

Human-Computer Interaction

Qualitative Data Analysis

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Today's Agenda

- » Topic overview: Qualitative Data Analysis
- » Hands-on activity

Qualitative Data Analysis Methods

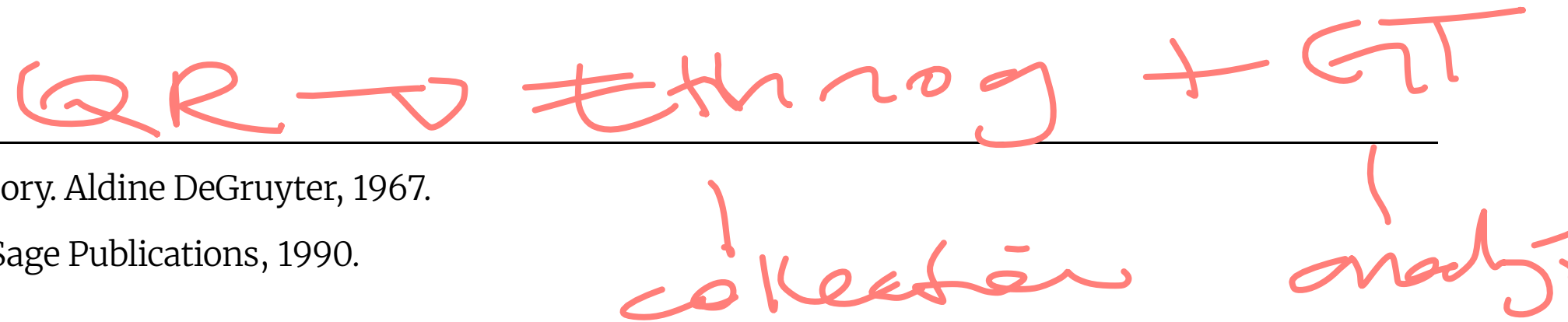
- » Content analysis
- » Discourse analysis
- » Narrative analysis
- » **Thematic analysis**
- » **Grounded Theory**



What is Grounded Theory?¹²



- » An approach to describe relationships where little is known or to provide a fresh take on existing knowledge
- » A method to systematically build integrated sets of concepts from systematically obtained empirical data
- » A process of composing knowledge through intimate contact with subjects, events
- » A theory that is shaped by data as well as by the researcher
- » HCI research adopts Grounded Theory as a systematic and rigorous method to analyze qualitative data

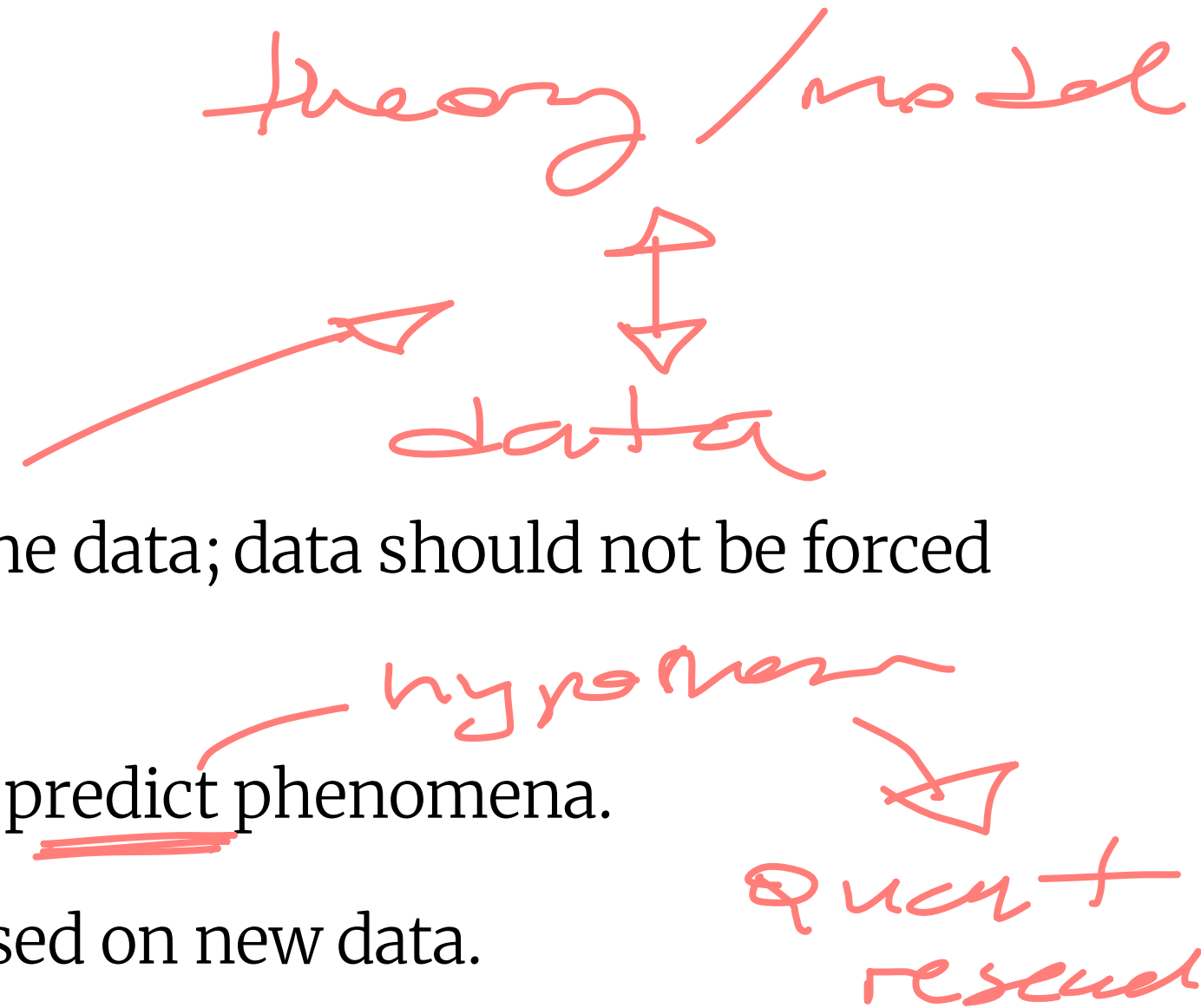


¹Glaser, B. G. and Strauss, A. The Discovery of Grounded Theory. Aldine DeGruyter, 1967.

