Control Hierarchy

the first two avoid the confound

1. "hold it constant"
2. "equalize on average" (e.g., counter-balance)

the second two measure the effect of the confound

3. "measure and remove" (i.e., add covariates)
4. run a "control experiment" (testing the confound)

the last one doesn't avoid or measure the confound

5. use converging operations (e.g., a hybrid design)

Pre-test/Post-test w/ One Group

- measure the subjects before and after treatment and test if they get better
- problem(s)

Post-test-only w/ Two Groups

- one group gets the treatment, the other doesn't and test if the treatment group ends up better
- problem(s)

Pre-test/Post-test w/ Two-Groups

Treatment Group	***before***	**–** ***after***	**=**	***change*** = ***effect of therapy plus effect of time***
Control (no-treatment) Group	***before***	**–** ***after***	**=**	***change*** = ***effect of time (only)***

if the change score for the treatment group is larger than the change score for the control group, then the therapy was effective (i.e., better than only time)

Pre-test/Post-test w/ Two-Groups

- Analysis Option #1

  "change score" logic + "level-4" confound control

  compare the change scores between the groups (i.e., treatment vs control) using an independent-samples ***t***-test

  a (significant) advantage for the treatment group is evidence that the therapy is better-than-nothing

- *any problems with this?*

Pre-test/Post-test w/ Two-Groups

- Analysis Option #2

  "outcome" logic + "level-3" confound control

  compare the post scores between the groups (i.e., treatment vs control) but include the pre-scores as a covariate

  a (significant) advantage for the treatment group is evidence that the therapy is better-than-nothing

- *any problems with this?*

Pre-test/Post-test w/ Two-Groups

- Analysis Option #3

  "change-score" logic + "level-3" & "level-4" confound control

  compare the change scores between the groups (i.e., treatment vs control) but also include the pre-scores as a covariate

  a (significant) advantage for the treatment group is evidence that the therapy is better-than-nothing

- *any problems with this?*