LECTURES 1-5: Variables, Designs and Interactions

The Scientific Method

- **Falsifiability:** criterion for distinguishing science from non-science (if not falsifiable → Pseudoscience) *Falsifiability, or defeasibility, is an important concept in the philosophy of science. It is the principle that in hypothesis testing a proposition or theory cannot be considered scientific if it does not* ***admit the possibility of being shown to be false***
- **Falsifiationism:** theories can never be confirmed by empirical tests, only falsified
- **Hypothetico-deductive spiral:** Theory → Empirically testable hypotheses → Empirical test → Results → Theory modification/falsification/corroboration
- **Empiricism:** empirical is evidence collected on observation and empiricism respects evidence and replication, sharing findings to accumulate understanding

Constructs, Operations & Variables

- Constructs (a concept that is an element in psychological theorising) are **operationalised** to produce **variables**.
- **Operationalisations (or "Operations")** are the procedures used to make **variables**. Operations can involve either:
    - *Manipulation* - change is introduced by the researcher
    - Or *measurement* (e.g., behavioural, physiological, or self-report measures).
- **Variables**:
    - are the implementation of constructs in a study.
    - are used to assess the hypothesised relationship between independent & dependent constructs.

Independent and Dependent Constructs.

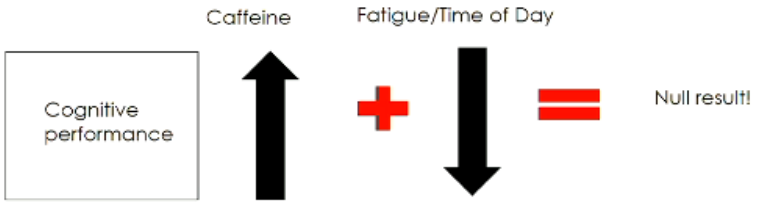
- IC and DC are defined by the *research question*.
- Causal hypothesis: A causes X → ***if A causes B: B depends on A***
- *NOT:*
- *The DC is the thing that is measured.*
- Mostly true BUT: not a distinguishing characteristic.
- *An IC is also often measured!!!*
- **Independent Construct:** putative causal factor (the A in A → B) i.e. **alcohol (A)** *impairs* working memory (B))
- **Dependent Construct:** the behaviour/cognition to be studied (the B in A → B) i.e. alcohol (A**)** *impairs* **working memory (B)**)

LECTURES 5-7: CONFOUNDS

Confound of Not?

- Must not be a focal variable (IV or DV) in current analysis.
- Must vary in the study.
- Must correlate with the IV (i.e., vary systematically; e.g., between conditions).
- Must plausibly affect the DV.
- Must be able to explain the critical result, without help from the IV.

- Systematic variance that works against your hypothesis causing an unexpected null result



Counter-Confound: Works against the hypothesis, and makes it less likely to observe effect in predicted direction