Dilemmatics
The Study of Research
Choices and Dilemmas
• “there no one true method, or correct set of methodological choices that will guarantee success”
• “there is not even a ‘best’ strategy or set of choices for a given problem, setting, and available set of resources”
• RULE I: Always *face* your methodological problems squarely; or, Never turn your back on a Horned-Dilemma.

• RULE II: A wise researcher never rests; or, that laurel you are about to sit on may turn out to be an unrecognized horn of another methodological dilemma.
RESEARCH STRATEGIES AND THE THREE-HORNED DILEMMA
I. Settings in natural systems.
II. Contrived and created settings.
III. Behavior not setting dependent.
IV. No observation of behavior required.

A. Point of maximum concern with generality over actors.
B. Point of maximum concern with precision of measurement of behavior.
C. Point of maximum concern with system character of context.
Field Experiment

• An experimental study
  – With experimental and control groups to compare
  – Different treatments are applied to two groups, but not in a controlled environment, such as lab.
  – Possible many confronting factors
Field Study

- Observation in a natural setting
  - No controlled groups
  - No treatment
Experimental Simulation

• A experimental study conducted in a setting simulating real-world situation
  – Treatments on subjects

• Stanford Prison Experiment
  – “Why good people turn evil”
  – [Link](http://www.youtube.com/watch?v=sZwfNs1pqG0)
Computer Simulation

• Using computing programs to simulate real-world phenomena

Visualization of an aggregate temporal graph generated from 100 runs of an agent-based simulation of political hierarchies. The two yellow vertices represent an interesting feature: a highly stable vertex pair.

Crouser, Freeman et al., 2013
Judgment Task

• A study asking subjects to make a judgment for given artifacts/phenomena

• Comparative judgment task
  – Asch’s Conformity Experiment: social press on individuals
Sample Survey

• Usually questionnaires
  – Sampling strategies are very important!
    • Universal behaviors: unbiased samples
Three Maxima

- Three-horned dilemma.
  - A: generality
  - B: precision
  - C: realism
• There is no way to maximize all three conflicting desiderata of the research strategy domain.

• RULE III: The researcher, like the voter, often must choose the lesser among evils.

• RULE IV: It is not possible, in principle, to do an unflawed study.
• RULE V: You can't build flawless theory, either; or, You have to be careful about dilemma horns even when you sit down in your theoretical armchair.

• No actor, no behaviors, no empirical data.
So, methodological discussions should not waste time arguing about which is the right strategy, or the best one; they are all poor in an absolute sense. Instead, such discussions might better engage in questions of how best to combine multiple strategies (not within one study, but over studies within a program) so that information can be gained about a given problem by multiple means that do not share the same weaknesses.
Before We Move on,

• Think about your research strategy from this dilemmatic view.
  – Who are actors?
  – What behaviors do you want to observe?
  – What context?
  – What point of maximum are you concerned with most?
  – What method(s) should you use?
  – What potential limits will your study have?
DILEMMAS IN RESEARCH DESIGN
Comparison Design vs. Correlation Design

- **Comparison**
  - Pro and Con

- **Correlation**
  - Pro and Con

- **Regression**
  - When to use?
Replication and Partitioning

- "A single observation is not science."
- Replication
  - In qualitative methods
  - In quantitative methods
- Data
  - Multi-dimensional
    - What to observe and what attribute to use for aggregation (making a group)?
    - How many?
Uncertainty, Information and Noise

• What aspects to observe?
  – Known knowns
    • What we want to collect
  – Known unknowns
    • What may be valuable, but we are not sure
  – Unknown unknowns
    • Could ruin your research or have a breakthrough

• Unexpected data
  – Abnormal, outlier, ...
Randomization

• Where do we need randomization?
• Why do we need randomization?

• Essential
  – no randomization, no experiment.

