The Philosophy of Science in a Nutshell

I. Philosophy of Science: A Parable of Magnificent Proportions

Reformed alcoholic & wife. H hasn't consumed any alcohol in 15 years, but his wife's not so sure that he's really reformed. On vacation -- skiing expedition in back-country, really isolated.

H falls & breaks leg. Wife helps him move along & finally, the come to a deserted hut. They build a fire, but no St. Bernards or ski patrol in sight. While in the hut trying to make themselves warm, they discover that one of the kitchen closets is just stocked completely with booze -- not rot gut either - it's Macallan single malt scotch. There's also about a month's supply of food.

H is really in a lot of pain & asks wife to go for help. She's reluctant to leave him alone, but finally agrees after he promises not to go anywhere near the booze under any conditions. She kisses him as if it's the last time she'll ever see him, and goes on her way.

H waits several hours, gets dark. Hours. Days. A week. 2 weeks. After 4 weeks have passed, he was sure that his wife has died seeking help. In pain, sick, cold. Sure he'd die soon as well.

In desperation, he finally reaches for one of the bottle -- Since he's gonna die anyhow, he might as well have one last drink. No sooner had the bottle touched his lips, W burst in from the porch, where she'd been hiding for several weeks. "Aha!" "I knew I couldn't trust you!"

W obnoxious: a "doubter." In school, most emphasis is on knowing, not much on constructive doubting. Our society frowns on doubters, always questioning, always rocking the boat. Doubt is the life blood of the scientist. Certain Q's must be raised to establish knowledge/truth in a scientific manner.

"Who says so?" "Where are the data?" "Where's the proof?"

II. Philosophy of Science: Critical Attitudes

Basic to all science in Western Society. Some which are important here: Determinism, Parsimony, Operationism, Empiricism, Avoidance of Reification, Avoidance of circular reasoning. I ask you to understand and consider these attitudes, not nec. adopt. These do comprise a lot of my own personal philosophy.

A. Determinism: The word "determinism" is considered profane in some circles. Here it is being advocated not as a philosophy but as a practical point of view in working with clients. To assume determinism is simply to assume that behavior is caused. Stated this way, much of the controversy surrounding the term can be dismissed. This is particularly true if we allow for the possibility that to a certain extent, at least, an individual can determine (cause) his/her own behavior. Assuming determinism is thought to be heuristic -- facilitative of discovery in the process of case assessment or diagnosis. Case assessment ordinarily includes some search for cause-and-effect relationships. Whether or not all behavior is determined is a philosophical question with an unknown answer. In direct practice, it is helpful to proceed as if the behavior of clients is determined, because to do so provides a rationale for searching for and possibly discovering cause-and-effect relationships. Such information can make a difference in the selection and use of treatment interventions and the evaluation of the effectiveness of those interventions.

B. Parsimony: To be parsimonious is to be stingy. In essence, this attitude dictates that in the development and evaluation of explanatory propositions about a behavior, preference should be for that preposition that is the simplest of the ones available. There is elegance in stingy simplicity. A more complicated or abstract explanation for some behavior is not to be preferred until simpler explanations have been ruled out, ones that require fewer assumptions and concepts to account for the same phenomenon. The value of parsimony in clinical practice lies in the efficiency it lends to such practice. Fewer assumptions and concepts usually mean less speculation, fewer variables attended to, and less data collection. All this can add up to a savings in time and other resources for you and your client. If, for example, personality testing and the search for remote historical causes can be reduced or eliminated because such information is not required in the most parsimonious of all explanations for a client's deviant behavior, this can be a savings of some significance in case management.

A word of caution is in order regarding parsimony. Just because one strives for simplicity in explanation does not mean that one will always end up with a simple explanation. Don't confuse simplicity with being simplistic. Behavior is not always simple in terms of its causality, and we mustn't be simplistic in our analysis of it. The simplest of all available or possible explanations may still be quite complicated, and appropriately so for some behaviors. Maintaining parsimony means showing a preference for the simplest of explanations, even though all may be complicated.

C. Operationism: Just as parsimony represents a stinginess in explanation, operationism represents a stinginess in description. Operationism asks what are the observables, the concrete empirical referents of the descriptive terms being used. It demands that whenever possible a concept should be defined in terms of measurable and directly observable phenomena (consensual validation issue).

The emphasis upon operationism in contemporary psychology has led to a mistrust of hypothetical constructs -- concepts that refer to internal states or events, and having a relatively low degree of operational specificity. If sufficient care is taken, most any concept can be rendered operational by connecting it with specifiable and measurable empirical referents. But as ordinarily used it must be acknowledged that many of our favorite and most familiar concepts do take on the nature of hypothetical constructs. Ex: superego, unconscious, cognitive map, self, primary process, guilt, conflict, anxiety, emotion, need, purpose, motive, value, and personality. To repeat, such terms can be and, in the hands of careful practitioners, have been operationalized. Too often, however, they are used as hypothetical constructs devoid of substance, giving the appearance of saying much but, when examined, signifying very little.

As with parsimony, a note of caution is also in order for the attitude of operationism. This attitude does not mean that every concept you use to describe a client's behavior had to be tied down exactly and precisely to observable. There are few terms that can be rendered operationally perfect. What this attitude does is to put pressure on you as an observer and labeler of behavior to be as operationally specific as possible. The thrust here is, again, one of utility. Operationism promotes clarity and sharpness in observation and discrimination of behavior, in thinking about behavior, and in communicating to others about behavior. Most of our terms can be defined much more precisely than is generally the case.