²Strauss, A. L. and Corbin, J. Basics of Qualitative Research. Sage Publications, 1990.

What are key characteristics of Grounded Theory?

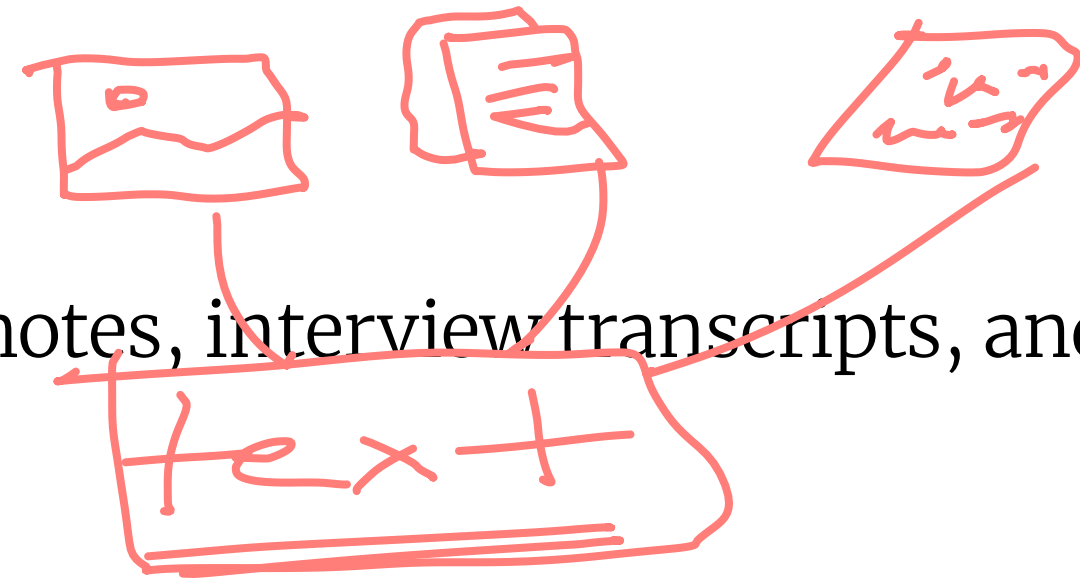
- » Induction: Theory emerges from data.³
- » Fit: Theory generated must:
 - » Fit the data: categories should emerge from the data; data should not be forced into pre-existing categories.
 - » Be relevant: theory should explain, interpret, predict phenomena.
 - » Be adaptable: theory should be modifiable based on new data.
- » Subjectivity: Subjectivity can be minimized by (1) keeping an open mind, thinking comparatively, studying multiple viewpoints, and periodically asking big picture questions; (2) inter-rater reliability.



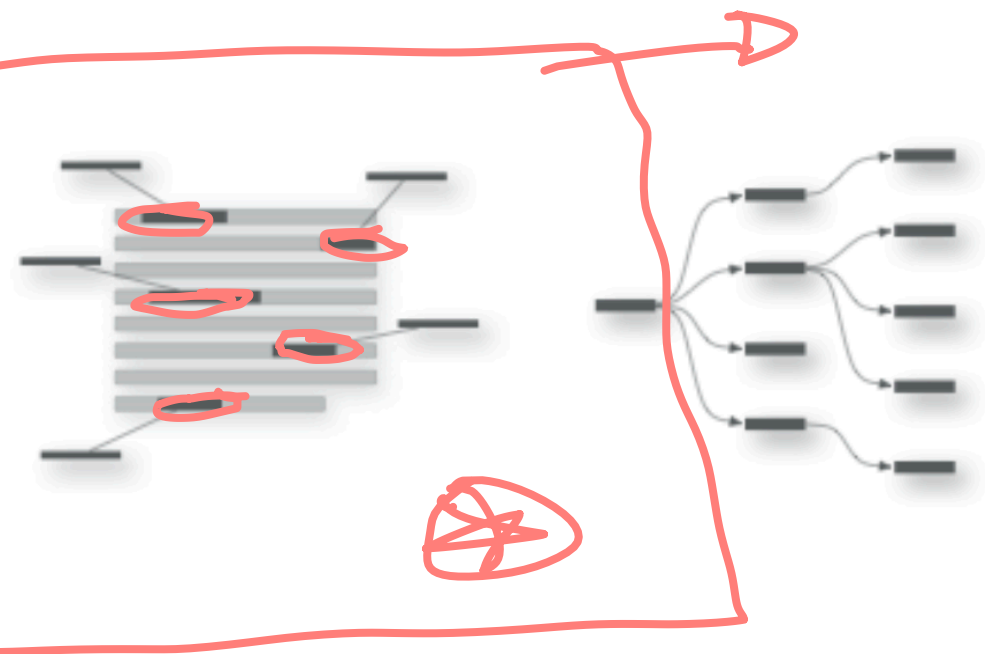
³ Inductive approaches to research aim to generate theory, and deductive approaches to research aim to test theory.

How do we conduct Grounded Theory?

