INTRODUCTION & OVERVIEW

I. Selected Challenges to Integrating Social Science Research into Transdisciplinary Research

II. Highlights & Examples of Rigorous Social Science Research Design & Methodology

III. A Way Forward – Practical Recommendations to Enhance Convergence Science
I. SELECTED CHALLENGES TO INTEGRATING SOCIAL SCIENCE RESEARCH INTO TRANSDISCIPLINARY RESEARCH

1. The “lip service” phenomenon; control of research by non-social-scientists & research agendas set by non-social-scientists

2. Issues of perceived legitimacy of the social sciences
   - Exaggerated faith in the natural sciences
   - Low status of the social sciences & social science seen as trivial or unnecessary

3. Increased effort & time required

4. Issues linking natural science with social science models

Adapted from Heberlein 1988.
II. HIGHLIGHTS & EXAMPLES OF RIGOROUS SOCIAL SCIENCE RESEARCH DESIGN & METHODOLOGY

1. Research design begins with research questions

2. Research questions come from different sources
   - Fundamental or basic research questions – driven by theory
   - Applied research questions – we need to know something, but also driven by theory

3. Both basic & applied research questions should be grounded in the literature (not just 1-2 articles)

4. Concepts derived from extant literature should be used to frame the research questions
II. HIGHLIGHTS & EXAMPLES OF RIGOROUS SOCIAL SCIENCE RESEARCH DESIGN & METHODOLOGY

5. Conceptualization informs measurement

6. Measurement must be valid & reliable; also consider units of analysis

7. Sampling must be considered (e.g., probability/non-probability in quantitative research; purposive/criterion-based in qualitative research)

8. Data collection methods must be appropriate to implement the measurement of concepts
Keep in mind... Assessment Fatigue!
Additional considerations . . .
ADDITIONAL CONSIDERATIONS . . .

- Social science theories & concepts ground our work

- Without this foundation, the methods we use become like a hammer & non-social scientists want to use it; more often than not, the hammer is misused by non-experts

- Do non-social scientists have Institutional Review Board (IRB) training/certification? Ethics training? Methodological training?

- Even with IRB certification, what is in the training of a geologist or biologist, for example, that suggests that it would prepare him or her for doing social science?

- Engineers are required to have a degree & to be licensed
How would you feel about working in a high rise building designed by a sociologist? Engineers would never allow that.
ADDITIONAL CONSIDERATIONS . . .

- Good convergence research respects disciplinary domains

- If not, the research will be vacuous & not contribute to the body of knowledge
Key components of strong social science research . . .
MEASUREMENT – CONSTRUCT VALIDITY

- The most important kind of validity

- The extent to which a measure accurately measures the theoretical concept it is intended to measure

- How well does a measure operationalize the concept

- Example: Impact of Event Scale (Hobfoll 1989, 1991)
EXAMPLE – IMPACT OF EVENT SCALE (IES)

- 15 Item scale

- Items regarding Intrusive thoughts & Avoidance behaviors following stressful events

- Stem references a specific, potentially traumatic event (e.g., a disaster)

- Originally employed as a psychological measure of individual stress; adapted following the Exxon Valdez oil spill to examine community-level psychosocial stress & used in other disaster research

- Now used to inform the development of mental health programs
EXAMPLE – IMPACT OF EVENT SCALE

Please read the statements below made by people after they experienced stressful life events. For each statement, please indicate how often it was true for you about the oil spill during the past seven (7) days. It might not have happened at all during the past week, or it might have occurred rarely, sometimes, or often during the past week.
CONSTRUCT VALIDITY EXAMPLE: IMPACT OF EVENT SCALE **INTRUSION** SUBSCALE

