

Chapter 1

Philosophies of Science and Counseling: Why Science Matters to Counseling

Chapter Overview

This chapter describes the different sources of knowledge and introduces scientific inquiry as a mechanism by which to develop a dependable knowledge base for the counseling profession. The chapter begins by reviewing four philosophical foundations of science. In addition, the integration of science and practice as a foundation of graduate training programs in counseling and counseling psychology is emphasized. The chapter also highlights the critical role of scientific or critical thinking as a central outcome of graduate training, and in essence, as a major goal of this book.

Detailed Chapter Outline

I. Sources of Knowledge

Charles Peirce, a 19th-century American mathematician, philosopher, and logician, stated that there are at least four ways of knowing, or of “fixing belief” (Buchler, 1955). The first method is the method of tenacity, or the notion that whatever belief one firmly adheres to is truth. These “truths,” therefore, are known to be true because people have always known them to be true and the frequent repetition of these “truths” seems to enhance their validity (Kerlinger & Lee, 2000). A second method of knowing is the method of authority, which can be human or superhuman. A third method of knowing is the a priori method, or method of intuition. Accordingly, if something makes sense and has previously been believed to be true, then it is indeed true. The fourth method of knowing is the scientific method, which involves empirical tests to establish verifiable facts. A fifth way of knowing not included in Buchler’s conceptualization is knowledge learned through one’s direct experiences in the world.

Given the overwhelming complexity of life and the vast amounts of knowledge needed even in daily living, people most often acquire “truths” through all five of these ways of knowing. Reliance upon any one type of knowledge without critique and analysis can be dangerous. Individual biases can develop based upon a limited information and experiences can be distorted, which in turn can lead to inaccurate conclusions.

II. Science as a Way of Knowing

Science, as derived from Latin, means knowledge. Science represents one of a variety of perspectives (e.g., philosophy, religion, art, literature, mythology) and sources of knowledge (Buchler, 1955) in its attempt to describe and explain human nature. Popper's opening statement in *The Logic of Scientific Discovery* (1959) described the scientist as follows:

A scientist, whether theorist, or experimenter, puts forward statements or systems of statements, and tests them step by step. In the field of experimental sciences, more particularly, he [sic] constructs hypotheses, or systems of theories, and tests them against experience by observation and experiment. I suggest that it is the task of the logic of scientific discovery, or the logic of knowledge, to give logical analysis to this procedure; that is to analyze the method of empirical sciences.

In this way, Popper described the tasks and methods of the scientist. He argued against Hume's deductive perspective (or perspective that general rules hold and it is our job to uncover these rules) by suggesting that science is also inductive (i.e., conclusions drawn from science are probable rather than absolute). Popper also questioned Kant's positivist perspective by suggesting that knowledge is never determined as finality, but rather that it can and should be continuously subject to additional testing and possible refutation.

More recent descriptions of science, and the scientific method, extend the perspective held in the early-to-mid 1900s, which described scientists as objective observers who were both methodical and detached in their use of the scientific method to uncover "truth." The authors believe that maintaining a critical attitude or reasoning (i.e., critical inquiry) is an essential component of being a scientist. In essence, the scientist uses the scientific method, or a set of assumptions and standardized rules about collecting and evaluating data, in an effort to reduce bias and develop credible "ways of knowing." The basic functions of the scientific approach are twofold:

- The first is to advance knowledge, make discoveries, and learn facts.
- The second is to establish relations among events and develop theories, thereby helping professionals to make predictions of future events.

III. Philosophical Foundations of Human Behavior

Philosophical foundations guide one's understanding of the world and affect the methods by which scientists conduct research.

A. Positivism

Positivism is the paradigm that most closely depicts the scientific method as traditionally taught in the physical sciences. According to this paradigm, the nature of the universe can be known and the scientist's goal is to discover the natural laws that govern objects in the universe. A key principle is that "truth" exists, and given time, brilliance, and sophisticated

methods, discoveries will be made that illuminate the truth. In the positivistic realm, the scientist is “objective.”

The scientific method involves well-defined steps. First, the scientist makes a conjecture about the nature of the universe. Next, the scientist designs an experiment such that its results will either confirm or disconfirm the conjecture. Positivism is often characterized as a hypothetico-deductive process. In other words, deductions are derived from testing hypotheses.

There are other important characteristics of positivistic research. First, relations typically are expressed in terms of causality—X causes Y. Second, theories are reductionistic such that complex processes are understood by being broken down into simpler subprocesses, which can be studied more easily. Third, laws are usually expressed mathematically, measurements are quantitative, and conclusions are dichotomous (either the data conform to the prediction, or they do not). According to positivism, human nature is lawful, the accumulation of facts or knowledge will result in conclusions regarding whether a law is true or not true, and the goal is to identify causal relationships among variables.