• Costly
  – True random sampling takes more time, costs more money and requires more subjects.
Treatments vs. Repetitions

• The N/k/m dilemma
  – N=k x m
  – N: total observations
  – k: number of cells
  – m: observations of cells
DILEMMAS AT THE METHODS LEVEL
• How we can measure, manipulate, control, and otherwise contend with variables?
Construct Validity Dilemma

• RULE VI: You can't do one thing.

Figure 5: The Rationale for Predictive Validity
Measures

(1) Who performs the behavior under study? Always the actor.

(2) Who observes and records the behavior?

<table>
<thead>
<tr>
<th>Actor</th>
<th>Subjective reports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Researcher</td>
<td>Visible observer</td>
</tr>
<tr>
<td>Recorder in the past</td>
<td>Records of public behavior</td>
</tr>
</tbody>
</table>

(3) Is the actor aware that his behavior is being recorded for research?

<table>
<thead>
<tr>
<th>Yes Observation</th>
<th>May Be Reactive</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. Observation is Nonreactive</td>
<td></td>
</tr>
</tbody>
</table>

(4) Who translates records into data? Always the researcher.

Figure 3.6 Sources of Empirical Evidence
<table>
<thead>
<tr>
<th>Sources of Invalidity of Methods: That Is, Plausible Rival Hypotheses</th>
<th>Actor's Records</th>
<th>Researcher's Records</th>
<th>Previous Records</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Subjective Reports</td>
<td>Trace Measures</td>
<td>Visible Observer</td>
</tr>
<tr>
<td>Biases associated with the actor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Guinea pig effect</td>
<td>H</td>
<td></td>
<td>H</td>
</tr>
<tr>
<td>2. Role selection</td>
<td>H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Measurement as change agent</td>
<td>H</td>
<td></td>
<td>H</td>
</tr>
<tr>
<td>4. Response sets</td>
<td>H</td>
<td>M</td>
<td>H</td>
</tr>
<tr>
<td>Biases associated with the investigator</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Effects of interviewer or observer</td>
<td></td>
<td></td>
<td>H</td>
</tr>
<tr>
<td>6. Instrument change</td>
<td>H</td>
<td>M</td>
<td>H</td>
</tr>
<tr>
<td>Biases associated with the population</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Population restrictions</td>
<td>H</td>
<td>H</td>
<td>M</td>
</tr>
<tr>
<td>8. Population instability over time</td>
<td>M</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>9. Population instability among areas</td>
<td>H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biases associated with content</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Content restrictions</td>
<td>H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Content instability over time</td>
<td>M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Content instability over areas</td>
<td>M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other characteristics of methods</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Dross rate</td>
<td>H</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>14. Difficulty of access to secondary data</td>
<td>H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Difficulty of replication</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Key Messages

1. The research process teems with dilemmas involving the need to maximize, simultaneously, two or in some cases three conflicting desiderata.

2. The researcher cannot avoid choosing, nor can he or she find a no-lose strategy, nor a compromise, that does not minimize some other desideratum.

3. One cannot plan, or execute, flawless research. All strategies, all designs, all methods, are seriously – even fatally – flawed.

4. No strategy, design, or method used alone is worth a damn. Multiple approaches are required – at the method level, within study for every construct; at the design and strategy levels, between studies.

5. Multiple methods not only serve the purposes of replication and convergence; they serve the further, crucial purpose of compensating for inherent limitations that anyone method, strategy, or design would have if used alone.
Triangulation, if possible!

