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Probabilistic ideas were used in experimental psychology to serve the traditional ideals of classical natural science: determinism and objectivity. In particular, inferential statistics provided the illusion of an objective, mechanized form of inductive inference. This illusion was created by the neglect of controversies and alternative theories and by institutionalization.

2 **Statistical Method and the Historical Development of Research Practice in American Psychology** 35
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Rapid adoption of analysis of variance techniques by psychologists depended on a prior shift of research practice promoted by the requirements of applied psychology, from individuals to group data. The treatment group concept was introduced in order to permit causal inferences from group data.

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Egon Brunswik made the uncertainty of perceptual cues the basis of a Darwinian view of perception, and considered the brain as an intuitive statistician. However, his ideas deviated so far from those of his contemporaries with respect to the questions "What to look for?" and "How to proceed?" that they were misunderstood and rejected.

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Probabilistic models in psychology arose in reaction to dissatisfaction with the deterministic models that had been in vogue since Herbart and Fechner. The history of this reaction is traced, and its contemporary scenario is addressed in a discussion of the concept of "memory strength."

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Nineteenth-century social theory dealt with the conditions for social order and the origin and change of institutions. Two bodies of data informed theorists: ethnographic accounts of non-European peoples and contemporary moral statistics. A synthesis within a single theory was attempted by Durkheim. He and his circle became absorbed with the study of collective representations. Because of their evolutionary approach, they came to neglect moral statistics, contemporary Europe, and quantitative techniques.

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Mathematical economics developed in the nineteenth century under the influence of eighteenth-century mechanics. Under this influence, economists have ignored probability in model building, and so theoretical economics has been, and largely still is, couched in deterministic terms.

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The theoretical and practical development of statistical measurements of the economy and of index numbers of value—both on deterministic and probabilistic bases—took place between the 1860s and the 1930s. These developments were a precondition for the statistical verification of economic theories.

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Statistical methods were used in economics from the early twentieth century, but probability theory was thought inapplicable to economic data. This belief was overturned in the 1940s and probability theory became an essential element in the measurement and testing of economic laws.

IV PHYSIOLOGY

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The nineteenth-century physiologist demanded a science both experimental and deterministic. The efforts of the mathematician Gustav Radicke to solve the formidable problems of statistical inference were largely ignored; statistical tools began to assist physiology only after 1900.

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During the 1940s, evolutionists deemphasized the previously significant role of stochastic evolutionary changes. The case of Theodosius Dobzhansky suggests that this shift was due only in part to the empirical grounds.

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Fisher and the Oxford School of evolutionists disputed the role of stochastic processes in evolution, not because of any fundamental opposition to probabilistic thinking—Fisher was indeed a leading statistician—but because they did not accept that order and adaptation could be generated by disorder and chaos.

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Max Born is often said to have held a naive "ignorance interpretation" of the probabilities he introduced into quantum mechanics. But in fact on Born's view these probabilities are as real as particles themselves, for the probabilities are the objects in nature on which the quantum laws operate.

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In Europe the physicists who originated and developed the quantum theory were perplexed and troubled by it. But in the United States few of the young physicists who took up the theory had serious philosophical anxieties about it. Their attitude was entirely rational given the operationalist-oriented philosophy of science that most of them shared.

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