

Design Problems and Confounds

A confound exists when the causal factor in the study is not unique. Such a situation will typically occur when the conditions differ in more than one way. Thus, a confound is a violation of the internal validity of a study.

How do you detect confounds? Well, that's a skill that you may need to acquire. If you have a very linear-logical mind, you should be able to catch on to the process fairly quickly. Every year, however, I find a number of very intelligent people who have a difficult time detecting confounds. To provide such folks with a list of problems that may create a confound, Max Gwynn developed the core of the following list, to which I've added pieces from other places:

- 1a. Nonrandom sampling ; or 1b. Self-selection of participants to the study (pp. 154-162)
- 2a. Low power due to a) Small sample size, or b) Weak effect size (pp. 143-145)
- 2b.. Huge sample size leading to a meaningless (but statistically significant) difference between means (pp. 143-145)
3. Repeated-measure design without counterbalancing (lecture)
4. Correlation - causation confusion and the third variable problem (pp. 262-264)
5. Restricted range on one or both variables for correlation (lecture)
6. Curvilinear rather than linear relationship between variables leading to non-significant correlation or an outlier leading to a significant relationship (p. 110)
7. Self-reports (involving deliberate misrepresentation) leading to doubts about response validity (pp. 300-309)
8. Demand characteristics (pp. 234-236)
9. Hawthorne effect (pp. 230-232)
10. Placebo factors (pp. 232-234)
11. Reactive behavior during naturalistic observation (pp. 266-267)
12. Selective perception on the part of the observer in naturalistic observation (pp. 266-267)
13. Experimenter bias in data collection (pp. 222-228)
14. Confounding variable present in design (pp. 140-141)
15. Sampling error alone accounts for group mean differences (pp. 309-311)
16. Low ecological validity (pp. 221-222) [But remember Mook!]
17. Poor construct validity (p. 55)
18. History (p. 146)
19. Maturation (p. 146)
20. Testing (p. 147)
21. Instrumentation (p. 147)
22. Statistical regression (p. 147)
23. Selection (p. 148); including nonrandom assignment and self-selection of participants to conditions (pp. 161-162)
24. Mortality (p. 148)
25. Selection-Maturation interaction (p. 148)
26. Diffusion or imitation of treatments (p. 149)