounded text appropriate to this level of training.

In a highly specialized field it is unfortunately very difficult to find single individuals who have either the technical qualifications or the inclination to attempt to write an entire text at this level. Therefore we solicited individual chapters by specialists in given areas. This immediately created a problem of integrating the various chapters into a meaningful whole. Since we did not wish to restrict any of the contributors by imposing

a rigid format—we in fact urged them to raise new issues and pursue important problems as they saw fit—we made the task of integration even more difficult. As a partial resolution of this problem, the senior editor has written two “overview” chapters, one on measurement at the beginning of Part I and the other on the analysis of cross-sectional data at the beginning of Part II. Insofar as possible, we have also attempted to integrate the various chapters by making editorial suggestions where either major overlaps or omissions were evident. The result is a book which is in no sense complete but which we hope will stimulate the advanced student to search out the gaps and fill them with additional readings and original thought.

For the most part, the chapters in this book deal with major methodological questions. Our aim has been to raise questions which we consider highly important, if not crucial, to the advancement of the various social sciences. Several chapters, particularly Chap. 2 by Siegel and Hodge, Chap. 6 by Boudon, and Chap. 11 by Coleman, are quite technical and may be omitted by students who lack a fairly good mathematical background. Some of the statistical chapters might very well be included in second or third courses in statistics or perhaps in courses on mathematical models. Chap. 4 by Jackson and Curtis and Chap. 10 by Wiggins, however, are completely nonmathematical and appropriate for methodology courses given to first-year graduate students.

Curricula in methodology may vary considerably from department to department, and certainly from one discipline to the next, and this is as it should be. However, we hope that this text will stimulate interest in developing higher-level general methodology courses given in the student's third or even fourth year of graduate study. The impression all our contributors wish to convey is that methodological issues are at the core of the social sciences. They cannot simply be raised early in the graduate curriculum and then be ignored once examinations have been passed. As will be clearly evident throughout this book, methodological problems are so closely connected with theoretical questions that the two areas can-

not be easily separated. Our major objective in editing this volume will be achieved if we succeed in convincing the student of the wisdom of this contention.

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Hubert M. Blalock, Jr.

Ann B. Blalock

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MEASUREMENT AND CONCEPTUALIZATION

Problems of measurement and conceptualization are certainly crucial in the development of any science, and they are especially important during the early exploratory phases. Sociologists, social psychologists, and political scientists are in an excellent position to borrow ideas and techniques from other disciplines, as has been done, for example, in attitude measurement in psychology or in index construction in economics. In some of the more quantitative areas of sociology, such as sociometry and demography, considerable progress has been made in the measurement area. Yet much remains to be done, particularly in the general area of social organization where macrolevel concepts abound, but where operational procedures cannot easily be linked with these concepts.

The early debates over operationalism and measurement that took place in sociology prior to the 1940s helped to state the problem, but in retrospect they seem relatively sterile in terms of positive solutions. Some of these general issues are discussed in Chap. 1, which provides

an overview of the basic problem of bridging the gap between theory and research. The central thesis of this chapter is that the measurement process is an indirect one, that there are no purely logical or deductive ways of establishing linkages between theoretically defined variables and actual measures, and that under some circumstances theory and measurement become intertwined in a rather complex manner. A very general way of conceptualizing the measurement problem is discussed, with the hope that such an approach will be useful in specific situations in which one is attempting to link indicators with underlying variables that cannot be directly measured.

In Chap. 2, by Siegel and Hodge, the strategy proposed in Chap. 1 is carried out and elaborated in some detail on a realistic measurement problem of the sort often encountered in empirical research. The approach involves postulating a number of causal models of varying complexity, which make explicit assumptions regarding the linkages between measured and unmeasured variables. The authors make use of path coefficient analysis, which is discussed by Boudon in Chap. 6 of Part 2. Since the Siegel and Hodge chapter is fairly technical, the reader may wish to postpone serious consideration of this material until Chaps. 5 and 6 have been covered.

The question of measuring the unmeasurable has received the most systematic attention within the field of attitude measurement. In Chap. 3, Harry Upshaw discusses some of the major theoretical issues in this complex field. The concern, as is true elsewhere in the book, is not so much with the details of specific techniques (though these are also discussed) as with general approaches and strategies. Sociologists, political scientists, and anthropologists who may not be especially interested in attitude measurement, *per se*, should note carefully the similarities and differences between issues that arise on the level of individuals and those on the macrolevel, where postulated *group* properties are being inferred from measured indices. Since survey research is a major tool of the social scientist, the field of attitude measurement is also important in its own right. Much of the theoretical literature is highly technical, but the basic tech-

niques can be learned by students with relatively little mathematical background.

