

13.5 The Importance of Planning

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In the real conduct of research, scientists do not always plan a specific sample size and stick to it.

When experiments are set up such that the results from one participant do not affect the next participant, or when observational studies are made such that the results of one observation are independent of any other observation—in other words when the next coin flip is not influenced by previous flips—then the researcher’s intentions do not influence the data production or the data interpretation.

In some situations, data are collected for a particular time period, during which the actual number of participants (coin flips) is a random value that depends on the random rate at which people happen to participate. For example, participants in a typical university psychology experiment might be recruited for a certain number of weeks during a semester. There may be a stable average rate of participation, but the number of participants in any given week is a random number. In this situation, our goal is to determine how many weeks we should plan on recruiting participants, so to have a high probability of achieving the goal of the experiment. We can do the power analysis in a manner analogous to the methods of the previous sections.

The point of the previous paragraphs is to say that sticking to a planned sample size or duration is not crucial to the data analysis, after the data have been collected. Instead, the planning is important for deciding whether or not the research has a reasonable chance of success, before the data are collected.

Power analysis can reduce research pain in other ways. Sometimes in real research, an experiment or observational study is conducted merely to objectively confirm what is anecdotally known to be a strong effect.