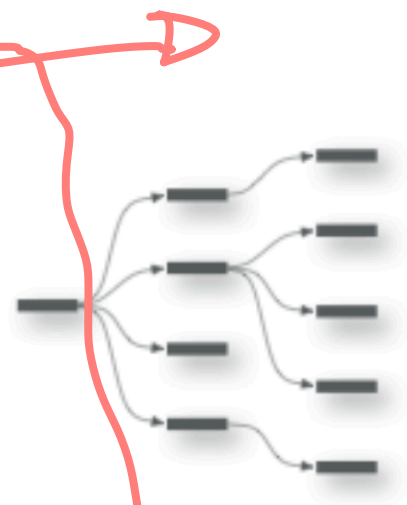
- » Reading a textual database, including fieldnotes, interview transcripts, and other data that is translated into textual form
- » Discovering and labeling variables
- » Identifying and modeling relationships



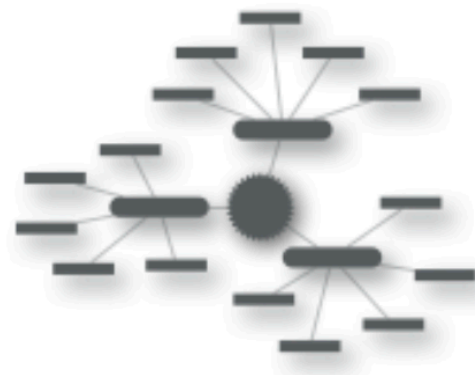
The Grounded Theory Process



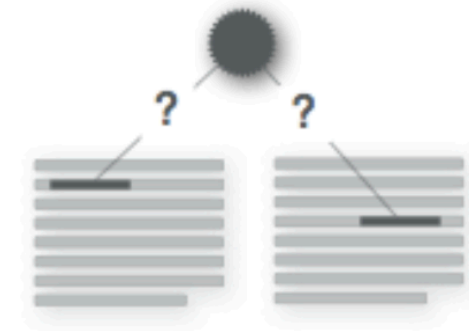
Open Coding



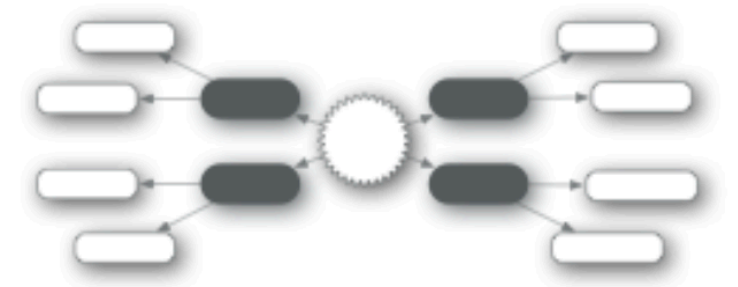
Axial Coding



Selective Coding



Comparative Analysis



Theory Building



Open Coding⁴

Coding for concepts that are significant in the data as abstract representations of events, objects, relationships, interactions, etc.

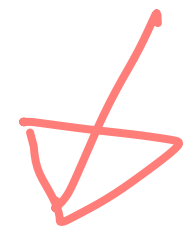
in vivo code

{abusing the robot}

“I kicked it before and I was told not to...
[laughs]...when it first came.”

⁴Mutlu, B. & Forlizzi, J. (2008). Robots in Organizations: Workflow, Social, and Environmental Factors in Human-Robot Interaction.

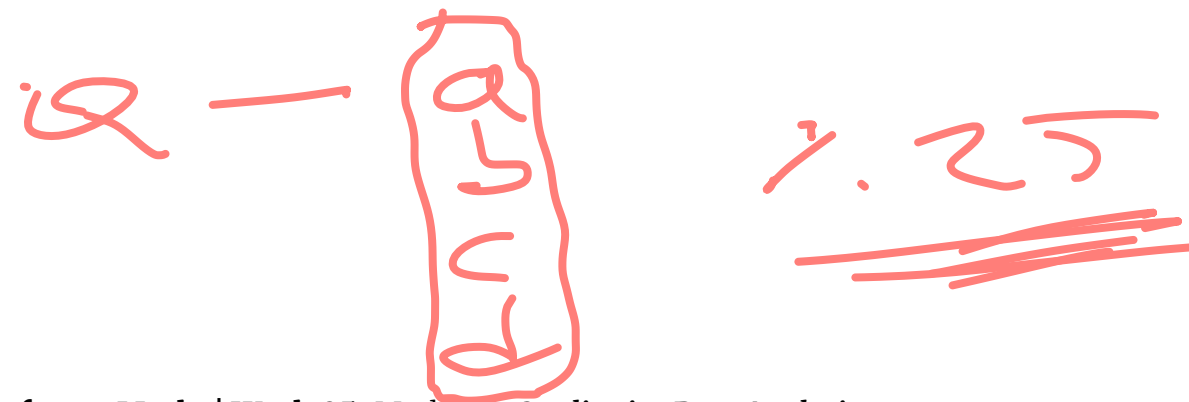
How do we ensure objectivity of coding?



Reliability analysis measures the extent to which independent coders evaluate a behavior to reach the same conclusion.

What are some measures of reliability?

- » Agreement among coders: Measures how much coders agree as percentage of coded segments
- » Cohen's κ : Takes into account agreement that could happen by chance
- » Fisher's κ , Krippendorff's α : Alternatives to Cohen's κ



How do we calculate Kappa?

