

FALSIFICATION AND CERTAINTY REPOST

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The reason that Professor Zeide (Zeide, 2010) objects so strongly with Popper's falsification view of scientific theory (Popper, K.S., 1968) is because Professor Popper and Professor Zeide are defining, interpreting and using the terms "induction", "verification" and "falsification" in different ways: they have different ontologies and metadata. There are many possible types of "induction" (logical, empirical-scientific, statistical, mathematical (which deductive, not inductive) ...etc.) but Professor Zeide seems to be defining (by usage) an "induction" I do not recognise, and seems not that of Popper (1968).

Consider the certain demonstration that a particular swan is black (let us assume the bird is a bird and not a fish, it a swan and not a goose, or ugly duckling) by examining every feather (and assume a black swan is defined in terms of its feather colours). This is NOT "verification" in the inductive sense, as used by Popper (1968), or Hume (1748) or the ancient Greeks (e.g. Sextus Empiricus, 200), even though the word may be used in this way in colloquial English language (validate: "to prove that something is true", OED(2010)). "Inductive verification" is only meaningful in relation to the general assertion "all swans are white", which is posited as a result of induction from a number of particular cases of swans being white. Also, Popper (1968) is referring to general empirical-scientific theories when he says we can never be certain of the truth of scientific theories, the same point made about any logical induction by Hume (1748). Examples of such theories are Newton's and Einstein's theories of inertial motion and gravitation; the steady state and big-bang models of the universe; quantum mechanics; dark matter and dark energy. History confirms that we cannot be certain of the absolute truth of these grand theories. However, this does not mean we cannot be (reasonably) certain of simple empirical laws, like Boyle's law for gases, or Reineker's or the $3/2$ self thinning law for unthinned forests, since these are simple descriptive relationships of empirical data under specific conditions. However, these empirical descriptions should not be claimed to be "true", since the models are only descriptive, and may not work under extreme conditions. We may note that Aristotle (350BC) believed induction could prove a "truth", but he also considered empirical evidence unnecessary for proof of truth. Many empirical descriptive relations are fitted from sample data using statistical methods, and of course we cannot be sure of absolute truth of statistical estimates. In common sense terms most people

would agree with Professor Zeide that a person can be certain he has a nose on his face (if he has). But such certain knowledge is not a scientific theory.

The mixture of the two extremal models, as proposed by Professor Zeide (Zeide, 2008) will naturally span and include those extremes, and can often be useful as a descriptive model in forest science. However, as Professor Zeide admits, such descriptive mixture models can be non-falsifiable (if the models are over-parameterized, presumably). Popper (1968) argues that non-falsifiable theories are not “empirical scientific theories”. My view is that a non-falsifiable overparameterized descriptive model of data is not even a “theory”.

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25/8/2010

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