



Viewing the world systemically.

Hypothesis-Based Research Methodologies

Prepared by: Kenneth R. Thompson
Head Researcher
System-Predictive Technologies

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Now let us address the current research methodologies in the social sciences. The social sciences, in particular, have relied on hypothesis-driven research to arrive at decisions concerning their industry. As will be seen, however, such research methodology **cannot** result in predictive outcomes beyond the specific case evaluated. Whereas validated hypotheses may help make decisions concerning narrowly-defined problems, they do not provide a basis for predicting outcomes under differing conditions.

Before considering various hypothesis-based methodologies, we will consider the methodology required for theory construction that has been clearly explicated by Charles Sanders Peirce in 1896 and Elizabeth Steiner in 1988. From Peirce (Peirce, 1896), we have:

§10. KINDS OF REASONING

65. There are in science three fundamentally different kinds of reasoning, Deduction (called by Aristotle συναγωγή or αναγωγή), Induction (Aristotle's and Plato's έπαγωγή) and Retroduction (Aristotle's άπαγωγή), but misunderstood because of corrupt text, and as misunderstood usually translated *abduction*. Besides these three, Analogy (Aristotle's παραδειγμα) combines the characters of Induction and Retroduction.¹

And Steiner puts the issue into clear perspective as follows (Steiner, 1988):

- Retroduction devises theory.
- Deduction explicates theory.
- Induction evaluates theory.

To these three modes of theory development, there is a fourth as alluded to by Peirce—abduction.

- Abduction extends theory.

¹ Peirce, Charles Sanders, (1896), notes from “History of Science” (not published), In: *Collected Papers of Charles Sanders Peirce, Principles of Philosophy*, (ed.) Hartshorne, C. and Weiss, P., The Belknap Press of Harvard University Press, Cambridge, Massachusetts (1960).

To see just what each of these modes of theory development do, consider the following:

- **Retroduction** is the logical process by which a point of view is utilized to devise a conjecture or theory; whether that view is determined by utilizing an existing theory to devise a new one, or is obtained from the *whole cloth of relevant knowledge* by which perspectives from several relevant fields of knowledge are utilized to devise a new theory.
- **Deduction** is the logical process by which a conclusion (theorem) is obtained as the implication of assumptions and previous theorems. These derivations are strictly logical. It is these derivations that argue for an axiomatic theory, since it is only axiomatic theories that have the structure required whereby an outcome can be used to encourage acceptance of the results of the research independent of subjective argument.
- **Abduction** is the logical process by which a theoretical construct of one theory is utilized to analyze or interpret the parameters of another theory. This is frequently used by using mathematics to develop *mathematical models* to interpret observations of a given theory.
- **Induction** is the logical process by which theory is evaluated. This is the testing of a theorem (*logically-derived hypothesis*) by which empirical observations are obtained to confirm or reject the theorem/hypothesis.

The problem with hypothesis-driven methodologies has been recognized in the social sciences by various researchers, but no alternative has been generally accepted. Essentially, social scientists have defined-themselves-out of theory development as an alternative, since they keep attempting to refine a methodology, hypothesis-based, that cannot devise theory.