

EXPERIMENTAL DESIGN

A Brief Guide



1.



Split-Plot Design

- Assign one factor to large plots, another to subplots.
- Useful for experiments with factors having different levels of variability.

Example: An agricultural experiment where irrigation methods are applied to whole fields (plots) and different crop varieties are tested within each field (subplots).

2.



Cross-Over Design

- Participants receive multiple treatments in sequence.
- Washout periods prevent carry-over effects; participants act as their own control.

Example: A clinical trial where patients receive both a new drug and a placebo in different periods, with outcomes compared across periods.

5.



Factorial Design

- Study effects of multiple factors simultaneously.
- Identifies interactions between factors.

Example: A study examining the effects of diet and exercise on weight loss, with both factors having different levels (e.g., low, medium, high).

7 Types of Experimental Design



3.



Quasi-Experimental Design

- Lacks random assignment; used when randomization isn't feasible.
- Attempts to establish causality, but more prone to confounding variables.

Example: A study evaluating the impact of a new policy in schools, where researchers compare outcomes between schools that adopt the policy and those that do not, without random assignment.

4.



Completely Randomized Design (CRD)

- Randomly assign subjects to treatment groups.
- Controls confounding variables effectively if randomization is successful.

Example: A study testing the effect of a new drug on blood pressure. Participants are randomly assigned to either the drug group or the placebo group.

7.



Randomized Block Design (RBD)

- Divide subjects into blocks based on characteristics (e.g., age, gender).
- Random assignment within each block controls variability.

Example: An agricultural study testing different fertilizers where fields are blocked according to soil type, and treatments are randomly assigned within each block.

6.



Matched-Pairs Design

- Pair subjects based on characteristics; assign different treatments.
- Reduces variability due to individual differences.

Example: A study on the effectiveness of a new teaching method, where students are paired based on prior academic performance and assigned to either the new method or a standard method.

5 Tips for choosing a suitable experimental design



1. Clarify Research Objectives

Define what you aim to discover or test. Align your design choice with your research questions to ensure it addresses your study's goals effectively.

2. Assess Randomization and Control Needs

Determine if randomization is feasible. Use designs like CRD or RBD for controlling confounding variables, or opt for quasi-experimental designs if randomization isn't possible.

3. Consider Participant and Variability Factors

Evaluate participant availability and variability levels. Choose cross-over designs for limited participants or split-plot designs for studies with hierarchical variability.

4. Plan for Interactions and Complexity

Use factorial designs if studying multiple factors and potential interactions. This approach is ideal for complex phenomena with interdependent variables.

5. Account for Practical and Ethical Constraints

Ensure your design is feasible within your time, budget, and resource limits, and adheres to ethical standards. Review similar studies for insights and consult with experts when needed.

