720A04 Philosophy of Science

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**1. What is the hypothetico-deductive method? Explain the difference between a verification and a falsification using the hypothetico-deductive method.**

The hypothetico-deductive method is a scientific method where a scientific inquiry is proceeded by formulating a hypothesis that could be falsified by a test on observable data. The hypothesis is falsified if the test produces results that contradicts the predictions of the hypothesis. If the test can, but does not produce results that contradict the hypothesis, the hypothesis supports the theory. Then, several competing hypotheses can be tested and compared to each other to see how rigorously the tests validates the predictions of the hypotheses. We want to test if is true and we think that we can test that by observing if is true. In mathematical notation:

The logically valid argument is, if we do not observe , then the hypothesis is false since the test could falsify the hypothesis by contradicting the predictions of the hypothesis. This is the contrapositive of . In mathematical notation:

However, if we in fact observe ( is true), then a logically invalid argument is . Why? Because we do not have (at least to our knowledge) a situation where . We merely have an implication saying that follows from but we do not know whether follows from . There could be other reasons for why has been observed other than . The hypothetico-deductive method can be used for falsification, but not for verification. Perhaps, the results from hypothesis testing could give hints about the verification, but they cannot verify a hypothesis.

Example:

**2. What is a scientific paradigm and how do they influence scientific practice? Is it good or bad that science is guided by paradigms?**

A scientific paradigm is

Example:

**3. What does it mean for a scientific hypothesis to be falsifiable, and why is it good that they are falsifiable?**

A scientific hypothesis is falsifiable

Example:

**4. In what way are observations theory-dependent, and why does that challenge the idea that hypotheses are generated inductively from observations?**

Observations are theory-dependent because

Example:

**5. What is the difference between the natural and the human sciences according to Ingthorsson?**

Ingthorsson argues that

Example:

**6. What is the difference between science and pseudo-science according to Sven-Ove Hansson and why should we care?**

According to Sven-Ove Hansson, the difference between science and pseudo-science is

Example: