“The Logic of Theory Testing”
SIR KARL POPPER

I - Two central questions addressed by Popper:

- How can we tell whether a theory is scientific or not? The demarcation problem.

How is a theory tested? The scientific method.

II - Logical Positivism: The verification principle

<table>
<thead>
<tr>
<th>Induction:</th>
<th>Deduction:</th>
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<tbody>
<tr>
<td>Swan a is white.</td>
<td>All Swans are white</td>
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<tr>
<td>Swan b is white.</td>
<td>a is a Swan.</td>
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<tr>
<td>Swan c is white.</td>
<td>Therefore a is white.</td>
</tr>
<tr>
<td>Etc.</td>
<td></td>
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<tr>
<td>(Prob) All swans are white.</td>
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Induction: based on a number of finite observations, a probable universal statement is inferred.
A theory is a collection of propositions with a number of consequences

- Verificationist theory of demarcation:
  If a given theory entails verifiable consequences, then it is a scientific theory.

- Inductive theory of testing:
  If a theory entails true consequences, then prob it is a true theory. The verified consequences of the theory support in an inductive way the truth or probability of the theory.

III - Popper’s alternative: rejection of both verification and induction:

- Popper’s answer to the demarcation problem:
  A given theory is scientific if it has falsifiable consequences.

- Popper’s rejection of verification: Popper’s deductive proposal
  A given scientific theory is tested if it survives severe falsifying tests.
- **Popper's bombshell**: the aim of the scientific method is not to reach true theories but to examine the extent to which a given theory can avoid falsification.

- **Deductive theory of testing**: *Modus Tollens* as a model.

- **Why Popper rejected induction and verification?**
  a) - Asymmetry of falsification and verification.
  b) - The problems with induction.

- **Scientific theories should be bold**: 
  a) - Highly improbable relative to background knowledge.
  b) - A theory should suggest possible falsifying tests.

- **Implications on Freudian and Marxist Theories**

**IV - Problems with induction:**

- Singular empirical statements (ex a is a white swan)) cannot possibly confirm universal statements (ex all swans are white).

- Hume’s objection: Suppose you attempt to justify induction in the following way: The success of induction in the past justifies the principle of induction. But this doesn’t work. The justification is circular. You are assuming the truth of induction in the past to justify the principle of induction. You are assuming the truth of the very thing you are trying to prove.

**V - Criticisms of Popper’s falsificationism:**

- Can Popper really avoid induction?

- Can theories be ever falsified? theories are tested in conjunction with a number of auxiliary sentences:
  If T & A1, A2----An, then consequence P
  Not P
  It doesn’t follow that not T for any auxiliary statement could be false.
  Is the distinction between ad hoc statements and auxiliary statements helpful?

**VI – Conclusion**: The legacy of Popper