D. Empiricism: This attitude is a close companion to that of operationism. If operationism asks that terms be tied to observable referents, empiricism asks that the referents be observed. Empiricism is not satisfied that terms and statements about behavior be rational and intuitively appealing. In fact, empiricism is hardly ever completely satisfied. It insists that data (plural word) be obtained to validate descriptive and explanatory statements, and completely adequate data are seldom obtained (particularly in our business). Empirical validation is usually a matter of degree. In essence, then, empiricism call for less speculation and more data collection. The empiricist asks: "What are the data?" "What is the evidence for that statement?" It serves as a check on arm-chair speculation and clinical intuition, the products of which are often long on rationale but short on validity.

E. Avoidance of reification: Reification involves attributing reality status to something that has never been shown to have such status. It means that people use certain terms (usually hypothetical constructs) as though they were talking about "real" things when, in fact, such things have never been shown to exist. Perhaps some day we'll discover "anxiety" floating in the bloodstream along with the red and white corpuscles, or locate a section of the medulla oblongata that houses the "id," or pinpoint a layer of tissue in the right ventricle of the heart that secretes "affection." In the meantime, it is better to regard such terms as convenient descriptive labels that require operationalization, but do not deserve reification. Whenever labels are used to refer to internal, covert events or states that are not themselves directly observable, the danger of reification looms large. Operationism tends to discourage reification, because it forces our attention upon observables that do exist and away from things that do not or have not yet been shown to exist.

F. Avoidance of Circular Reasoning: It is very easy to fall into the trap of treating a descriptive concept as a pseudo-cause (false explanatory concept), especially when such concepts have been reified and not operationalized. This happens very frequently in clinical work, and appears to be a holdover from the layman's predisposition to think and speak in circular ways when attempting to explain some act. What do you call a client who has little orientation, poor communication skills, perhaps some rituals, and reports frequent auditory hallucinations? A schizophrenic. Why does he hallucinate? Because he's schizophrenic. Cause and effect are indistinguishable. The same empirical referents that represent the effect, and that give rise to the descriptive term "schizophrenic" are being used to represent the cause, and therefore give rise to the explanatory term "schizophrenic." In science, cause and effect should be separable, and should be independently measurable. When cause and effect are indistinguishable, circular reasoning is a likely possibility.

III. Philosophy and Theory in Science and Research

A. Ideology: Closed system of beliefs and values that shapes the understanding and behavior of those who believe in it.

1. Nature of Reality: What’s really real? Scholars are debating some aspects of the scientific method, particularly philosophical notions about the nature of reality and the pursuit of objectivity. Objectivity and multiple realities. Objectivity is an important objective of scientific inquiry, but not all scholars agree on how best to attain it.
2. Paradigms: fundamental model or scheme that organizes our view of something. A variety of paradigms are available that determine how research is done.
	1. Positivism: Positivist paradigms emphasize objectivity, precision, and generalizability in research. Contemporary positivist researchers recognize that observation and measurement cannot be as purely objective as the ideal image of science implies, but they still attempt to anticipate and minimize the impact of potential nonobjective influences. (Quantitative Research) (Post-positivism)
	2. Interpretivisim: The interpretivist paradigm emphasizes gaining an empathic understanding of how people feel inside, how they interpret their everyday experiences, and what idiosyncratic reasons they may have for their behaviors. (Qualitative Research)

3. Critical Social Science: The critical social science paradigm focuses on oppression and uses research procedures to empower oppressed groups. (Action Research) (Feminist Research)

D. Theory: a systematic set of interrelated statements intended to explain some aspect of social life or enrich our sense of how people conduct and find meaning in their daily lives.

1. The distinction between **theories and values** can seem fuzzy when social scientists become involved in studying social programs that reflect ideological points of view. (What are the criteria by which to judge success?)
2. **Prediction:** In attempting to explain things, theories inescapably get involved in predicting things. Although prediction is implicit in explanation, it is important to distinguish between the two. Often, we are able to predict without understanding. (Black box)
3. **Observations** that we experience in the real world help us build a theory or verify whether it is correct. When our observations are consistent with what we would expect to experience if a theory is correct we call those observations empirical support for the theory. The credibility of a theory will depend on the extent to which:
	1. our observations empirically support it; and
	2. its components are systematically organized in a logical fashion that helps us better understand the world.
4. **An hypothesis** predicts something that ought to be observed in the real world if a theory is correct. It is a tentative and testable statement about how changes in one thing are expected to explain changes in something else.
5. **Hypotheses predict relationships among variables**—that a change in one variable is likely to be associated with a change in the other variable.
6. A **variable is a concept**, which means it is a mental image that symbolizes an idea, an object, an event or a person.
	1. A variable that explains or causes something is called the **independent variable**.
	2. The variable being explained or caused is called the **dependent variable**.
7. The concepts that make up a variable are called **attributes** of that variable.
8. **Deductive Method**: In the deductive method, the researcher begins with a theory and then derives one or more hypotheses from it for testing. (quantitative)
9. In **induction** one starts from observed data and develops a hypothesis to explain the specific observations. (qualitative)
10. Science is a process that involves an alternating use of deduction and induction.
11. **Explanatory scientific research** depends implicitly on the notion of cause and effect.
12. Explanatory social scientific research depends implicitly on a **deterministic** image of human behavior, at least in part.
13. Most explanatory social research uses a **probabilistic model of causation**. X may be said to cause Y if it is seen to have some influence on Y. (three requirements of causation)
14. The **idiographic model of explanation** aims to explain through the enumeration of the many and perhaps unique considerations that lie behind a given action. (Individual differences)
15. The **nomothetic model** seeks to understand a general phenomenon partially. (differences between groups)
16. **Quantitative research methods** attempt to produce findings that are precise and generalizable.
17. **Qualitative research method**s emphasize depth of understanding, attempt to subjectively tap the deeper meanings of human experience, and are intended to generate theoretically rich observations.