Experimental Design

This activity will help you to:

- ❑ *Understand and recall different types of experimental design*
- ❑ *Analyse experiments in terms of their design*
- ❑ *Explain some strengths and weaknesses of different experimental designs*

Experimental Design Types

- **Independent measures** – two groups are used, one for each condition
- **Matched participants** – like independent measures, but the two groups of PPs are matched to be as similar as possible (e.g. age, sex, social background, level of education etc.)
- **Repeated measures** – one group of PPs is used to do both conditions

Some Example Experiments

1. In order to assess the effects of fatigue on reaction times, a researcher gave participants a target detection test in which they pressed a button every time a dot appeared on a screen. The time between the dot appearing and the button being pressed was recorded. The participants did the test twice, once first thing in the morning, and once last thing at night.

2. In order to compare the effectiveness of two different types of therapy for depression, depressed patients were assigned to receive either cognitive therapy or behaviour therapy for a 12-week period. The researchers attempted to ensure that the patients in the two groups had a similar severity of depressed symptoms by administering a standardised test of depression to each participant, then pairing them according to the severity of their symptoms.

3. In order to assess the effect of organisation on recall, a researcher randomly assigned student volunteers to two conditions. Condition one attempted to recall a list of words that were organised into meaningful categories; condition two attempted to recall the same words, randomly grouped on the page.

4. To assess the difference in reading comprehension between 7 and 9-year-olds, a researcher recruited a group of each from a local primary school. They were given the same passage of text to read, and then asked a series of questions to assess their understanding.

5. To assess the effectiveness of two different ways of teaching reading, a group of 5-year-olds were recruited from a primary school. Their level of reading ability was assessed, and then they were taught using scheme 1 for 20 weeks. At the end of this period, their reading was reassessed, and a reading improvement score was calculated. They were then taught using scheme 2 for a further 20 weeks and another reading improvement score for this period was calculated. The reading improvement scores for each child were then compared.

What You Need To Do…

For each of these examples, state and explain which experimental design was used by the researchers. Then answer the questions on the next page…

Questions you **must** attempt…

1. Redesign experiment 1 to use repeated measures.
2. Explain why it was necessary to use a matched participants design in experiment 2
3. Redesign experiment 5 to use matched participants.
4. Suggest why repeated measures would be an inappropriate design for experiment 3

Questions you **should** attempt…

5. There are three main problems with using a repeated measures design:
   - The PPs get to see both conditions, and this may allow them to work out the experimental aim, producing demand characteristics.
   - The PPs may be tired or bored during condition 2. This could depress their performance.
   - The PPs get to practice the experimental task during condition 1. This could improve their performance on condition 2.

   These problems can be controlled using **counterbalancing**.

   (i) For experiments 1 and 5, explain whether any of these problems were likely to affect the outcome of the experiment.
   (ii) Find out what **counterbalancing** is, and explain for both experiments how it would have been done.

6. The main problem with using independent measures is that people are different to each other (**participant variables**) and therefore, the DV will usually be affected to some extent by the variations between people as well as the IV manipulation. This can mask the effect of the IV, especially where the expected effect is fragile or difficult to measure. In these cases, it is often a better idea to use repeated measures.

   (i) For experiments 3 and 4, suggest whether **participant variables** were likely to have been a problem.
   (ii) Explain how the researcher in experiment 3 attempted to avoid this problem.

7. Matched participants is a good compromise between independent and repeated measures, because it reduces the effect of participant variables but avoids fatigue and order effects. However, it is not used very often by psychological researchers. Suggest some reasons why this might be.