Varieties of Single-Factor Research Designs Data from designs above the line are potentially causally interpretable

Research Design \rightarrow Independent/Dependent Data \rightarrow Statistical Design

| | Between Groups Different Participants in different t IV Condition Between Groups | Repeated Measures (R.M.) Same participants in all IV conditions Repeated Measures | Matched Groups One participant from each matched group in each IV condition Matched Groups |
|-----------------------|---|---|--|
| True Experiment | W/ Random Assignment Random assignment of individual participants to an IV condition Experimenter manipulates IV Potential for causal interpretation If attrition does not hurt initial equivalence If no confounds of ongoing equivalence | W/ Counterbalancing Random assignment of participants to an IV condition order (non-seriated IV) Experimenter manipulates IV-controls order & timing Potential for causal interpretation If attrition does not hurt initial equivalence If no confounds of ongoing equivalence | W/a Priori Matching Matched Groups of participants formed using 1+ variables Participants within each matched group Randomly Assigned-one to each of the IV conditions Experimenter manipulates IV Potential for causal interpretation (matching controls that variable(s), RA controls all other subject variables, so participants are "equivalent" across groups) If attrition does not hurt initial equivalence If no confounds of ongoing equivalence |
| Quasi Experiment | Between Groups Quasi-Experiment Assignment of Intact groups or conditional RA assignment of individuals Experimenter manipulates IV NO potential for causal interpretation (RA needs to be of individuals, without constraints) | Repeated Measures w/Seriated IV • Participants complete IV conditions in "natural order" • Experimenter manipulates IV – controls timing but not order • Potential for causal interpretation • If no confounds of ongoing equivalence • Order is not a confound because it is "part of the IV" | Matched Groups w/Post-Hoc Matching Participants already in intact groups (matched groups made of 1 participant from each intact group – should be before IV manipulation) Experimenter may randomly assign intact groups to IV conditions Experimenter manipulates IV NO potential for causal interpretation (matching applied this way controls only for the matching variable) Matching after the IV manipulation is not useful |
| sdn | Between Groups Natural Groups Design | Repeated Measures w/out Counterbalancing | Natural Groups Design w/Post-Hoc Matching |
| Natural Gro Design | Participants already in intact groups participants are identified as member of groups, not assigned (e.g. gender) IV is "manipulated by nature" No potential for casual interpretation | Participants complete IV conditions in natural order Experimenter controls neither order nor timing of IV conditions No potential for causal interpretation | Participants already in intact groups (matched groups made of 1 participant from each intact group – should be before IV manipulation) IV is "manipulated by nature" & "timed by nature" NO potential for causal interpretation Matching after the IV manipulation is not as useful |