Experimental designs and controls

Lesson 2.1.2 | AS research methodology

Core ideas

Independent measures designs use different participants in each condition, which avoids order effects but can create participant-variable differences.

Repeated measures designs use the same participants in every condition, which controls participant variables but can create practice or fatigue effects.

Matched pairs designs pair similar participants before putting one member of each pair into each condition.

Order effects occur when doing one condition affects performance in another condition.

Counterbalancing changes the order of conditions across participants to reduce order effects.

Controls such as random allocation, standardised instructions and control groups make comparisons fairer.

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Key terms

Experimental design: The way participants are arranged across conditions.

Independent measures: Different participants are used in each condition.

Repeated measures: The same participants take part in every condition.

Matched pairs: Similar participants are paired before being split between conditions.

Order effects: Changes in performance caused by the order of conditions.

Counterbalancing: Varying the order of conditions to reduce order effects.

Random allocation: Putting participants into conditions by chance.

Extraneous variable: An unwanted factor that could affect the dependent variable.

Further detail and evidence

Independent measures uses different people in each condition; repeated measures uses the same people; matched pairs matches relevant characteristics and allocates pair members to different conditions. A control condition is the comparison treatment, not an experimental design in itself.

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Applying the ideas

For a silence/music memory study, repeated measures could use equivalent word lists and counterbalanced AB/BA orders. Different lists must be comparable. In matched pairs, match baseline recall before allocating one person to each condition. Bandura used matched triplets because there were three modelling conditions.

Worked example: Choose a suitable design for testing whether background music affects memory, and justify the choice. A repeated measures design could be suitable because the same participants could complete a memory task in silence and with background music. This controls participant variables such as natural memory ability. The researcher should counterbalance the order of the two conditions so practice or fatigue does not unfairly affect one condition.

Worked example: Assess one control that could make an experiment fairer. Random allocation can make an experiment fairer by placing participants into conditions by chance instead of by researcher preference. This reduces allocation bias and makes it less likely that one condition contains stronger or more motivated participants. It does not remove every extraneous variable, but it improves the fairness of the comparison.

Evaluation and connections

Counterbalancing distributes order effects rather than removing learning that cannot be reversed. Independent measures avoids carry-over but may need more participants. Matching reduces only measured differences and can be time-consuming; it does not make people identical. Explain which design best fits the actual task.