SOCIAL SCIENCE RESEARCH: DESIGN, METHODOLOGY, & RIGOR

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TRANSDISCIPLINARY RESEARCH ON THE CHANGING ARCTIC & ITS GLOBAL IMPACTS:
ENHANCING CAPACITY FOR CONVERGENCE SCIENCE
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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 <u>never</u> 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

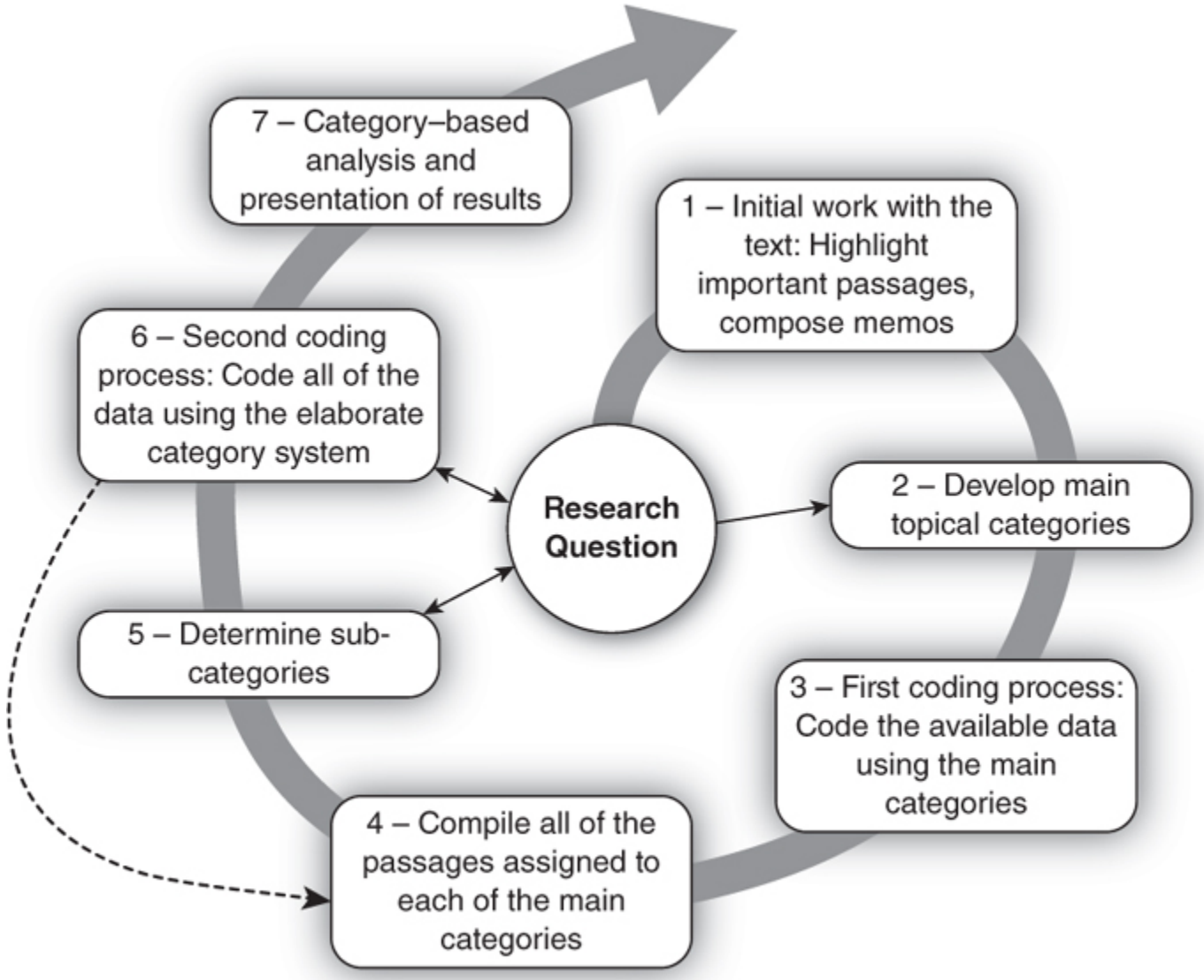
- Theory-based or community-based, systematic approach to conducting interviews
- Develop & field test interview/discussion guide
- Interviews may be structured, semi-structured, or open-ended
- Audio recorded & transcribed; quality checked for accuracy
- Provide a foundation for coding & analysis of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

