Inference

Or
what to do once you *have* data?

Terminology

By “inference”,

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

Types of Inference in Qualitative Research

Next

- (Analytic) induction
- Matrix thinking: the ANOVA analogy
- Several alternatives
- Complications

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*"

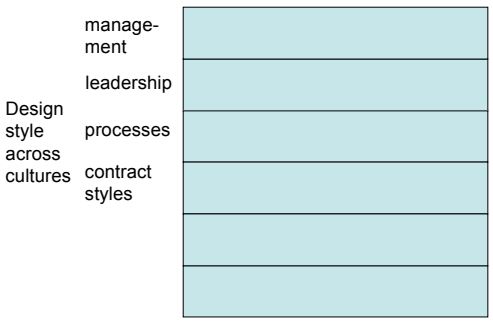
• Note that up to this point, you have been working with a subsample of data.
  – There is no way of knowing whether this interpretation is correct in other data than yours
  – Thus, the final step:
  – (6) Generalize your interpretation with
    • comparative data from other studies or your own knowledge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

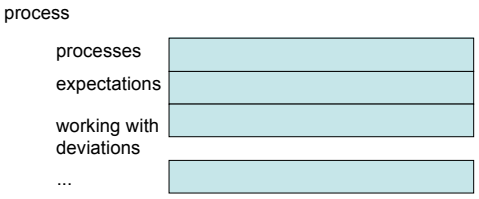
• This procedure results in a
  – reliable analysis that covers the most important parts of your data.
  – if you've gathered your data well, your interpretation accounts for most variation in the phenomenon you've been studying

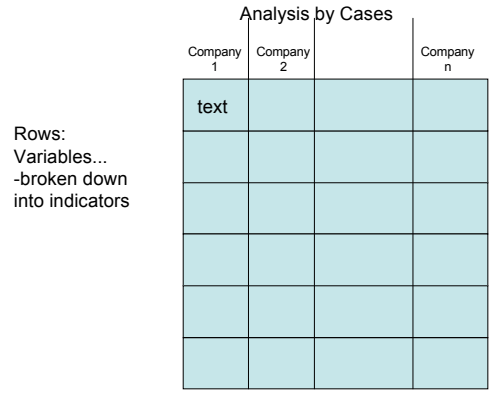
• Criticisms
  – AI identifies necessary, but not sufficient conditions for some phenomenon
    • briefly: we know that A∪B ∪C led to event X in our data, but can't know whether A∪B ∪C always lead to X (in other data)
    • AI is retrospective: it tells what happened, but cannot predict

Matrixes: the ANOVA analogy

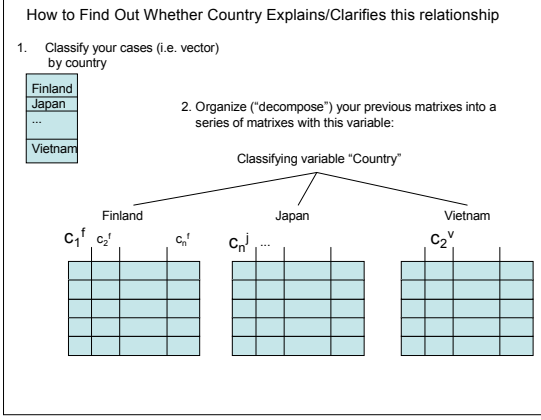
- Miles and Huberman's "Qualitative Data Analysis" (London: Sage)
  - a set of matrixes and path diagrams for analysis
  - the analogy is ANOVA - Analysis of Variance
  - esp. in the early stages of analysis, you use matrizes to analyze relationships (co-variance) between variables



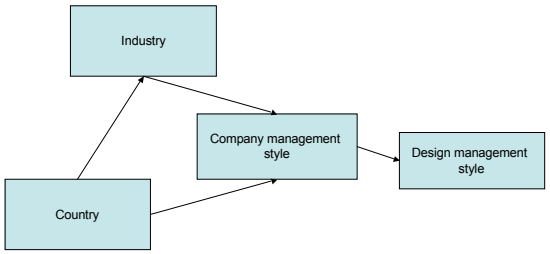




- this methods provides
  - a series of useful snapshots
  - an ability to see relationships
- ALSO, with more complicated tactic...
  - a possibility to break down these relationships
    - (the analogy is the linear model, and esp. cross-tabulations)



- another additional step is building “path diagrams”
  - you take out those relationships that function well - i.e. seem to describe relationships
  - and organize them in some kind of “causal” order
    - for instance, typically in terms of time



- evaluation
  - typically, there are multiple paths of causation,
    - which this system allows
    - it may even allow you to describe relationships in terms of a formula
  - but: do causal assumptions work? Can you account for errors? What about if you’re interested in specificity?

Alternatives/1

- Browseability goes with coding
  - color codings to transcripts
  - post-it notes, cut post-its in diaries
  - archive cards, arranging and organizing
  - ...why not mind maps: they function like the path analysis analogy in Miles and HUberman

Alternatives/2

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

Alternatives/3

- Another special case:
  - analytic philosophy
    - you build inferences by imagining alternatives, even impossible cases
    - only if you can defend your interpretation against even far-fetched imaginary cases, you write it down
  - this style leads to accurate conceptual descriptions
  - ...but it usually not accepted by empirical researchers (except in very early phases of research)

Complications/1 (for designers)

- 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)

Complications/2

- 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)	Confirmibility	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?