Preface

THIS book is addressed specifically to experimental psychologists and generally to all who believe that knowledge about human behavior can be gained by the traditional method of interlacing theoretical deductions with controlled observations. Those who believe so do not by any means comprise all students of behavior. Many psychologists, sociologists, and especially anthropologists and psychiatrists raise serious objections against routine attempts to "extend the methods of the physical sciences" to the study of man. These objections cannot be dismissed simply on the grounds that they are not constructive; for inherent in the objections may well be a conviction that there can never be a "behavioral science" as scientists understand science. Whether there can be such a science or not will be decided neither by citing successful applications of "scientific method" to carefully circumscribed sectors of human behavior nor by pointing out what has not yet been done. Therefore on the question of whether a behavioral science can *in principle* be constructed, we shall take no sides. That *some* kinds of human behavior can be described and even predicted in terms of objectively verifiable and quantifiable data seems to us to have been established. The question is how far this "beach head" can be extended. Perhaps the critics of "hard" behavioral science are entirely right in their conviction that the "hard" methods cannot cover the whole gamut of human behavior. Indeed, perhaps "behavior" is not an adequate foundation on which to build our understanding of man. However, as long as there is more to

be found out by the established methods, we see no reason why we should not continue to try.

We are thus of the opinion that the method of experimental psychology should be nurtured, refined, and extended. At the same time, we are not, however, unaware of the limitations of the method as it is currently practiced. Of these limitations there are two kinds. One is the narrowness of the experimental field in which psychological data have been *systematically* accumulated and integrated. Traditionally, this field has been that of physiological psychology and psychophysics, where it has been possible not only to gather data but also to link various sources of data together into comprehensive theories, for example, a theory of sensory perception, a theory of motor integration, etc. But how one uses knowledge of this sort to get a psychology *proper*, pertaining to the complex world of thought and emotion,remains obscure. The other limitation is on the range of application of scientific method to "real psychology," the realm of personality, intellect, and moral commitment. To be sure, students of these areas have designed innumerable procedures to translate observables into hitherto elusive traits, which emerge as "factors" and "score profiles." However, the results of investigations in these areas remain, for the most part, isolated from each other. Typical conclusions are arrived at by applying intricate scaling techniques and sophisticated significance tests to masses of data highly specific to the *particular* question under investigation. Such conclusions are frequently no more revealing than that "people who score high on test T_1 are somewhat likely to score high on test T_2." Regardless of whether these results are trivial or dramatic, the fact remains that little has been done to enhance a broad understanding of man from these fragments. The knowledge so

gathered remains a catalogue of "findings." The closer the observations get to what supposedly matters in psychology, the more theoretically impoverished and isolated from each other these findings become.

We believe that a source of the difficulty lies in the way the questions are put to begin with. A psychologist is interested in some psychologically important matter. Intuition and impressions gathered from observations or else vaguely formulated psychological theories suggest a hypothesis. The scientifically-oriented psychologist attempts to translate the hypothesis into an experimental procedure. Thus he has already determined the framework of thought in which he will work. The bulk of his effort will go into designing tests, scaling them, interpreting the results, and establishing their statistical significance. After all this work, he will perhaps come up with a simple yes or no answer: his hypothesis will be accepted or rejected, or, to put it in more sophisticated terms, he will have justification for rejecting a null hypothesis (at a given level of significance) or else he will not. With this his investigation is *concluded*. The job of linking his investigation to the remaining body of knowledge (aside from a cursory comparison with related results obtained by others) has not even been started.

Perhaps this impasse can be circumvented if one starts at the other end, as it were. Instead of asking a complicated question (as all psychologically important questions must be) and coming up with a very simple answer (often in the form of yes, no, or maybe), one might try asking a very simple question (such as, "given a choice between two alternatives what will a person do?") and derive a rich and complex avalanche of answers. No "theory" needs to be implied in the original question. Therefore the format of the answers

need not be prearranged to shed light on the "theory." The data themselves (protocols of choices) are straightforward and not subject to misinterpretation. People choose on various occasions the one or the other alternative and their choices can be represented as frequencies, including several degrees of contingency, which perhaps depend on certain conditions. Thus one proceeds to construct a theory solely from the statistical regularities one observes in the data. The data are already quantified (as frequencies of chosen alternatives), and so one need not worry about scaling, factorization, or the like.

So far psychology has not entered the theory at all. The aim of the theory is only to organize the voluminous data, in particular to discover dynamic or stochastic laws which govern the *generation* of the data. Such a theory, being mathematical, is already welded into a logical structure by the interlacing mathematical deductions. And mathematical deduction is, after all, the most potent unifier of theories known to man. Only after this purely formal theory is well under way, may psychological interpretations be attempted. Since the formal theory is already considerably integrated (by the mathematical relations deduced from the data), this integration will be reflected in the emerging psychological theory. This has been the dominant method of mathematical psychology, first applied to rote learning situations. The work described in this book follows the same method.

Prisoner's Dilemma is the nickname given to the two-choice situation with which we have been working. The situation was designed not by psychologists but by game theoreticians, as an example of a game which has no satisfactory solution. That is to say, whatever choice is recommended by "rational considerations," has something wrong with it in spite

of the fact that nothing remains unknown about the situation. In other words, the chooser cannot do better by finding out more. Hence the dilemma. The simplicity of the situation is misleading. Attempts to analyze it carry one deeper and deeper into a maze of intricate and interrelated questions, which are impossible to keep on the purely "rational," i.e., strategy-calculating level. For this reason, we think that our requirement has been fulfilled. The question asked is a simple one. The answers obtained are involved and rich in psychological overtones. The psychological theory suggests itself naturally, as it were.

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