Inference

Terminology

By “inference”,

- I cover a bunch of topics that are usually talked about separately
  - analytic induction
  - reliability and validity
  - generalizing, quantification, sampling
  - argumentation

Analytic Induction

Analytic Induction

- Steps of inductive reasoning:
  - (1) Analyze a small number of cases (typically, people) closely.
    - Push hunches and inspiration too far: at this stage, it is important to be creative.
    - Unworthy ideas are dismissed later.

  - (2) Create a set of hypotheses from this analysis
  - (3) Test these hypotheses *with the same data*

- (4) When a hypothesis stands this preliminary test,
  - analyze "negative cases" that fit to the emerging hypothesis only with difficulty
  - If the case does not fit,
    - discard or revise the hypothesis,
    - or add a new dimension to the analysis.

- (5) Go on until all cases have been analyzed, and you have a description that describes all data
  - Typically, this is a conceptual framework that is ordered from the most important concepts to less important ones.
- This conceptual framework can simply be called "*an interpretation*"

- Note that up to this point, you have been working with a subsample of data.
  - There is no way of knowing whether this interpretation is correct in other data than yours
  - Thus, the final step:
  - (6) Generalize your interpretation with
    - comparative data from other studies or your own knowledge of the world

- This procedure results in a
  - reliable analysis that covers the most important parts of your data.
  - if you've gathered your data well, your interpretation accounts for most variation in the phenomenon you've been studying

- Criticisms
  - AI identifies necessary, but not sufficient conditions for some phenomenon
    - briefly: we know that A∪B ∪C led to event X in our data, but can't know whether A∪B ∪C always lead to X (in other data)
    - AI is retrospective: it tells what happened, but cannot predict

Matrixes: the ANOVA analogy

- Miles and Huberman's "Qualitative Data Analysis" (London: Sage)
  - a set of matrixes and path diagrams for analysis

- Of course, you don't have to follow AI
  - Keep historians and classical humanists in mind:
    - their explanations are personal interpretations from huge learning rather than a direct, controlled path from data

- Sometimes, you may want to do analysis in groups
  - to share not just data, but also inference
- Methods with a social basis:
  - brainstorming, "six hats" (Ed de Bono), affinity walls, "future laboratories" for idea generation
  - analytic: "data sessions" in interaction studies, "objective hermeneutics" (in the German tradition)

THESE STORIES ARE USEFUL!!!

- Concrete means vary...
  - color codings to transcripts
  - matrixes, mind maps
  - post-it notes, cut post-its
  - archive cards, arranging and organizing
  - ...

Finally...

- Computers and qualitative analysis
  - two recommendable programs exist:
    - NUD•IST (Tom and Lynn Richards, La Trobe)
    - Atlas/ti (Thomas Muhr, originally TU/Berlin)
  - these follow the **Grounded Theory** methodology (Glaser and Strauss 1967)
    - which follows AI, but is tied to symbolic interactionism in sociology

Important!

- Don't rush to inferences!
  - it takes time to build one -- and even more time to test it
  - start slow by getting familiar with your data
  - when you know your data thoroughly, writing is easy. Before that, you probably just illustrate your prejudices/preconceptions with "data"

questions?

Reliability and Validity

- Any results are always preliminary
  - researchers never talk about "true" knowledge (outside classic mechanics, classic mathematics)
  - Instead, we talk abour “reliability and validity”

- Types of validity:
  - internal validity: is the argument coherent and logical?
  - external validity: are results generalizable?
  - sometimes “construct validity”: the validity of the theoretical construct

- Reliability means
  - replicability over cases, time, method: your study is reliable if another researcher somewhere else, at another time can, with your methods, get the same results

- However, these concepts have a definite meaning in few contexts only
  - validity works in experimental research, in which it prevents design errors
    - internal validity is even then a principle, not a term with exact meaning
  - reliability has a meaning in scale construction and quantitative content analysis (Cronbach’s alpha, α)

- Qualitative alternatives have been proposed
  - usually they center around the notion of "evaluability":
    - you should design and conduct your study so that an outsider can make sense of it, and
    - get enough instructions to be able to replicate it
  - one influential conceptualization is on the next page

Guba and Lincoln on naturalistic research		
Conventionally	Naturalistically	
	Criteria	How to take it into Account?
Internal validity	Credibility	Using many methods (triangulation), peer review during study, analyzing negative cases
External validity	Transferability	With a rich description of the object, the reader can transfer results to elsewhere
Reliability	Dependability	Auditing: documenting the study in detail so that other researchers can evaluate it
Neutrality (objectivity)	Confirmibality	Auditing

How to show validity?