Measurement problems can be discussed on a very general level. But there will always be numerous specific and unique questions faced in each substantive field. Therefore we had originally intended to devote an entire section to such specific content areas. However it became apparent that many fields fall into either one of two categories: (1) those in which too little quantitative work has been done (e.g., race and ethnic relations, deviance, medical sociology, sociology of religion) or (2) those using highly specialized techniques (e.g., small groups, demography). The field of social stratification seems to be intermediate in this respect, being reasonably typical of many areas of specialization within sociology and perhaps within political science and anthropology as well. Consequently it is hoped that the kinds of issues discussed by Jackson and Curtis in Chap. 4 are sufficiently general that they are likely to be encountered in numerous other substantive areas. Most certainly, if measurement problems cannot be generalized from one area of specialization to the next, it will turn out to be quite time-consuming and inefficient to rethink them in each and every field of specialization. One of the greatest challenges facing the social sciences seems to be that of stating measurement problems in their full generality, so that we can develop *classes* of measures with properties that have been well studied.

The Measurement Problem: A Gap between the Languages of Theory and Research

HUBERT M. BLALOCK, JR.

Few sociologists would disagree with the statement that there is a sizable gap between sociological theory and actual empirical research. The important question, however, involves the extent to which this gap can readily be bridged by a more or less steady improvement of research techniques, on the one hand, and theory, on the other. The purpose of the present chapter is to discuss certain inherent difficulties that produce such a gap, not only in sociology but in all scientific disciplines. I shall take the position—which is certainly not original—that the nature of the scientific method and the ways in which we perceive and analyze the world impose very real limitations that make it difficult if not impossible to close the gap completely. The major concern will be with the limitations that are especially applicable to the social sciences generally and to sociology in particular.

Whenever one points to limitations of the scientific method or stresses the difficulties encountered in closing the gap between theory and research, there is always the danger of encouraging defeatism and pessimism. This is perhaps also true of accounts that compare developments in physics, the most advanced of the physical sciences, with those in the social sciences. Nevertheless, this seems to be a risk worth taking. In the first place, if we pay close attention to parallel problems encountered in other sciences we may profit by borrowing methodological techniques that have proved useful in comparable situations. Many quantitative methods used by sociologists have been borrowed from more advanced fields such as the biological sciences, econometrics, psychology, and statistics.

Secondly, problems cannot be made to disappear simply by ignoring them. It seems much more reasonable to attempt to define them as broadly

as possible, so that general strategies or approaches can be worked out, rather than having to resolve difficulties each time they arise with particular variables. Once complexities have been identified, they can often be studied one at a time and their implications noted. In some instances, an investigator may discover that a given difficulty cannot possibly be resolved without collecting additional data or redesigning his study. If so, it would be well to know this in advance.

The operationalism controversies which have taken place within the various social sciences and which reached their height in sociology during the 1930s and 1940s served the useful purpose of raising a number of fundamental questions concerning the measurement process and its relationship to theory. Perhaps the extreme operationalists were naïve and overly optimistic if they believed that measurement processes could be carried out independently of theory construction. Yet they performed the wholesome service of criticizing the practice of developing theories devoid of testable propositions.

In retrospect, the controversy seems rather sterile in two important respects: it did not seem to have much bearing on what most practicing sociologists actually did, and it did not suggest any positive solutions for bridging the gap. The main contribution of the operationalists and extreme empiricists, it seems to me, was that they continually stressed that measurement problems constitute the key to the advancement of any science. Without adequate measurement even the most eloquent theories must go untested. To the degree that there are numerous plausible alternative theories, careful measurement becomes the prerequisite to selecting from among these theories or to modifying those which seem most adequate.

Sociological theorists often use concepts that are formulated at rather high levels of abstraction. These are quite different from the variables that are the stock-in-trade of empirical sociologists. In attempting to bridge the gap between the two levels, we have tended to refer to the latter kinds of variables as *indicators* of the former concepts. We have then been plagued by the problem of *validity* and with deciding on desirable criteria for determining validity. The operationalist criterion of prediction has perhaps been the easiest of these to conceptualize, but, as I shall point out later in the chapter, this criterion leads to theoretical difficulties.

The position taken in Sec. 1.3 of this chapter is that indicator variables can usually be linked to underlying or unmeasured concepts by postulating causal models in which one's assumptions are made explicit. In some simple causal situations, as where correlations among indicators are assumed to be produced by a single underlying variable, operational procedures such as factor analysis can be used to obtain empirical estimates of the unmeasured variable. But in more complex situations, the notion of validity may be far too simple.