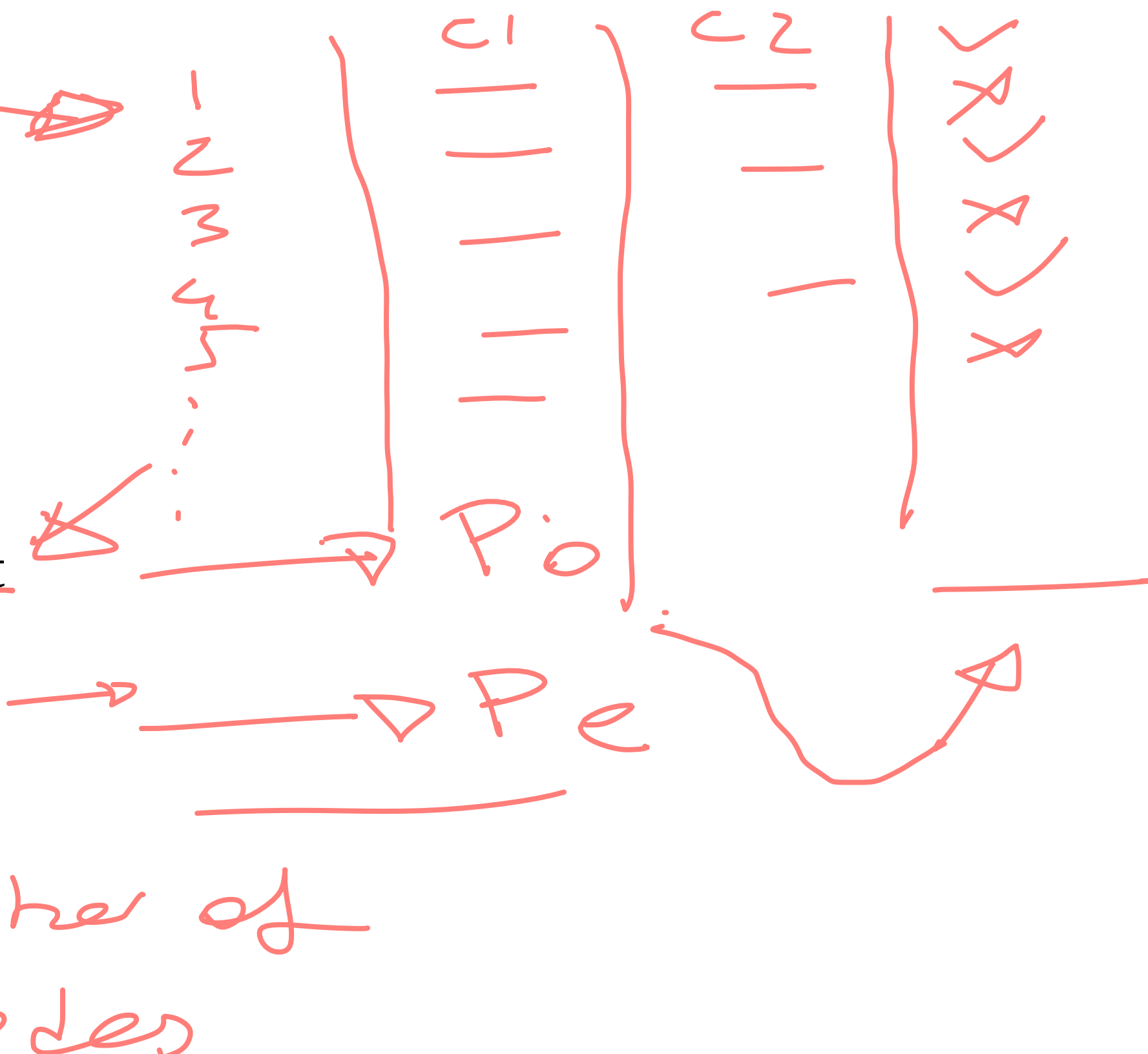
$$\kappa = \frac{P(a) - P(e)}{1 - P(e)}$$

$$\frac{0 - 1}{1 - 1}$$

κ : Cohen's Kappa

$P(a)$: Probability of observed agreement

$P(e)$: Probability of chance agreement



How do we interpret Kappa values?

- » < 0 — no agreement
- » 0–.20 — slight
- » .21–.40 — fair
- » .41–.60 — moderate
- » .61–.80 — substantial
- » .81–1.00 — almost perfect

45

.70

.82 → 98% ✓

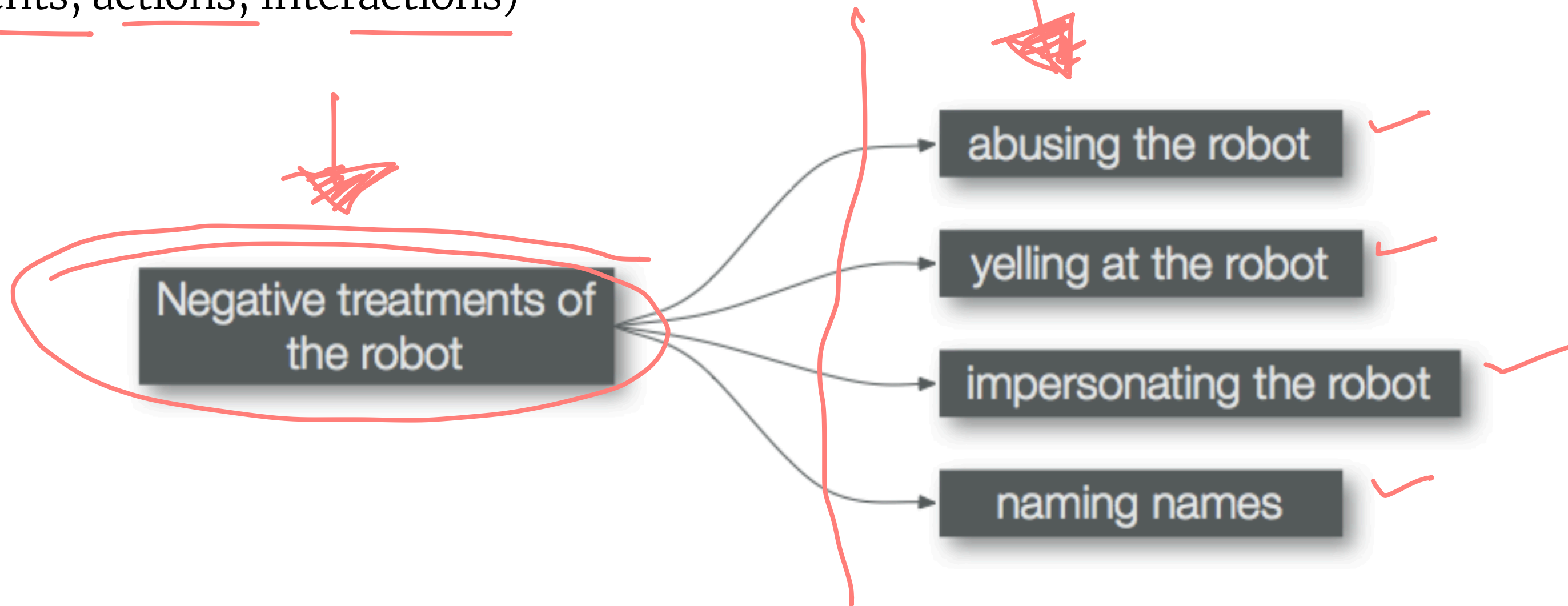
What process do we follow to test reliability?