QUALITATIVE DATA ANALYSIS – INTERVIEWS

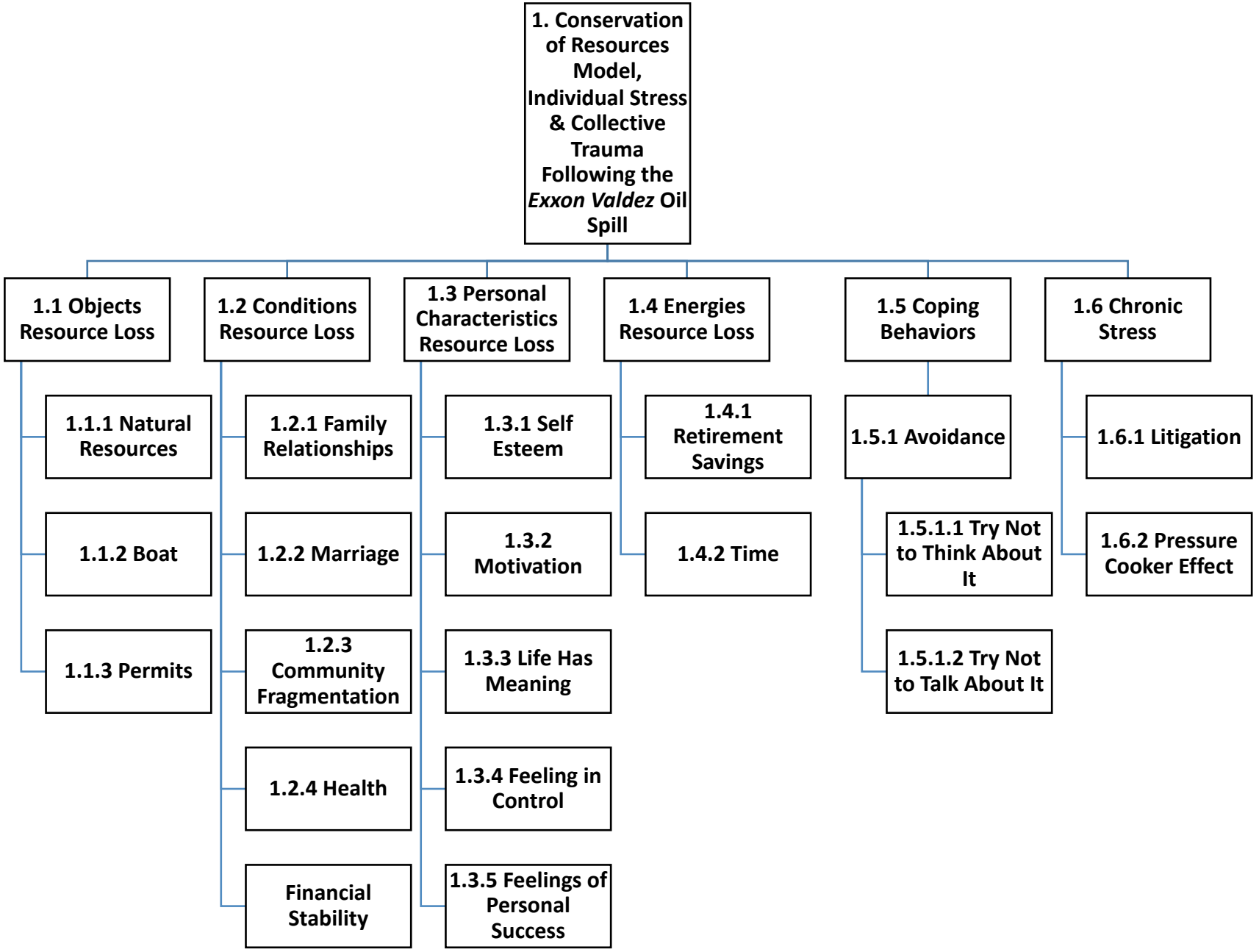
1. Begin with a provisional coding scheme – typically based on theories & concepts underlying the study (often formulated based on the instrument used to collect the data) (Saldaña 2010)

2. Continue with more focused coding as themes emerge

Example Approach to Coding Qualitative Data



Example Coding Scheme: *Exxon Valdez* Oil Spill Study



Ritchie 2004.