• Basic idea
  – Combining two different research strategies to improve the research.
    • Experimental study + survey
      – Survey, and then experimental study: identify what factors to study, and then measure them.
      – Experimental study and then survey: find a cause of a behavior, and then use survey to find to what extent you can generalize the result to the whole population.
    • Field study + survey
      – Understand the universal behaviors and the contexts
    • Formal theory: with simulation, with experiment, with survey
• Know the advantages and disadvantages of individual strategies
FINAL RULES

• There is no such thing as too much research!
• There is no such thing as flawless research!
• But: Poor research is much worse than none at all.
LEVELS ISSUES IN THEORY DEVELOPMENT, DATA COLLECTION, AND ANALYSIS
• Levels issues in theory development: the level of theory
  – Homogeneity: The Group as a Whole
  – Independence: Individuals Free of Group Influence
  – Heterogeneity: Individuals Within Groups
### Assumptions of Variability Across Organizational Entities

<table>
<thead>
<tr>
<th>Entities</th>
<th>Assumptions of Variability</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Homogeneity</strong></td>
<td></td>
</tr>
<tr>
<td>Individuals over time</td>
<td>Observations of each individual are homogeneous over time (e.g., dispositional effect)</td>
</tr>
<tr>
<td>Individuals within groups</td>
<td>Group members are homogeneous within each group (e.g., stage of group development)</td>
</tr>
<tr>
<td>Groups within organizations</td>
<td>Groups are homogeneous within each organization (e.g., group performance standards set by the organization)</td>
</tr>
<tr>
<td>Organizations within industries</td>
<td>Organizations are homogeneous within each industry (e.g., nature of organization's products)</td>
</tr>
<tr>
<td><strong>Independence</strong></td>
<td></td>
</tr>
<tr>
<td>Individuals over time</td>
<td>Observations of each individual are independent over time (e.g., situational effect)</td>
</tr>
<tr>
<td>Individuals within groups</td>
<td>Group members are independent of groups (e.g., group member perceived work-family conflict)</td>
</tr>
<tr>
<td>Groups within organizations</td>
<td>Groups are independent of organizations (e.g., frequency with which group members socialize as a group outside of work)</td>
</tr>
<tr>
<td>Organizations within industries</td>
<td>Organizations are independent of industries (e.g., organizational provision of family-oriented benefits such as parental leave)</td>
</tr>
<tr>
<td><strong>Heterogeneity</strong></td>
<td></td>
</tr>
<tr>
<td>Individuals over time</td>
<td>Observations of each individual are heterogeneous over time (e.g., relative level of physical activity over time)</td>
</tr>
<tr>
<td>Individuals within groups</td>
<td>Group members are heterogeneous within each group (e.g., relative power of each individual within the group)</td>
</tr>
<tr>
<td>Groups within organizations</td>
<td>Groups are heterogeneous within each organization (e.g., relative performance of each sales team within each organization)</td>
</tr>
<tr>
<td>Organizations within industries</td>
<td>Organizations are heterogeneous within each industry (e.g., relative market share of each organization within an industry)</td>
</tr>
</tbody>
</table>
• Explicit specification and explication of the level of a theory and its attendant assumptions of homogeneity, independence, or heterogeneity.

• Specification and discussion of the sources of the predicted homogeneity, independence, or heterogeneity of the constructs.

• Explicit consideration of alternative assumptions of variability.

• Clarifying and explicating the level or levels of their theories
• Data-Collection Strategies Ensuring Conformity to Predictions of Variability
Data Analysis

• Aligning level of analysis and level of theory
• Conformity of data to the level of theory
**FIGURE 1**
Conformity of Data to the Level of the Theory

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Homogeneity</td>
<td><img src="image1" alt="Diagram" /></td>
<td><img src="image2" alt="Diagram" /></td>
<td><img src="image3" alt="Diagram" /></td>
<td><img src="image4" alt="Diagram" /></td>
</tr>
<tr>
<td>2. Independence</td>
<td><img src="image5" alt="Diagram" /></td>
<td><img src="image6" alt="Diagram" /></td>
<td><img src="image7" alt="Diagram" /></td>
<td><img src="image8" alt="Diagram" /></td>
</tr>
<tr>
<td>3. Heterogeneity</td>
<td><img src="image9" alt="Diagram" /></td>
<td><img src="image10" alt="Diagram" /></td>
<td><img src="image11" alt="Diagram" /></td>
<td><img src="image12" alt="Diagram" /></td>
</tr>
</tbody>
</table>