1. Choose your measure (e.g., Cohen's κ)
2. Determine minimum level of reliability ($\kappa \geq .80$)
3. Identify your reliability sample (e.g., 10% of the full sample)
4. Train another coder and ask the coder to code the reliability sample
5. Calculate reliability (iterative process: retrain, recode, recalculate)
6. Report inter-rater reliability

using your codes
↑
codebook

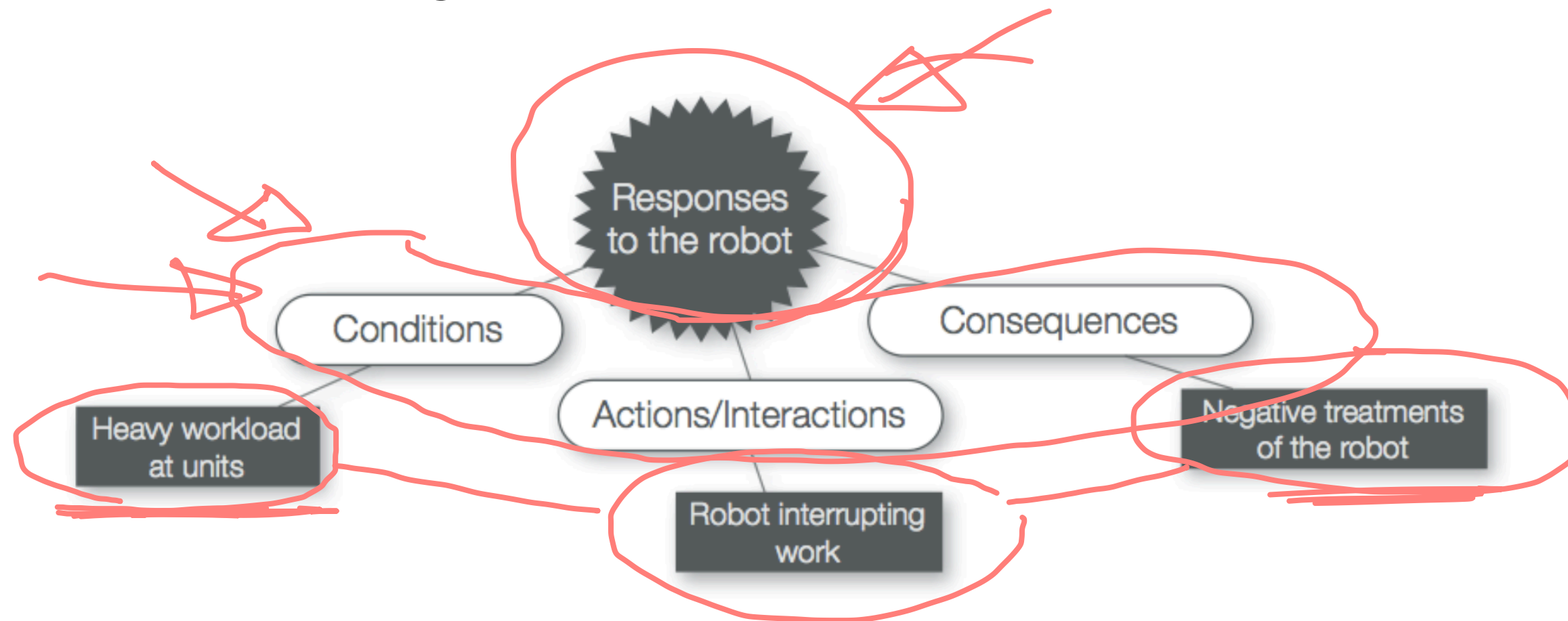
Axial Coding

Concepts are categorized into explanations of arising phenomena (e.g., repeated events, actions, interactions)