CONSIDERATIONS FOR SURVEY RESEARCH

- Surveys are one of 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

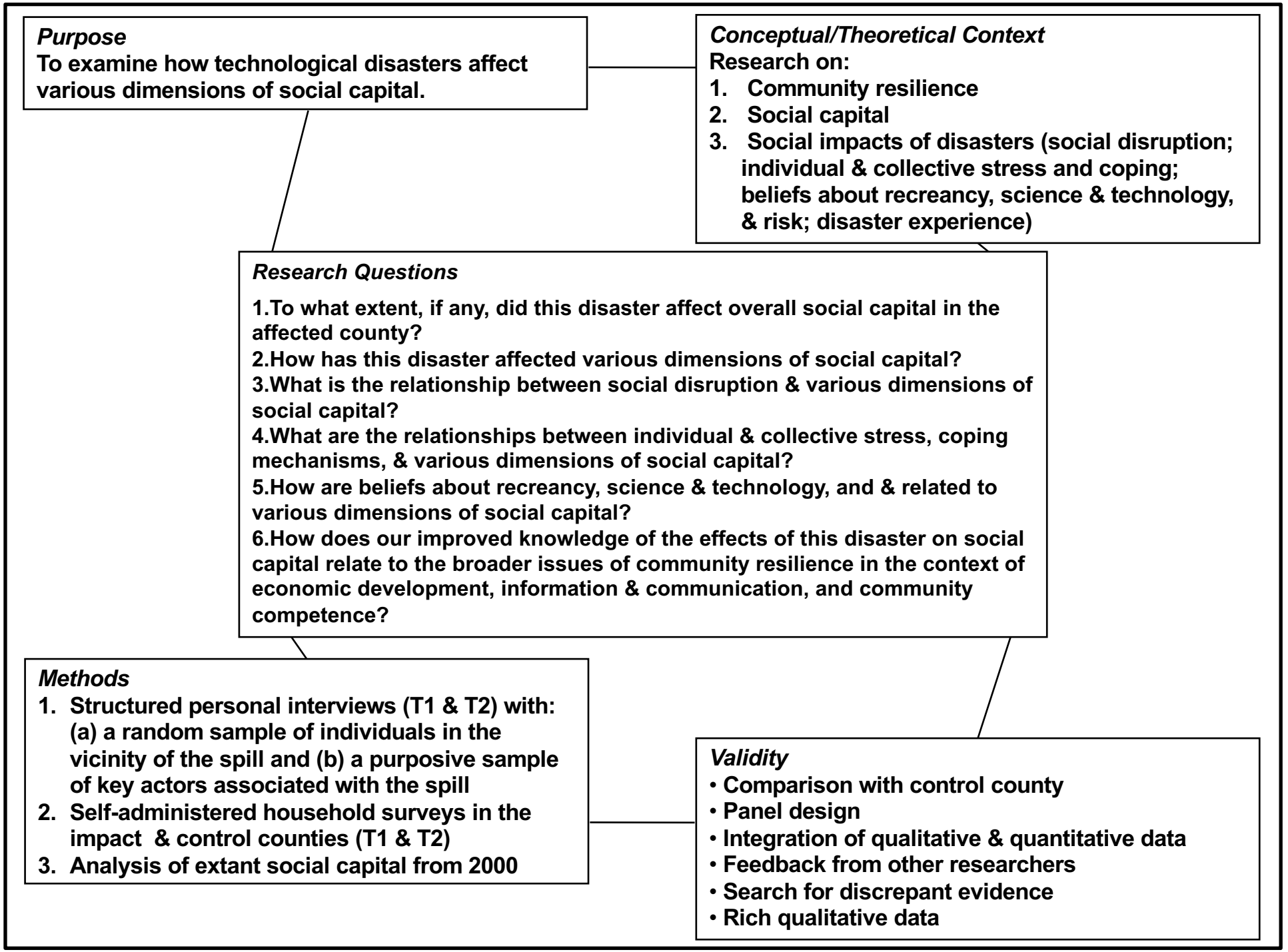
- There are many possible approaches to administering surveys: structured face-to-face & telephone surveys; self or group-administered surveys; Internet data collection
- It takes training & sophistication to develop a good survey research design
- It's important to ensure a robust sample with survey 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 . . .