B. Postpositivism

Postpositivism shares with positivism the belief in a “real” reality and the goal of discovering “truth.” Postpositivists, however, recognize that truth cannot be fully known and that (at best) researchers make probabilistic statements rather than absolute statements about truth. In addition, because postpositivism is characterized by a belief that absolute “truth” cannot be known, the logic of the positivistic scientific method is altered. In the postpositivistic paradigm, theories lead to conjectures, and the statements about truth are altered to recognize that the inferences are probabilistic.

The term *corroborated* is often used to indicate that a study produced results consistent with prediction and that the conjecture has survived another test. A succession of studies that fail to conform to prediction would constitute evidence that the theory should be revised or abandoned. The goal in postpositivistic research is to produce, through a succession of experiments, descriptions that are closer approximations to the truth. Postpositivism also recognizes that there is error and bias in the scientific process. Finally, there is recognition that the researcher may affect the research process. Truths, therefore, are not considered to be self-evident but rather must be arbitrated by the scientific community. The process of peer review is an admission that the validity of a conclusion is open to interpretation and that it is scientists’ opinions about the veracity of a claim that dictate whether or not a result adds to the cumulative knowledge of a field.

C. Constructivism

In the constructivism paradigm, notions of “truth” and “reality” are abandoned in favor of the belief that ideas about the world, particularly the social world, are constructed in the minds of individuals. Constructivists recognize that these constructions are based on the experiences of individuals as they interact with the physical and social environment, are shaped by cultural context, and may be idiosyncratic.

Constructivists believe that the meaning attributed to the event by the participants of the system, rather than the event itself, defines reality. Constructivists recognize the reality of the event, but then argue that it is the meaning that is attributed to that event by the individual that is important in determining social relations and behavior.

Constructivists use hermeneutics and dialectics to facilitate understanding of the participant’s constructions. Hermeneutics refers to the activity of interpretation of data (e.g., language, behavior, text, artifacts, other aspects of human behavior or thought). Constructivists use these data to develop an interpretation that is a description of the constructions of the participants. Constructivists also attend to dialectics, or the interactions between the participant and the investigator, in their interpretation of data. In the constructivist paradigm, there can be no conjectures (i.e., predictions based upon hypothesized truths) or tests of conjectures. Data are not collected with the aim of determining whether or not observations are consistent with conjecture.

D. Critical Theory

Critical theory posits that people’s social constructions are shaped by the social, political, cultural, historical, and economic forces in the environment that often have been created by individuals who were in positions of power. In other words, a goal of critical theory is to facilitate individuals’ realization that constructions are socially constructed beliefs rather than unchangeable truths. Through this process, the dialectic leads individuals to understand that social action is needed to change the social order so as to facilitate emancipation from oppression (e.g., racism, classism, heterosexism, sexism). Scholars have argued that “no single critical theory” exists, but that there are some “commonalities among the variants of critical theory” (e.g., Ponterotto, 2005b, p. 130).

E. Summary of the Philosophical Foundations

Each paradigm has different systems for understanding the world but no method, either logical or empirical, can establish the superiority of any given foundation. Nevertheless, it is vital to understand the philosophical foundations of various paradigms to ensure that the research approach is appropriate for the question.

IV. Scientific Method as Applied to Counseling and Counseling Psychology

The scientific method provides a mechanism to contribute to knowledge that is credible, reliable, and effective. Within the field of counseling, the goal of the scientific method is multifaceted and is to advance knowledge, make discoveries, increase one's understanding of human behavior, and use knowledge to solve practical problems. Scientific research can advance one's knowledge base or understanding of human behavior by providing data that describe and help one understand a wide range of human behaviors.

The expansion of knowledge in the counseling profession is guided by pressing societal needs as well as by questions or problems that arise in one's professional work. A common defining element of the counseling profession is that one conceptualizes a person's behavior as a function of the environment (Fretz, 1982). A goal of science, therefore, is to expand one's knowledge about interactions between individuals and a larger personal, social, cultural, and historical context.

There are costs to acquiring knowledge by using the scientific method. In summary, the knowledge of a profession must be empirically based and verifiable rather than subjective and untestable. The credibility of the counseling profession would be significantly challenged without a strong scientific foundation and reliance upon theory to guide one's research and interventions.

V. The Role of Theory in the Counseling Profession

Theories seek to establish general relations and conditional statements among events that help professionals to understand phenomena. Theories are relevant to science in that they provide a mechanism by which to organize and understand explanations for the dynamics that underlie a given psychological phenomenon (Karr & Larson, 2005; Strong, 1991). Another critical role of theory in science is that theories provide a foundation for hypothesis development and testing (Tracey & Glidden-Tracey, 1999). Theoretical frameworks that consist of sets of conditional statements that can be qualified by specific information about an individual allow both the needed specificity and complexity in explaining and predicting individuals' behavior.