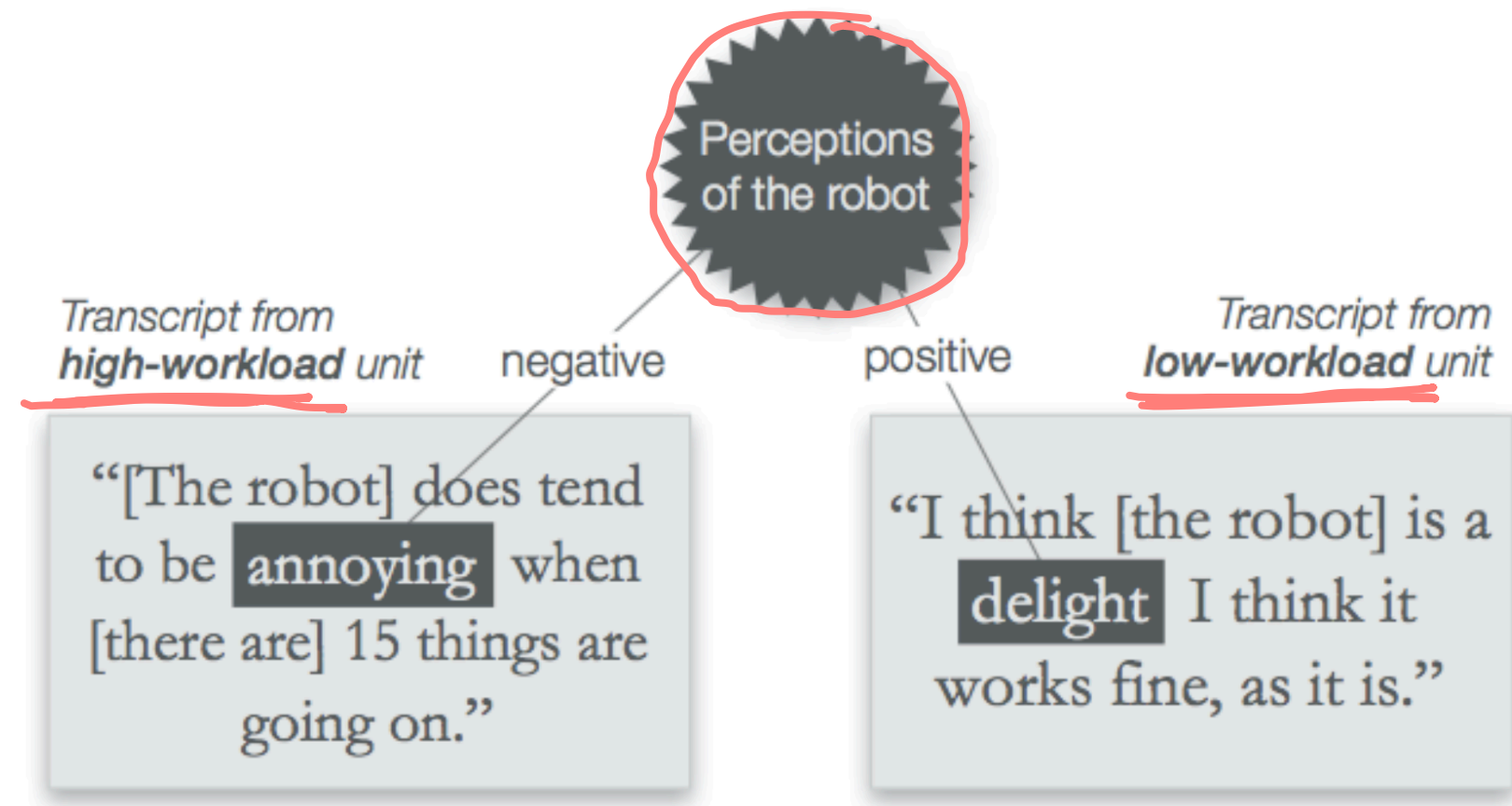
Selective Coding

Categories are classified into *conditions*, *actions/interactions*, and *consequences* (templates that help us establish causal relationships) and relationships among categories are established to generate several individual models.