1. I thought about it when I didn’t mean to. (The thought of the spill just popped into my head.)
2. Pictures of the spill popped into my mind.
3. Other things kept making me have thoughts about it (even when I didn’t want to).
4. I had trouble falling asleep or staying asleep because pictures or thoughts about it came into my mind.
5. I had waves of strong feelings about it.
6. I had dreams about it.
7. Reminders of it brought back feelings I first felt about it.
CONSTRUCT VALIDITY EXAMPLE: IMPACT OF EVENT SCALE AVOIDANCE SUBSCALE

1. I had to stop myself from getting upset when I thought about it.
2. I tried to remove it from my memory.
3. My feelings about it were kind of numb.
4. I had a lot of feelings about it that I didn’t know how to deal with.
5. I stayed away from reminders of it.
6. I felt as if it had never happened.
7. I tried not to talk about it.
8. I tried not to think about it.
EXAMPLE – OVERALL IMPACT OF EVENT SCALE

- Very high internal validity – the items “hang together” very well, with a Chronbach’s alpha (coefficient) consistently around .9 or higher (on a scale from 0-1)

- Intrusion + Avoidance = Total IES = Proxy for Post-Traumatic Stress Disorder (PTSD)

- Highly correlated with other measures of PTSD
MEASUREMENT – RELIABILITY

- Reliability refers to the overall consistency of a measure, that it measures the same concept over & over – the IES is very reliable

- High reliability exists if a measure is “repeatable”/produces similar results under consistent conditions

- “E.g., if a person weighs themselves during the course of a day they would expect to see a similar reading. Scales which measured weight differently each time would be of little use.” i.e., the concept here is weight

https://www.simplypsychology.org/reliability.html
METHODS

Actions to be taken to investigate research questions

There is a rationale for the application of specific procedures or techniques used to identify, select, process, & analyze information related to the research question

- Surveys (mail, telephone, or on-line)
- Secondary data & archival analysis (documents)
- Observation
- Focus groups
- Interviews (face-to-face, telephone, videoconferencing)
- Ethnography
EXAMPLE OF QUALITATIVE METHODS – INTERVIEWS

- Theory-based or community-based, systematic approach to conducting interviews
- Develop & field test interview/discussion guide
- Interviews may be structured, semi-structured, or open-ended
- Audio recorded & transcribed; quality checked for accuracy
- Provide a foundation for coding & analysis of the data
QUALITATIVE DATA ANALYSIS – INTERVIEWS

1. Begin with a provisional coding scheme – typically based on theories & concepts underlying the study (often formulated based on the instrument used to collect the data) (Saldaña 2010)

2. Continue with more focused coding as themes emerge
Example Approach to Coding Qualitative Data

1. Initial work with the text: Highlight important passages, compose memos
2. Develop main topical categories
3. First coding process: Code the available data using the main categories
4. Compile all of the passages assigned to each of the main categories
5. Determine sub-categories
6. Second coding process: Code all of the data using the elaborate category system
7. Category-based analysis and presentation of results
Example Coding Scheme: *Exxon Valdez* Oil Spill Study

1. Conservation of Resources Model, Individual Stress & Collective Trauma Following the *Exxon Valdez* Oil Spill

1.1 Objects Resource Loss
   - 1.1.1 Natural Resources
   - 1.1.2 Boat
   - 1.1.3 Permits

1.2 Conditions Resource Loss
   - 1.2.1 Family Relationships
   - 1.2.2 Marriage
   - 1.2.3 Community Fragmentation
   - 1.2.4 Health

1.3 Personal Characteristics Resource Loss
   - 1.3.1 Self Esteem
   - 1.3.2 Motivation
   - 1.3.3 Life Has Meaning
   - 1.3.4 Feeling in Control
   - 1.3.5 Feelings of Personal Success

1.4 Energies Resource Loss
   - 1.4.1 Retirement Savings
   - 1.4.2 Time

1.5 Coping Behaviors
   - 1.5.1 Avoidance
     - 1.5.1.1 Try Not to Think About It
     - 1.5.1.2 Try Not to Talk About It
   - 1.5.2 Pressure Cooker Effect

1.6 Chronic Stress
   - 1.6.1 Litigation
     - 1.6.1.1 Try Not to Think About It
     - 1.6.1.2 Try Not to Talk About It

CONSIDERATIONS FOR SURVEY RESEARCH

- Surveys are one of the tools that non-social scientists tend to use.

