

Theory and Evidence: The Scientific Method

1. We need theories to make sense of reality; we always use theories when we make decisions; sometimes explicitly, and sometimes implicitly.
 - theories simplify reality by making various assumptions;
 - assumptions are neither true nor false, but “as if” statements;
 - assumption are judged by their usefulness.
2. Theories are statements about expected relationships between variables
 - theories connect **explanatory** (or **independent**) variables to the **dependent** variable through **causal mechanisms**;
 - theories establish **necessary** or **sufficient** conditions for changes in the dependent variable.
3. Theories must be **logically consistent**, **falsifiable**, and **empirically valid**:
 - logical consistency means (i) the various assumptions do not contradict each other, and (ii) conclusions follow from premises in a logically coherent way;
 - a theory is falsifiable if we can imagine a set of circumstances that would disprove its claims;
 - empirical validity refers to how well the theory’s predictions match real world events; we can test the theory with case studies, statistical analysis, experiments, and forecasts.
4. The scientific method for theory selection requires that we never abandon a theory unless we have a better one that is (i) logically consistent, (ii) explains more, and (iii) does not have too many auxiliary assumptions.