In order to develop this thesis more fully, I should like to turn first to a brief discussion of the operational point of view, followed by an account

of some criticisms and attempted resolutions. I am in basic agreement with the thesis that there are two very different kinds of concepts, theoretical and operational, which must be linked by common agreement or a priori assumption, rather than by any purely logical process. This point of view has some rather disturbing implications in situations where replication and randomization are not possible. These are discussed in Sec. 1.2, where it is argued that in these instances one's measurement becomes entangled with theory in a rather undesirable way. The suggested resolution is to commit oneself on specific assumptions that can be incorporated into an auxiliary theory developed for the purpose of testing the theory in a particular research setting.

1.1 THE OPERATIONALISM CONTROVERSY

The notion of an operational definition is commonly associated with the physicist, Percy W. Bridgman, who stated the operational point of view quite forcefully in a work entitled *The Logic of Modern Physics* (4). Arthur S. Eddington, the astrophysicist and philosopher of science, provides an illustrative example that can serve as a useful starting point. Eddington (7, pp. 251–255) asks us to imagine a student confronted with a hypothetical problem in elementary physics. The problem begins: “An elephant slides down a grassy hillside. . . .” Eddington notes that the experienced student need not pay too much attention to this imagery. He reads on and learns that the mass of the elephant is 2 tons. But what *is* this 2 tons to which the problem refers? If we conceive of it as a property of the elephant we shall not get very far. The earlier textbooks in physics used to define mass as “a quantity of matter,” but it was a mere pious opinion, in the words of Eddington, that such a quantity of matter could be equated with, or represented by, the accepted measurement procedures. Instead, as the student is well aware, mass must be measured or inferred by means of a pointer reading.

Eddington points out that the triumph of science has consisted in establishing the numerical connection among several pointer readings. It might be added that the problem of the elephant on the hypothetical hillside goes on to give the slope of the hill and a coefficient of friction and suggests that one determine the time of descent. All these additional variables, according to Eddington, can also be reduced to pointer readings. The essential point is that, although we seem to have very definite ideas about what objects exist in the external world, these conceptions do not actually come into the problem as handled by science. Before science can deal with the problem, these conceptions—however real they may seem to us—must be replaced by some sort of operations (7, pp. 252–253).

The operationalist position was championed in sociology by George A. Lundberg, whose *Foundations of Sociology* (10) appeared in 1939. Lundberg vigorously denied that certain kinds of variables are inherently unmeasurable

or that one should be concerned with hypothetical entities or “common essences.” Such a position, claimed Lundberg, is based on the erroneous assumption that “measurement is not a way of defining things, but is a process which can be carried out only after the ‘thing’ to be measured has been defined” (10, p. 68). If one is asked what is meant by the concept “intelligence,” he should be told that intelligence is what an IQ test measures.

Lundberg mentions that measurement is a way of defining; Eddington stresses that variables should be defined according to the way they are recognized. Bridgman (4, p. 6) points out that the proper definition of a concept is not in terms of properties possessed but in terms of actual operations. This seems to be the essence of the operational point of view. It means that if variables are defined in terms of properties (e.g., mass as a quantity of matter), there is no possible way of testing directly any hypotheses in which the variables appear. For tests and experiments are performed in terms of operations; it is pointer readings that are related.

Bridgman (4, pp. 9–26) argues that thinking in terms of operations can save one embarrassment about some of the apparent paradoxes in modern physics. For example, if one thinks of the length and mass of a body as inherent properties, he may find it difficult to conceive of such properties as changing according to the velocity of the body relative to the observer. One cannot always assume that different operations or procedures for measuring length will all give the same results or that, stated in nonoperational language, they will measure “the same thing.” Bridgman points out that in changing the operation we are in effect changing the concept.

Ideally, then, one should use a different concept for each operation; if the operation is changed, a new word should be used to stand for the new operation. In practice, of course, this is often unworkable. But it might be well to keep the suggestion in mind. A consequence of operational theory, says Bridgman, is that all knowledge obtained by science is inevitably relative (4, pp. 25–26). The statements we are making are about the nature of our descriptive processes. We cannot expect science to give answers to certain types of questions such as, What is length (or intelligence, prejudice, or social class) really?

“The essence of an explanation,” according to Bridgman, “consists in reducing a situation to elements with which we are so familiar that we accept them as a matter of course, so that our curiosity rests” (4, p. 37). In reply to certain criticisms of operationalism, Bridgman admits that operations are a *necessary* characterization only in the sense that unless one knows the operations he does not know the meaning of concepts; it is not claimed that meaning involves nothing more than operations (5, p. 116). He also admits that there is a certain haziness involved in the idea of operations; some are much simpler than others. There may be other than physical operations, such as the pencil and paper ones of the mathematician. In fact, Bridgman argues,