Prelude to Research Designs

- Review of a few things
- Demonstrations vs. Comparisons
- Experimental & Non-Experimental Designs
- "IVs" and "DV$s"
- Between Group vs. Within-Group Designs

Reviewing a few things…

Kinds of bivariate research hypotheses (and evidence to support)

**Associative research hypothesis**
- show a statistical relationship between the variables

**Causal research hypothesis**
- temporal precedence
- statistical relationship between the variables
- no alternative explanation of the relationship - no confounds

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**Research Designs**

**True Experiments**
- If "well-done," can be used to test causal RH: -- alternative hyp. are ruled out because there are no confounds !!

**Non-Experiments**
- No version can be used to test causal RH: -- can't rule out alternative hyp. Because there are confounds !!

**Try these -- focus on determining the "type" of IV and the consequences ...**

**Version #1** Upon entering the lab, each subject completed a questionnaire that was used to assign them to either the "good mood" or the "poor mood" condition. Each subject then completed a battery of complex concept formation tasks, from which a performance score is determined.

- IV ??
- DV ??
- Causally Interpretable ??

**Version #2** Upon entering the lab, each subject was approached by a confederate of the researcher who sat next to them and (based upon the results of a coin-flip) either complimented them on her/his dress and appearance or "accidentally" knocked over their books, spilled their drink on the subject, etc. Each subject then completed a battery of complex concept formation tasks, from which a performance score was determined.

- IV ??
- DV ??

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Which of the following are experiments and which are non-experiments?

Each participant from Ms. Smith’s or Mr. Jones’s class was assigned to the “15 min.” or “40 min.” practice condition based on a coin flip and then given the appropriate amount of supervised practice with the task before completing the “test”.

Participants from Ms. Smith’s class was assigned to the “15 min.” practice condition and those from Mr. Jones’s class were assigned to the “40 min.” condition. Each participant then given the appropriate amount of supervised practice with the task before completing the “test”.

Participants from Ms. Smith’s class was assigned to the “15 min.” practice condition and those from Mr. Jones’s class were assigned to the “40 min.” condition based on a coin flip. Each participant then given the appropriate amount of supervised practice with the task before completing the “test”.

Each participant from Ms. Smith’s or Mr. Jones’s class was asked whether they had studied “more like 15 minutes or more like 40 minutes?”

Between Groups vs. Within-Groups Designs

**Between Groups**
- also called Between Subjects or Cross-sectional
- each participant is in one (and only one) of the treatments/conditions
- different groups of participants are in each treatment/condition
- typically used to study “differences” -- when, in application, a participant will usually be in one treatment/condition or another

**Within-Groups Designs**
- also called Within-Subjects, Repeated Measures, or Longitudinal
- each participant is in all (every one) of the treatment/conditions
- one group of participants, each one in every treatment/condition
- typically used to study “changes” -- when, in application, a participant will usually be moving from one condition to another

<table>
<thead>
<tr>
<th>Between Groups Design</th>
<th>Within-Groups Design</th>
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</thead>
<tbody>
<tr>
<td>Experimental Tx</td>
<td>Traditional Tx</td>
</tr>
<tr>
<td>Pat</td>
<td>Glen</td>
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<tr>
<td>Sam</td>
<td>Sally</td>
</tr>
<tr>
<td>Kim</td>
<td>Kishon</td>
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<tr>
<td>Lou</td>
<td>Phil</td>
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<tr>
<td>Todd</td>
<td>Rae</td>
</tr>
<tr>
<td>Bill</td>
<td>Kris</td>
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<tr>
<td>Different participants in each treatment/condition</td>
<td>All participants in each treatment/condition</td>
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</tbody>
</table>

Tell whether each uses a BG or a WG design…

- The study compared the “educational motivation” of males and females. **BG**
- “Psychological well-being” scores collected from participants before and after they experienced a hurricane were compared. **WG**
- Participants were tested after completing 10 practices and again after completing 50 practices. **BG**
- Greeks and independents were compared to determine if one was more likely to have voted in the last ASUN election. **BG**
- After an initial assessment, patients underwent 6 weeks of treatment and were then reassessed. **WG**
- Patients who had been diagnosed as “depressed” were given either the experimental drug or sugar pills for 6 months then the extent of their depression was reassessed. **BG**
### Research Designs

Putting this all together -- here's a summary of the four types of designs we'll be working with ...

<table>
<thead>
<tr>
<th>Research Type</th>
<th>Design Type</th>
<th>Results Causally Interpretable</th>
</tr>
</thead>
<tbody>
<tr>
<td>True Experiment</td>
<td>Between Groups</td>
<td>Results might be causally interpreted -- if good ongoing equivalence</td>
</tr>
<tr>
<td></td>
<td>Within-Groups</td>
<td>Results might be causally interpreted -- if good ongoing equivalence</td>
</tr>
<tr>
<td>Non-experiment</td>
<td>Between Groups</td>
<td>Results cannot be causally interpreted</td>
</tr>
<tr>
<td></td>
<td>Within-Groups</td>
<td>Results cannot be causally interpreted</td>
</tr>
</tbody>
</table>

- **True Experiment**
  - w/ "proper" RA/CB - init equiv
  - manip of IV by researcher

- **Non-experiment**
  - no or poor RA/CB
  - may have IV manip