A. Theory-Driven Research

Many scholars highlight the importance of conducting research that is theory driven. Theory-driven research involves a process whereby theory is used to guide the development of hypothesis generation, which leads to testing and observations. Concerns regarding the status of theory-driven research in counseling have been raised. In their review of the literature from three major counseling journals from 1990 to 1999, Karr and Larson (2005) demonstrated that less than half of the sampled empirical quantitative studies published in *Journal of Counseling*

Psychology, *Journal of Career Development*, and *Journal of Vocational Behavior* met their criteria for consideration as theory-derived research. One area of counseling research that has been noted for its theory-driven approach is vocational psychology.

B. Theory-Driven Practice

Theory-driven research also allows counseling professionals to ensure that they are engaging in interventions with individuals that are theory driven. Theories of psychotherapy offer a framework from which to explain the characteristics and progression of psychological phenomena for clients that informs counseling professionals' approach to treatment.

Pepinsky and Pepinsky (1954) articulated a prescriptive model of counselor thinking based on the scientific method. In essence, Pepinsky and Pepinsky (1954) suggested that the counselor incorporate a scientific or critical thinking model by (a) generating hypotheses based on (b) the data that the client presents, followed by (c) empirical testing of the hypotheses, to develop (d) a model that can be used (e) to make predictions about the client. The essence of this approach is that it is *data based* or *empirical*, which lessens the chance of personal biases or subjectivity. Researchers must rely upon sound research methods to build the *knowledge* upon which the counseling profession is based.

In summary, theories have an integral role in the science and practice of the counseling profession. In this book, one will learn how to examine theories, test theories, and develop theories (e.g., grounded theory). But most importantly, it is this combination, or the integration of science and practice, that is a foundation of this profession.

C. Science and Practice Integration

The integration of science and practice is a foundation of graduate training programs. The basic assumption is that students trained in both science and practice will be better prepared as professionals, regardless of where a particular job falls on the science versus practice continuum.

Training Models

The scientist-practitioner model is espoused in the majority of graduate training programs. The first national conferences for the training of clinical and counseling psychologists were held in Boulder, Colorado, and Ann Arbor, Michigan, in 1949 and 1950, respectively (Baker & Benjamin, 2000). One major purpose of the Boulder conference was to develop a broad scientist-practitioner model of training that came to be known as the Boulder model (Raimy, 1950). The creators of that model stressed the philosophy that students need to be

trained to do research and to learn the skills of the practitioner. The integration of these two skill sets was believed to create a strong foundation for future research and practice.

Other models of graduate training have emerged. For example, the local clinical scientist model was presented as an alternative model to bridge science and practice and has been adopted by several programs that emphasize practitioner training (Stricker & Trierweiler, 1995). The Association for Psychological Science also has moved to adopt an accreditation process for clinical science training programs. The clinical science model emphasizes training that is “grounded in science, practiced by scientists, and held accountable to the rigorous standards of scientific evidence” (McFall, 1990). Although the particular training emphasis differs among each of these models, and their merits have been the subject of some debate (e.g., Sanchez & Turner, 2003), all share the commitment to training counseling professionals who are committed to the reciprocal nature of science and practice. Further, they share a core foundation in scientific or critical thinking that forms the foundation for all professional activities.

B. The Role of Scientific and Critical Thinking

Scientific or critical thinking is a central outcome of graduate training. The most important outcome is whether the graduate can utilize scientific or critical thinking in all professional activities rather than the actual level of engagement in science or practice activities. Scientific thinking refers to a controlled method of inquiry and reasoning, typically to collect data of some kind for the purpose of testing a hypothesis.

A crucial characteristic of a professional counselor is the integration of scientific thinking into the daily activities of professional practice (e.g., Gambrill, 2005; Pepinsky & Pepinsky, 1954). Scientific thinking is instrumental in how counselors process information about a specific client during counseling as well as evaluate the counseling process. One of the hallmarks of graduate work in counseling is to acquire critical thinking skills, the ability to identify and process information with fewer biases, stereotypes, and assumptions; formulate hypotheses; gather data; and make informed decisions.

Research clearly indicates that people are selective or biased in the type of information to which they attend and do not think as “objective computers” (e.g., Gambrill, 1990, 2005; Nisbett & Ross, 1980). People develop worldviews that are culture bound and prone to stereotypes and assumptions about a variety of characteristics and identities, including but not limited to race/ethnicity, age, gender, social class, sexual orientation, and ability status (e.g., see APA, 2003). These biases, along with others, can lead to problems for psychotherapists as they process information about clients.

Becoming an active consumer of the professional research literature is a basic expectation of graduate training (e.g., Goodyear & Benton, 1986). Reading the literature affects one's thinking, refines one's conceptualizations of the counseling process, and informs one's treatment interventions.

Class Activities

1. In your group, write a comparison/contrast on theory-driven research and theory-driven practice.
2. In your group, list measures that would help researchers avoid bias while performing research.