- Describe the research process (your logic)
  - description allows the reader to examine your logic
  - describe
    - how your reasoning evolved
    - how you conceptualized your data
    - how you took into account negative evidence
    - how you controlled sources of errors

- "Member validation"
  - another set of validation methods is to give
    - subjects an opportunity to read the report
    - and either tell their opinion about it, or a right to revise it
  - there are several names for this procedure
    - practical validation
    - discoursive validation

  - Problems: member validation works badly
    - with technical data
    - with scientific arguments: few readers are able to understand the aims of academic research
    - in conflict situations
    - with friends

- Alternatives, used *in addition* to "describing the research process"
  - "triangulation":
    - using several methods to study one object
    - is all methods produce a similar result, this provides a stronger proof than a result with just one method

- Errors
  - There are always errors in research, but only "systematic errors" are serious:
    - Biases due to concepts or theoretical apparatus
    - Wrong method choice
    - Unrecognized and unmanaged severe reactivity
  - it is important to foresee, identify, and minimize these errors
    - rather than errors in, say, transcripts

questions?

Generalization

- In generalization, qualitative methods clearly are inferior to statistics
  - problems: assumes simple causality (only few variables), no interactions, measurement errors
- Does this weakness decrease the value of qualitative research?

- Qualitative responses
  - qualitative research typically aims to produce "thick descriptions" from a small number of cases
    - the price of an additional case is high
    - often we are interested in uniqueness
      - (you cannot understand Finnish econ policy between 1965-1990 without studying the former president Mauno Koivisto)

  - in small countries, the number of cases may be too small for statistical analysis
  - critical aims:
    - in studying the third world, UN and OECD statistics are a typical source
    - but is "nation" a good unit to understand, say, Sub-Saharan Africa?
  - diagnostically important cases
    - "America's Working Man"

– generalizing to theory not to population (Robert Yin)
– learning from comparative methods
  • mimicking experimental research -- or comparing dissimilar cases
– comparison to other qualitative and case studies (Randy Hodson's work in sociology of work)

Quantification and Sampling

Statistics in Qualitative Research

- In some situations, it makes sense to quantify at least a part of data
  – analyzing covariance without statistics is risky, so in principle… but…
    • when it is typically difficult to quantify qualitative data on an interval scale, and
    • when N is small
      – only simple analyses and weak statistics are possible
      – is quantification worth all trouble?

– when to quantify?
  • When N is sufficiently large
  • When there is a consistent unit of analysis
  • of course, tabulations and "correlations" can help to get a snapshot of data without coefficients
    – (remember the Miles & Huberman methodology!)

Sampling

- Classical sampling…
  – …aims to guarantee that each case has a similar likelihood of being included in the sample
- In qualitative research, the "sample" is almost always *purposive*
  – we select the "best laboratory animal" for our study: a case that gives us a good access to our topic of interest

Three sampling "methods"

- Snowball sampling
  – asking each subject suggestions for other people to interview, observe, etc.
- Targeted sampling
  – studying "hidden" populations
  – using all possible knowledge to find these populations and get close to them

- "Theoretical sampling"
  - when field work progresses, new questions and interpretations arise.
  - sampling is determined by these new concepts, not by snowballs or by targeting specific populations

Saturation

- When to stop?
  - There is no mathematics to tell..!
  - The only sensible answer is "saturation":
    - you analyze data as you go along in field work
    - continue studying each question or hypothesis as long as new variation comes along
    - stop when new cases always fall into the existing interpretation, and negative cases are accounted for

questions?

Argumentation

- The final phase in constructing an interpretation is "argumentation":
  - tying the results to scientific literature
  - and showing its contribution in literature
    - without this phase, the study has little effect in the research community
    - to get published in good journals or conferences, any article often needs an argument

- Note that in qualitative research…
  - argumentation is placed differently from quantitative, theory-driven analysis
    - in theory-driven analysis, the very study is designed to be an argument
    - in qualitative research, the argument is typically *found* in the course of the study
      - argumentation begins at the advanced stages of the study
      - ***reserve and budget time for writing!***

– In getting published, the key concepts are "contribution" and "believability"
  - to show contribution, the writer has to show that the study tells something new, or tells something better than previous literature
    – the only way to show this is to go through literature and show what has been written & what is wrong with existing literature
  - in evaluating believability, readers go back to concepts like validity and reliability

- Some philosophy
  – A good interpretation typically has a few clear and distinct concepts that are related to each other in a systematic fashion.
    - Such interpretation translates knowledge of the user into understanding – that is, it picks up what is essential from fuzzy intuition

– What the reader gets is an economic snapshot picture of the subject and her world
– This picture may not be correct in all details, but this is not the point.
  - What is truly important is that this picture communicates the subject well to the audience

– Effective communication requires that the picture is informative
– 100 bare details are not informative
  - they are, if there is a framework that explains how they are related

questions?

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