

Scientific theories are one kind of natural explanation. In general, they make statements about the relationships between observable phenomena.¹¹ For example, some scientific theories in criminology make statements about the relationship between the certainty or severity of criminal punishments and the volume of criminal behaviors in society. Others make statements about the relationship between the biological, psychological, or social characteristics of individuals and the likelihood that these individuals will engage in criminal behaviors. Still others make statements about the relationship between the social characteristics of individuals and the likelihood that these individuals will be defined and processed as criminals by the criminal justice system. All these characteristics can be observed, and so all these theories are scientific.

Because they make statements about the relationships among observable phenomena, a key characteristic of scientific theories is that they can be falsified.¹² The process of attempting to falsify a scientific theory involves systematically observing the relationships described in the theory and then comparing the observations to arguments of the theory itself. This process is called research: That is, the assertions of the theory are tested against the observed world of the facts.¹³ If the observations are inconsistent with the assertions of the theory, then the theory is falsified. If the observations are consistent with the assertions of the theory, then the theory becomes more credible, but it is not proved; there are always alternative theories that may also explain the same observed relationships.

A theory can gain a great deal of credibility if all the reasonable alternative theories are shown to be inconsistent with the observed world of facts. At that point, the theory may simply be accepted as true. However, it is always possible that some new facts will be discovered in the future that are inconsistent with the theory, so that a new theory will be required. For example, Newton's laws of physics were accepted as true for two hundred years, but they were replaced by Einstein's theory of relativity at the beginning of the twentieth century because of the discovery of some new facts.¹⁴

Rather than viewing certain elementary research concepts and procedures in scientific methodology as foreign elements, the criminal justice professional may, once he or she has mastered them, discover very valuable tools for assessing current and future directions in the field.

Once familiar with these tools, much of the anxious sanctimony bestowed upon technical reports, academic concepts, and research findings can be dispensed with. Many readers of this text have a healthy cynicism or critical and suspicious approach to research findings and probably know and employ more about research methodology than they are aware. In most cases, they simply lack conceptual frameworks, scientifically acceptable tags, or sufficient knowledge of the language of research methods to defend their views in an appropriate manner. Research methods provide the tools necessary to approach issues in criminal justice from a more rigorous standpoint and enable a venture beyond opinions based solely on nonscientific observations and experiences (see Black, 1993).

Although many readers may never undertake their own research, all will be consumers or recipients of findings and policies based upon research. It is not unusual to find students as well as professionals in criminal justice who are unable to fully understand reports and journal articles in their own field. Other fields may have this same problem: however, one might certainly be wary of a surgeon who is performing an operation without an understanding of the latest article on the procedure in the *Journal of the American Medical Association*. Similarly, in striving for professional status, it is imperative that criminologists and criminal justice professionals comprehend and critically evaluate new developments in their field (Hagan, 1975). Mastery of this material will assist in this endeavor. A very interesting outcome upon completion of the material is that many find themselves carefully reading and interpreting the tables presented in studies and skipping much of the prose. This procedure, which reverses the usual pattern at the beginning of the course, results in a great economy of time and effort.

An analogy can be drawn between learning research methods and studying to become a movie director or critic (Tontodonato and Hagan, 1998). A movie director or critic cannot simply view a film and report, "You just have to see it." They must be more concerned with technique. What is the plot? Who are the heroes/heroines/villains? From what point of view is the story told: first person or third person? What was the denouement? Research methodologists are also interested in ransacking studies and breaking them down into essentials. What are the research design and hypothesis? What data-gathering procedures were employed? What were the independent and dependent variables? What type of data analysis and conclusions were made regarding the null hypotheses? Upon completing this book, it is hoped that the student will become prolific in being an active consumer of research.

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