Chapter 6: How to design an experiment.

Full answers to study questions

Experiment 1: A researcher is interested in whether there are differences in IQ between 12 year olds who are in state or private schools.

1. Describe the design: This would be quasi-experimental as you couldn't allocate children randomly to the two different types of school. The independent variable is type of school, which is an independent measures design with two groups: private or state school. The dependent variable is IQ.
2. Devise a hypothesis: A two-tailed hypothesis could be that you would expect IQs to differ significantly between children educated in state and private schools.
3. Critique the experimental design: The biggest issue here is that the two groups of children are likely to come from quite different backgrounds, so how do you know if the IQs differ due to the school they are at, or some other confounds? You couldn't make this into a proper experiment as it would be unethical to randomly allocate children to different types of schools. Instead, I would try matching the children in the two different conditions on confounding variables that I thought might have a large impact on the children's IQs. Parent's level of education and income seem like two very obvious variables to match on, but there could be others. You may have identified some other points too.

Experiment 2: A neuropsychologist has developed a new app to aid memory in patients with dementia. They ask them to complete a memory test (giving a score out of 50), ask them to use the app for one month and then they repeat the memory test.

1. Describe the design: This is an experimental design with a repeated measures design. The independent variable is time, before or after using the app. The dependent variable is memory score.
2. Devise a hypothesis: A one-tailed hypothesis might state that you would predict memory scores will increase after using the app.
3. Critique the experimental design: There is an obvious flaw in this design in the lack of a control condition. How would you know whether memory scores increase due to the app or due to practice effects? I'd add a control condition where the participants just use their usual memory aids for the month between the two testing sessions. You could also have identified some additional weaknesses in the design.

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Experiment 3: A researcher wants to see if mood improves after laughing. They randomly allocate participant to one of two conditions: comedy video or snooker video. Participants watch the video for ten minutes and then complete a questionnaire that provides a score out of 100 that represents whether they are in a good mood (high score) or bad mood (low score).

1. Describe the design: This is an experimental design as participants were randomly allocated to conditions. It is an independent design with two conditions: comedy or snooker video. The dependent variable is the mood rating.

2. Devise a hypothesis: A one-tailed hypothesis might be that you would expect participants who were in the comedy condition to be in a significantly better mood than participants who were in the snooker condition.

3. Critique the experimental design: My main concern with this design is that we don't know what mood the participants were in before watching the videos. Even though they were randomly allocated to the conditions, by random chance it is possible that their moods could have differed before the experiment between the two groups. I would redesign this study to measure mood before and after watching the video. With this change, I might predict that mood will increase from before to after watching the comedy video, but that there will be no change in the snooker video condition. Again, you might also pick up on some other weaknesses.

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