

SYSTEMATIC AND REPRESENTATIVE DESIGN OF PSYCHOLOGICAL EXPERIMENTS

With Results in Physical and Social Perception

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INTRODUCTION. DIFFERENTIAL AND FUNCTIONAL PROBLEMS IN PSYCHOLOGY

SCIENCE has a way of growing in spearheads. Ever since Galton and Pearson established correlation statistics at the end of the last century, in close connection with problems of heredity and "individual differences" of anthropometric and psychological traits, the special field of differential psychology has supplied the content in terms of which psychologists could develop, or absorb, a general methodology of statistical evaluation.

Meanwhile, experimental psychology, with freedom of design added to freedom of evaluation, complacently took for granted what will be characterized, later in the present discussion, as "classical" design. Nineteenth-century experimental "methods," concentrating on psychophysics (Fechner, 1860), memory (Ebbinghaus, 1885), and related functional or "stimulus-response" problems, did not challenge the principles underlying this approach; they are but specific elaborations of procedure and evaluation within an accepted framework. General experimental methodology in psychology thus remained, at least as far as explicitly verbalized, programmatic statements are concerned, virgin territory up to the time of the first impact of Fisher's factorial design upon psychology less than a decade ago.

But whereas factorial design departs from classical notions by becoming multivariate, it does not in itself guarantee a second important feature, to be called "representativeness" of design. The main purpose of this paper is to demonstrate the feasibility—and in fact the informal existence in a limited way for some time—as well as the requiredness of this second change of policy in addition to mere multidimensionality, at least if the further development of experimental psychology is to be toward a more truly "functional," "molar" rather than "molecular," dynamic rather than static science.¹

Although it is claimed that the arguments involved are valid for the entire domain of experimental psychology, the special field of perception is singled

¹ For a survey of psychological "systems" see Heidebreder (1933). More recent summaries and selected bibliographies are to be found in Brunswik (1946b, 1948). For the sake of brevity, all stimulus-response problems will here be designated as functional problems—in contradistinction to the differential problems mentioned above—regardless of whether or not their treatment is on the adequate level of complexity characterizing the "functional approach" as at least vaguely anticipated by what is known as the school of Functionalism (see also fig. 7, including the legend).