Ritchie 2008.

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

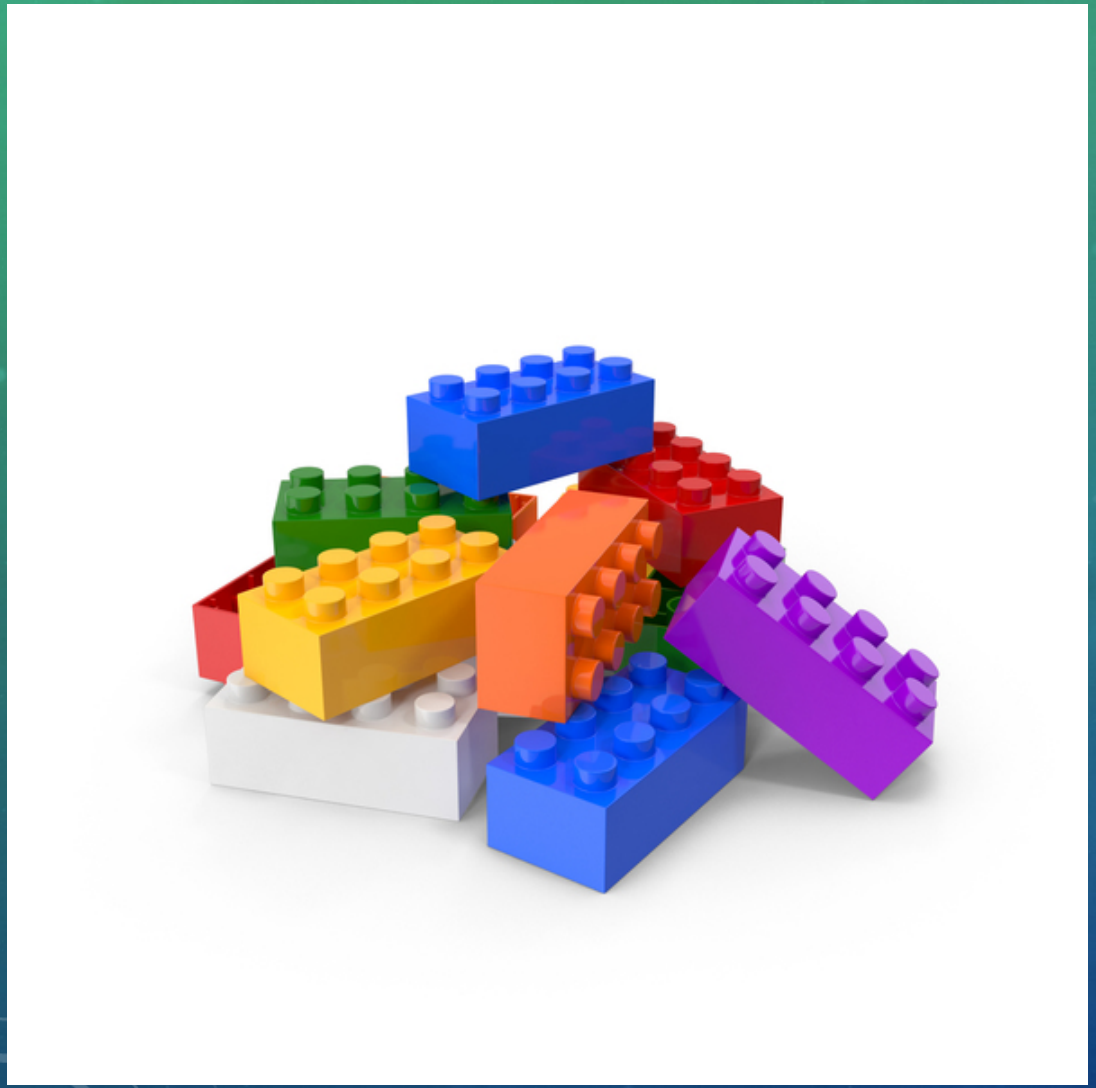
6. Project designers should be ‘bold’ in allocating realistic amounts of time & funds to support research designs that will lead to successful interdisciplinary collaborations

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!

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