Post-lecture Notes III.6 – Designs for Aging Research

Study Questions

What are the two basic options for aging research? What kind of design is each?

What are the unique threats to the internal validity of each of the two basic options?

Under what conditions can you safely ignore these threats?

What's the suggested solution for these threats (when they are really threats)?

What's the suggested solution when you can't (or just won't) wait the entire lag?

1. The automatic and unavoidable threat to all **cross-sectional** (aging) studies is _____ .
    (A) the possibility of a cohort effect
    (B) the possibility of a time-frame effect
    (C) the lack of statistical power
    (D) *all of the above*

2. The automatic and unavoidable threat to all **longitudinal** (aging) studies is _____ .
    (A) the possibility of a cohort effect
    (B) the possibility of a time-frame effect
    (C) the lack of statistical power
    (D) *all of the above*

Answers to Study Questions

The two basic options are cross-sectional and longitudinal. When using a cross-sectional design, which is technically a between-subjects design and, therefore, very similar to other quasi-experiments, you compare different groups people who are currently different ages. When using a longitudinal design, which is technically a within-subjects design (without the possibility of counter-balancing order), you follow one group of people as they age.

The groups of subjects in a cross-sectional study are currently different ages, so they must have been born at different times. This means that they are members of different cohorts and, so, any difference in their behavior right now may be due to a difference between cohorts, instead of a difference between younger vs older. Conversely, only one group of subjects is used in a longitudinal study, but order cannot be counter-balanced, and the world "gets older" at the same rate as the subjects, so any difference in behavior between younger vs older might be due to the changes in the world, instead, which is known as a time-frame or zeitgeist effect.

Cohorts usually have to be separated by at least a decade before they are noticeably different. Likewise, the world doesn't change very quickly. Therefore, when you are studying the effects of aging over very short time-lags, such as a few years or less, then you really don't have to worry about either cohort or time-frame effects. Under these conditions, most researchers just run a plain cross-sectional study, because it's much easier and doesn't require waiting.

The standard solution to the threats posed by cohort and time-frame effects is to use a hybrid design. The logic of this approach is that the odds of the two different threats producing the same difference in the data is vanishingly small, so if you find the same difference in both types of comparison, you can safely conclude that the difference was caused by the difference in age (and not one of the confounds). Note that there are three specific versions of the hybrid experiment, with fanciest, double hybrid, being worth the extra effort.

If you can't or won't wait the entire lag between the youngest and oldest ages in which you're interested, then you can run a staggered hybrid design, instead. This design has lots of smaller lags embedded inside it, but with many overlapping specific ages, so that you can conduct lots of double-hybrid-like tests. If none of these tests show any evidence of a cohort or time-frame effect, then you can safely compare the "youngest" data to the "oldest" data to get the desired difference. In this way, you can compare, for example, 30 year-olds to 55 year-olds in a study that only takes 5 years to run and still have "defenses" against the two main threats to aging research.

1: A: The automatic and unavoidable threat to all **cross-sectional** (aging) studies is the possibility of a cohort effect.
2: B: The automatic and unavoidable threat to all **longitudinal** (aging) studies is the possibility of a time-frame effect.