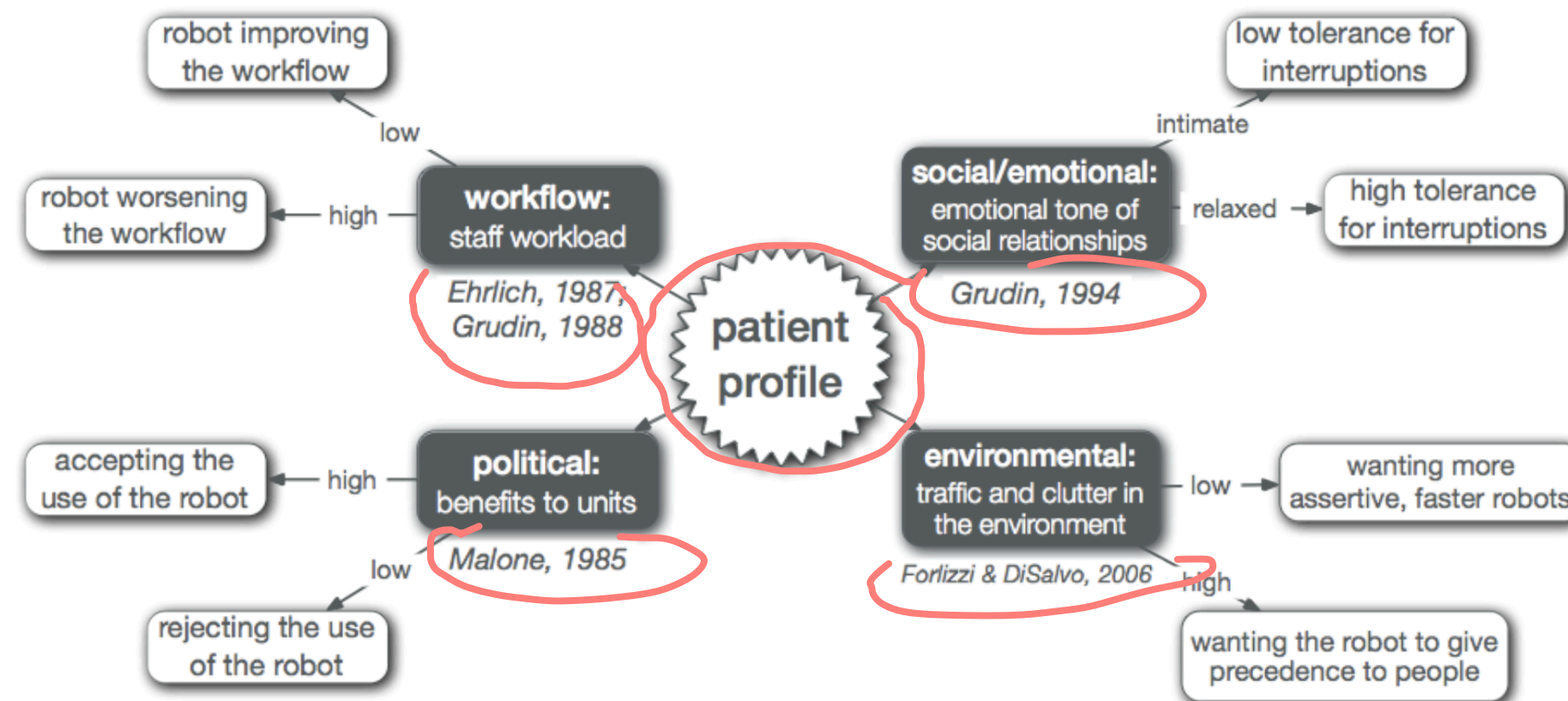
Comprative Analysis

Each phenomenon is compared across several dimensions to understand how it is affected by social, physical, or organizational structures.

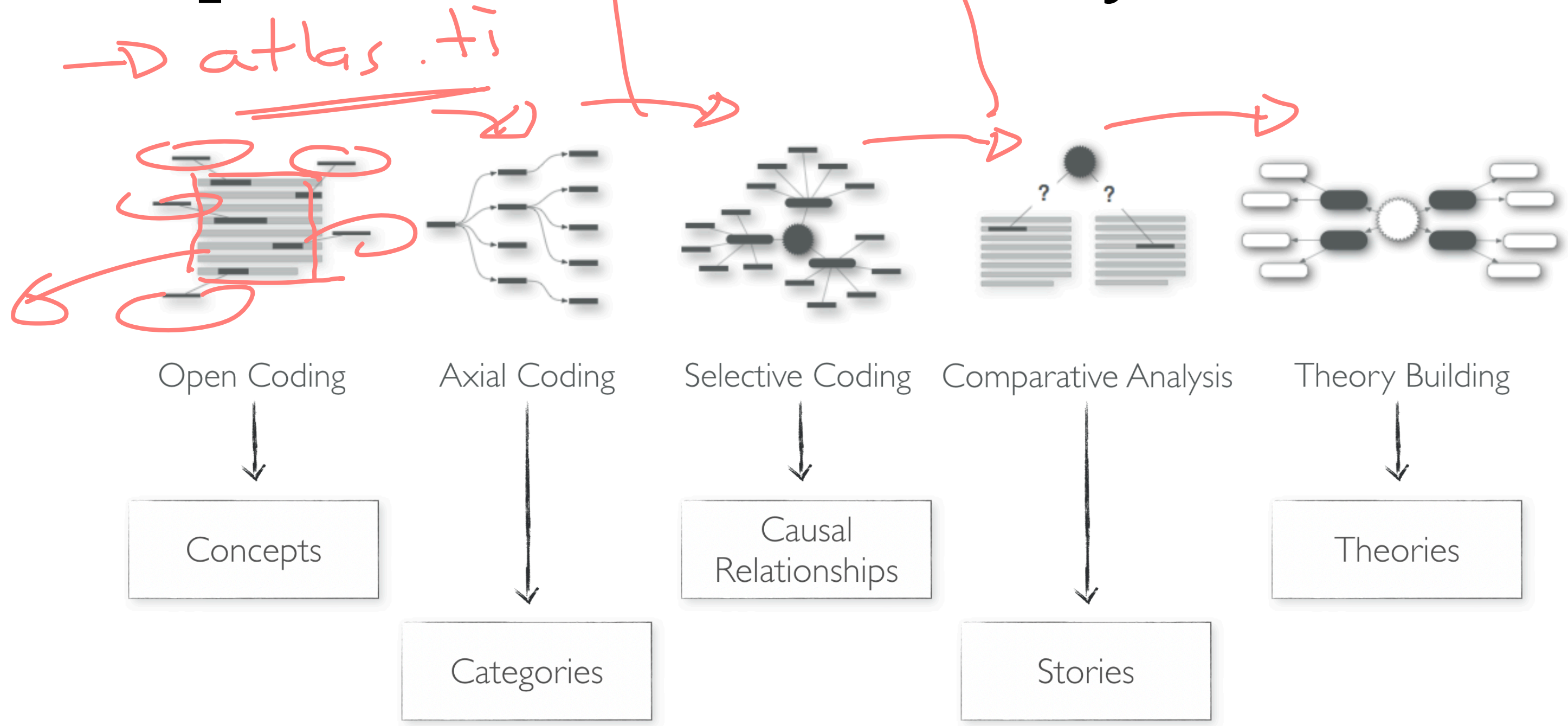


Theory Building

A final theoretical model (or models) is constructed based on the results of the comparative analysis; existing theory is embedded in this model.



