Theory and Socio-Ecological Research

SESYNC Socio-Ecological Case Study

For Case Study - Seemed like a good idea at the time: North American beaver in Tierra del Fuego

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Outline

- Quick overview of interdisciplinary research and why it matters
- How can we use theory in socio-ecological research?

Approaches to Interdisciplinary Research

Interdisciplinary approaches	What is combined?	Primary research application
Multi-disciplinary	Disciplines: e.g. ecology, political science and sociology (German et al. 2007)	Academic, Applied
Multi-sectoral or multi-dimensional	Objectives and fields: e.g. conservation, health, livelihoods, technical outcomes and institutional aims (Holman et al. 2005)	Applied, Development, Academic
Multi-phenomenological	Phenomena: e.g. environmental change and	Academic

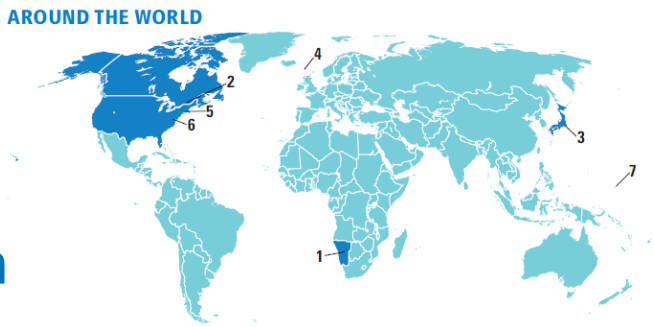
Interdisciplinary research is “research that attempts a deep integration of two or more disciplinary approaches from the beginning and throughout an entire research exercise.” Multidisciplinary approaches “do their best, within their disciplinary confines, to examine an issue and subsequently collaborate to develop together an overall analytical synthesis and conclusions” (Kanbur, 2002: 483).

7 OCTOBER 2011 VOL 334 SCIENCE www.sciencemag.org
Published by AAAS

In science news around the world this week, Germany returned 20 colonial-era skulls to Namibia, Canada's top court has ruled to keep an injecting drug use site open, Japan's ministry of education wants to boost overall science-related spending next year while reducing spending on nuclear-related research, the inhabitants of the Faroe Islands could become the world's first fully sequenced population, a new branch of Jackson Lab will be built in Connecticut, a House bill would boost NIH's 2012 budget by 3.3%, and the Republic of the Marshall Islands declared its waters off-limits to shark fishing and banned the import and export of shark products.

As demonstrated by the above blurb, science is:

- Embedded in history and socio-cultural relations
- Responsive to politics and public opinion
- Shaped by funding
- Influenced by changing social norms



Interdisciplinary research can:

"Strengthen the coherence and social relevance of the results that researchers generate" (Hulme and Toye 2006).

Elicit data that challenges predominant management misconceptions (Turner, Lambin, and Reenberg 2007; Zimmerer 1994).

Draw attention to underlying social conditions that construct and perpetuate ineffective or inequitable resource management practices (Forsyth 2003).

What is theory?

"To discover the underlying principles, mechanisms, and organization of complex adaptive systems and to develop a quantitative, predictive, conceptual framework ultimately requires the close integration of both theory and data... [T]heory, etymologically, comes from the ancient Greek theoria, which means "contemplation" or "a viewing". In that sense, a theory is a way of looking at the world and not necessary a way of knowing how the world is." (Marquet et al. 2014)

Theory can help advance scientific knowledge because it can:

1) Provide a simple explanation for observed phenomena;
2) Situate observations in the context of a body of knowledge;
3) Create a mechanism for verification or falsification; and
4) Stimulate further research

(McMillan and Schumacher, 2000)

Application of theory

- Social scientists and ecologists often use different theories
  - Social scientists might use theories about: conflict, institutional organization, communication, decision-making, power, gender relations…
  - Ecologists might use theories about: adaptation, growth, biodiversity, population dynamics