- Survey research is not simply creating questions or items & stringing them together—although software makes it pretty easy to do so.

- Many of the same considerations apply to survey research as they do to qualitative interviews.

- Development of strong survey research designs takes the same if not more time than qualitative approaches.
CONSIDERATIONS FOR SURVEY RESEARCH

- There are many possible approaches to administering surveys: structured face-to-face & telephone surveys; self or group-administered surveys; Internet data collection.

- It takes training & sophistication to develop a good survey research design.

- It’s important to ensure a robust sample with survey items that address the research questions.

- Must attend to issues of validity & reliability, which is not necessarily accomplished by lifting items from a survey conducted for another set of research questions in a different context.
CONSIDERATIONS FOR SURVEY RESEARCH

- Research design
- Survey introduction
- Question writing
- Things to avoid in surveys
- Types of questions and responses

- Sequence of questions
- Format & layout
- Pretesting the survey
- Types of survey data collection
- Challenges
When appropriate and possible, it can be advantageous to use a mixed-methods approach.

Tying it all together . . .
Research Questions
1. To what extent, if any, did this disaster affect overall social capital in the affected county?
2. How has this disaster affected various dimensions of social capital?
3. What is the relationship between social disruption & various dimensions of social capital?
4. What are the relationships between individual & collective stress, coping mechanisms, & various dimensions of social capital?
5. How are beliefs about recreancy, science & technology, & risk; disaster experience related to various dimensions of social capital?
6. How does our improved knowledge of the effects of this disaster on social capital relate to the broader issues of community resilience in the context of economic development, information & communication, and community competence?

Methods
1. Structured personal interviews (T1 & T2) with:
   (a) a random sample of individuals in the vicinity of the spill and (b) a purposive sample of key actors associated with the spill
2. Self-administered household surveys in the impact & control counties (T1 & T2)
3. Analysis of extant social capital from 2000

Validity
• Comparison with control county
• Panel design
• Integration of qualitative & quantitative data
• Feedback from other researchers
• Search for discrepant evidence
• Rich qualitative data

Purpose
To examine how technological disasters affect various dimensions of social capital.

Conceptual/Theoretical Context
Research on:
1. Community resilience
2. Social capital
3. Social impacts of disasters (social disruption; individual & collective stress and coping; beliefs about recreancy, science & technology, & risk; disaster experience)
III. A WAY FORWARD: SELECTED PRACTICAL RECOMMENDATIONS TO ENHANCE CONVERGENCE SCIENCE

1. Research design needs to begin with in-depth discussion about theory

2. Investigators need to have equal input into the design of all stages of the research

3. Collaborative proposal development requires a significant amount of time; build in time & resources to support it

4. Consideration should be given to the portfolio of collaborative projects so that disciplinary identities will not be denigrated

Adapted from Strang 2009.
III. A WAY FORWARD: SELECTED PRACTICAL RECOMMENDATIONS TO ENHANCE CONVERGENCE SCIENCE

5. Timetables & budgets should reflect different temporal needs

6. Project designers should be ‘bold’ in allocating realistic amounts of time & funds to support research designs that will lead to successful interdisciplinary collaborations

7. Collaborators should consider how data will be managed & whether they can be incorporated or linked in ways that encourage integrative ways of thinking about how information might be reconceptualized

8. The outputs of collaborative research should reflect the needs & qualities of each of the disciplines involved

Adapted from Strang 2009.
Let’s take about 10 minutes for small group discussion about how we might accomplish some of these goals. I’d like for each group to come up with one idea, and then we’ll come back together and share with the large group.
And remember . . .
You don’t want me designing your high rise!
REFERENCES