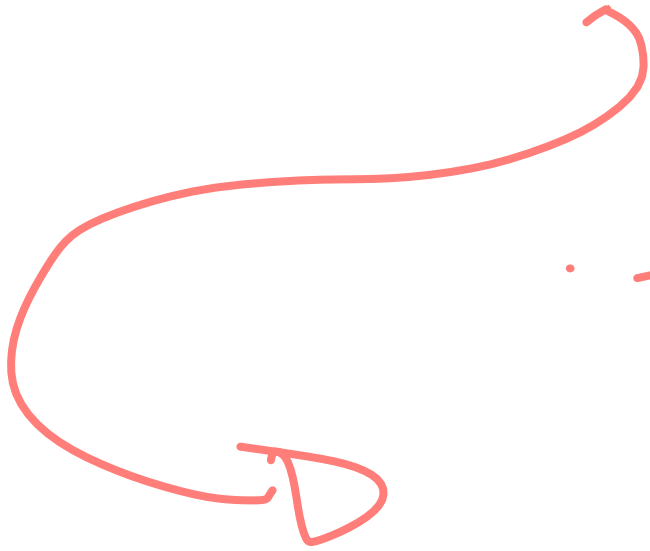
Recap of the Grounded Theory Process



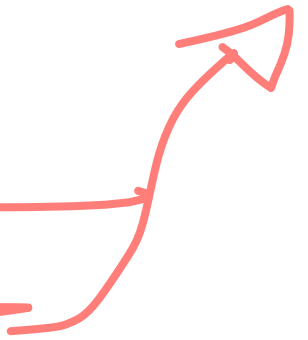


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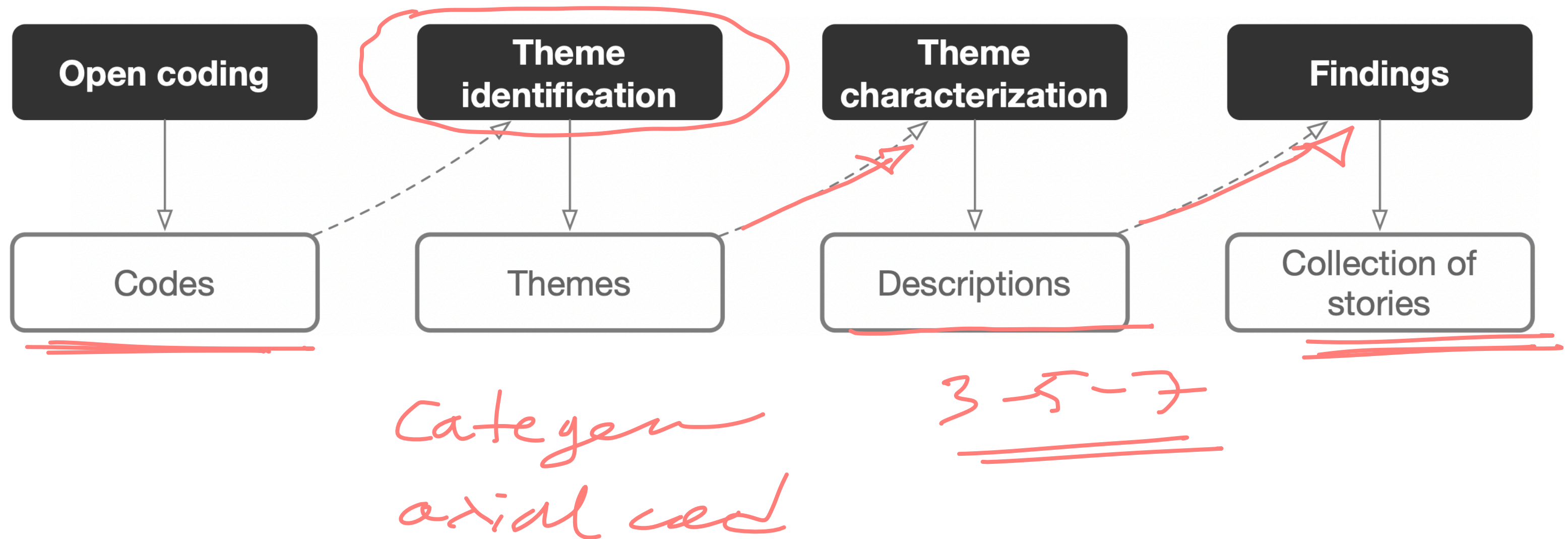


codes cuts



Thematic Analysis

Using the same techniques, we can utilize a *simplified* process:



Method Selection

When is thematic analysis or Grounded Theory appropriate?

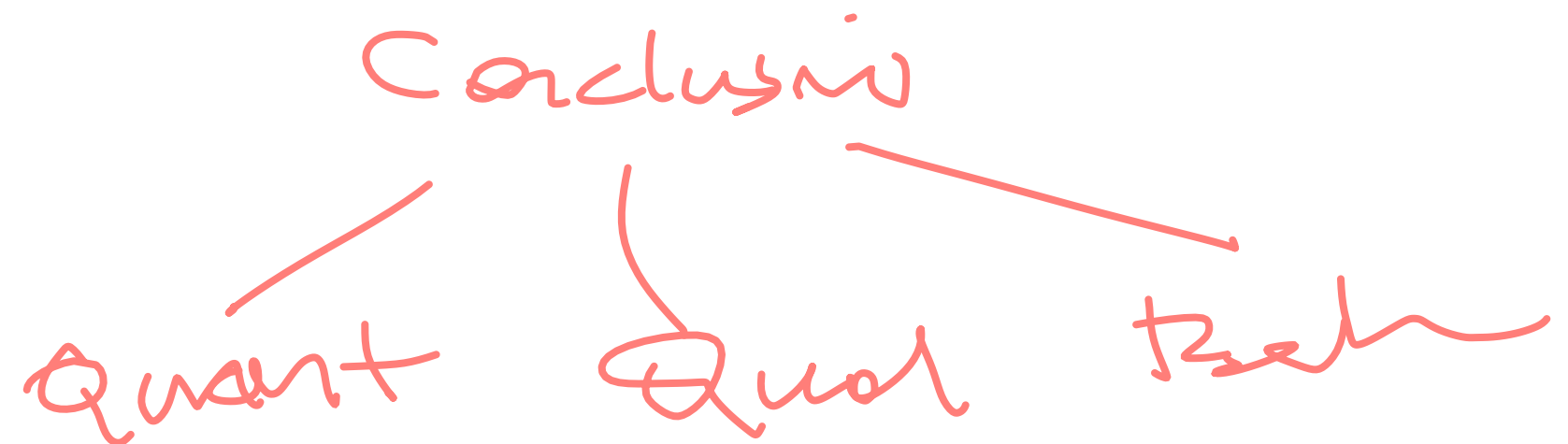
Grounded Theory 

- » Building substantive theory
- » Studying social phenomena



Thematic Analysis

- » Qualitative evaluations of systems
- » Triangulation



Questions?