Understanding Scientific Research Methods: How to recognise quality research

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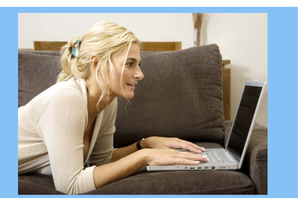
Who were the researchers?

- ✓ **Research conducted through <u>Universities & government institutions</u> is bound by strong Ethical Guidelines & must be approved by an independent Ethics Committee.**
- **Note: Be wary of research conducted by businesses, as they may use less rigorous research designs and report only the findings that support their business.**

Where was the research published?



- ✓ **Look for research published in <u>independent peer-reviewed scientific journals</u>.**
- **Note: Be wary of claims made only on company websites or product promotional material.**

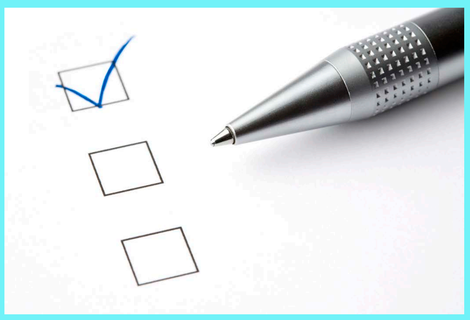
How many participants were involved?

- ✓ **Reports should include how participants were recruited, and if anyone dropped out of the study.**
- ✓ **It's usually better to have lots of participants in a study.**
- ✓ **Larger studies are less likely to be affected by participants' individual differences.**
- ✓ **Larger studies are able to detect smaller differences between groups (statistical power).**

Was the study designed in a way that reduces bias and error?

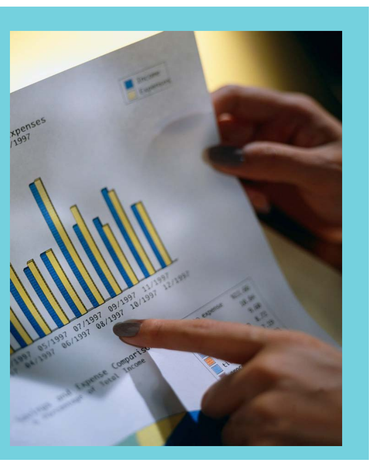
- ✓ **The <u>experimental group</u> receives the treatment that is being studied.**
- ✓ **A <u>comparison group</u> may be given another treatment. This allows researchers to see which type of treatment is more effective (experimental vs. comparison).**
- ✓ **A control group is used to help control for variables other than the treatment itself (i.e. motivation, fatigue, learning, etc.) which may affect the behaviours being measured.**
- ✓ **<u>Random allocation</u> of participants to groups is often used to ensure that participants' characteristics are balanced equally across the groups (i.e. age, gender, IQ).**
- ✓ **<u>Blind</u> medication trials (where participants don't know whether they are taking <u>active</u> medication or a <u>placebo</u>) may reduce the effect of participants' expectations.**

How were the outcomes measured?



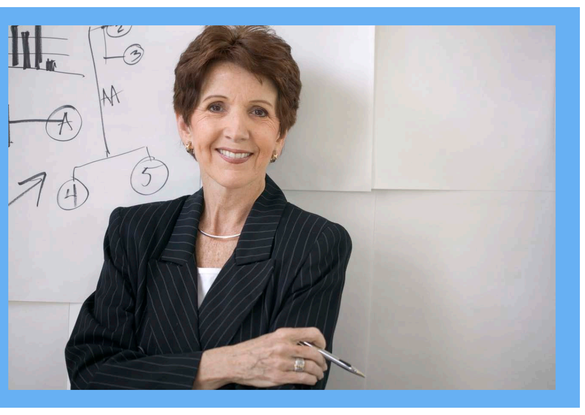
- ✓ **By taking <u>baseline</u> and <u>post-treatment</u> measurements, researchers are able to compare specific behaviours or other <u>variables</u> before and after the treatment.**
- ✓ **Researchers test the <u>validity</u> and <u>reliability</u> of questionnaires, observational rating systems, etc. to ensure that they consistently measure what they are designed to measure.**
- ✓ **<u>Inter-rater reliability</u> is used to check for consistency between observers' ratings.**

Were the results statistically significant?



- ✓ **Often we want to know if there is a difference between two groups (i.e. experiment vs. control), or in the same group before & after the treatment.**
- ✓ **Researchers use statistics to check whether differences found between groups are likely to have occurred by chance, or whether they are more likely to indicate a <u>significant</u> difference.**
- ✓ **The criterion for significance is often a <u>p value</u> of <u>.05 or less</u>. This means that if the experiment was run 20 times, the detected difference between the groups is likely to occur by chance only once. This is rare enough to take seriously.**

How were the results interpreted?



- ✓ **Researchers need to be critical & sceptical. They should be cautious in interpreting the results, and will discuss the limitations of the study, alternative explanations, confounding factors, and areas where further research is needed.**
- ✓ **Researchers must be careful not to exaggerate claims of <u>causal links</u>.**
  It is relatively easy to find an <u>association</u> or <u>correlation</u> between two things.
  It is much harder to prove that one thing <u>causes</u> the other.