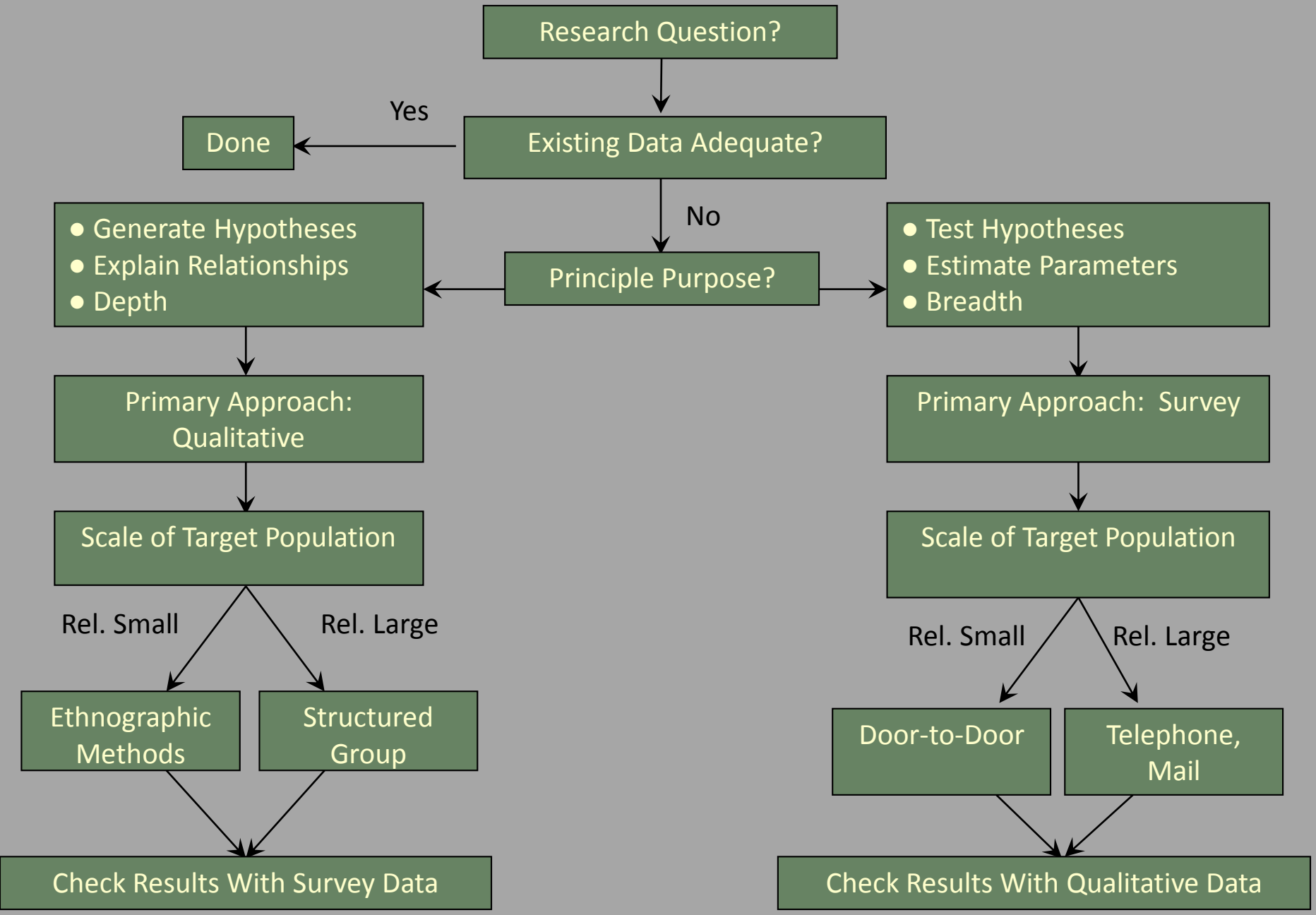
- And they may also use theory differently
  - Ecology: hypothesis testing
  - Social science (some, not all): theory testing

Identification of relevant theory is central to asking effective research questions

Asking Effective Research Questions:

1. Why is it important?
2. Who cares (or should care) about the question?
3. What body of theory will it contribute to?
4. Has it been asked before?
5. Can it be answered with the time, expertise, and resources available?

A simplified social science research approach decision tree



Inductive and Deductive Reasoning (1)

- **Deductive reasoning:** The process of reasoning from general principles to particular examples.

- “From the general to the particular”

- AKA Hypothesis testing

Inductive and Deductive Reasoning (2)

- **Inductive reasoning:** The process of reasoning from particular examples to general principles.

- "From the particulars to the general"

- AKA "theory testing"

Comparison of Qualitative and Standardized Questionnaire Survey Methodologies (from Bliss and Martin 1989)

	Methodology	
	Qualitative	Survey
Purpose	Describe and explain processes and relationships, generate hypotheses	Describe, estimate population parameters, test hypotheses
Design	Inductive, flexible	Deductive, rigid
Sample	Selective	Random
Questions	Informant-driven, Why? What? How?	Predetermined, How many/much?
Unit of analysis	Individual, case	Trait
Data	Multiple instruments	Single instrument
Analysis	Uncodified	Formal
Results	Depth, particulars	Breadth, generalizations

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