Ethnographic Data Analysis

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Computer Sciences

CS-570 Introduction to Human-computer Interaction

The Problem

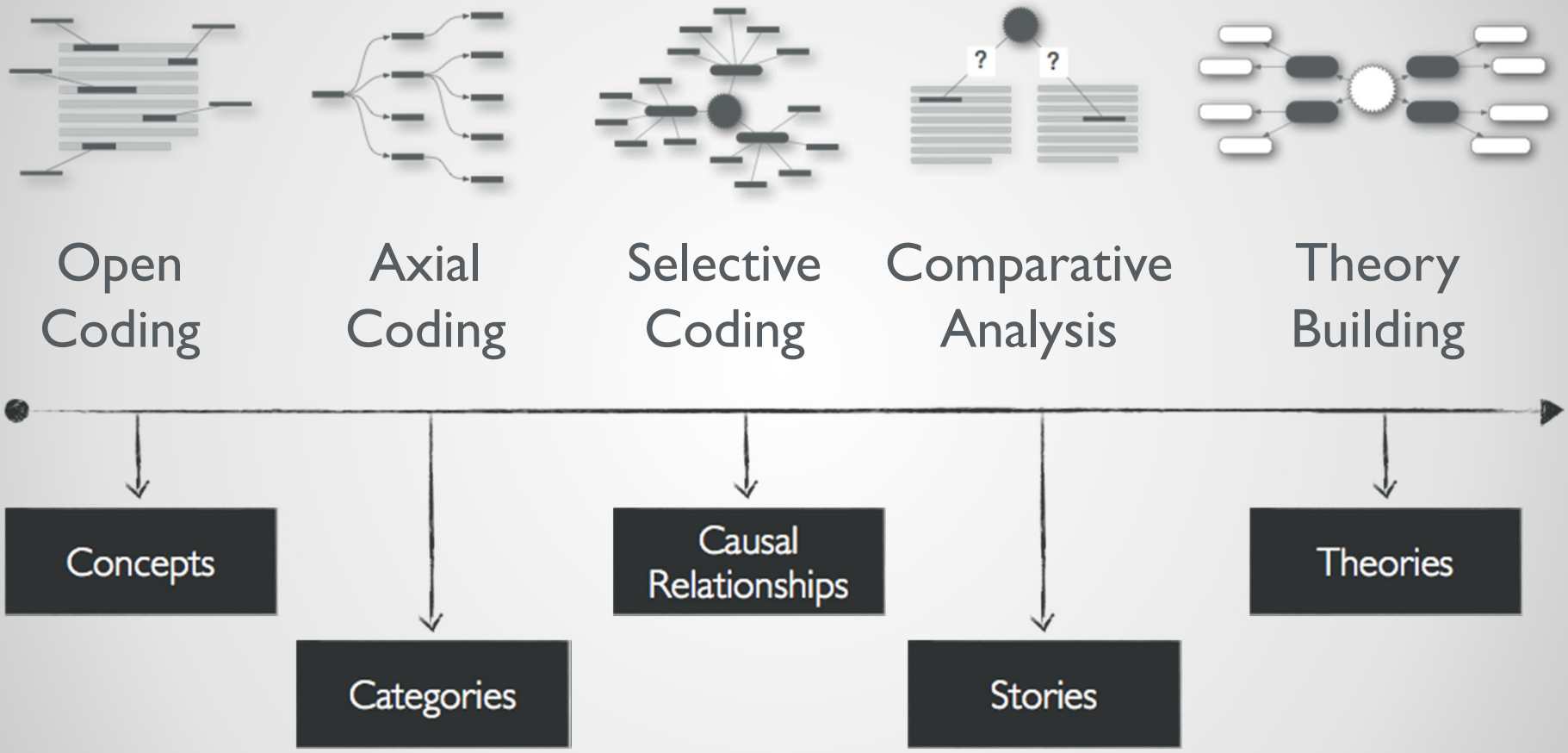
Ethnography can produce vast amounts of data

- Example: 40+ hours of observation/interviews = 539 pages (11,716 lines) of transcripts

Data types are often varied

Data involves rich interactions that are complex

The Process



* Glaser, B. G. and Strauss, A. The Discovery of Grounded Theory. Aldine DeGruyter, 1967.
* Strauss, A. L. and Corbin, J. Basics of Qualitative Research. Sage Publications, 1990.

Open Coding

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

Reliability analysis ensures objectivity in coding

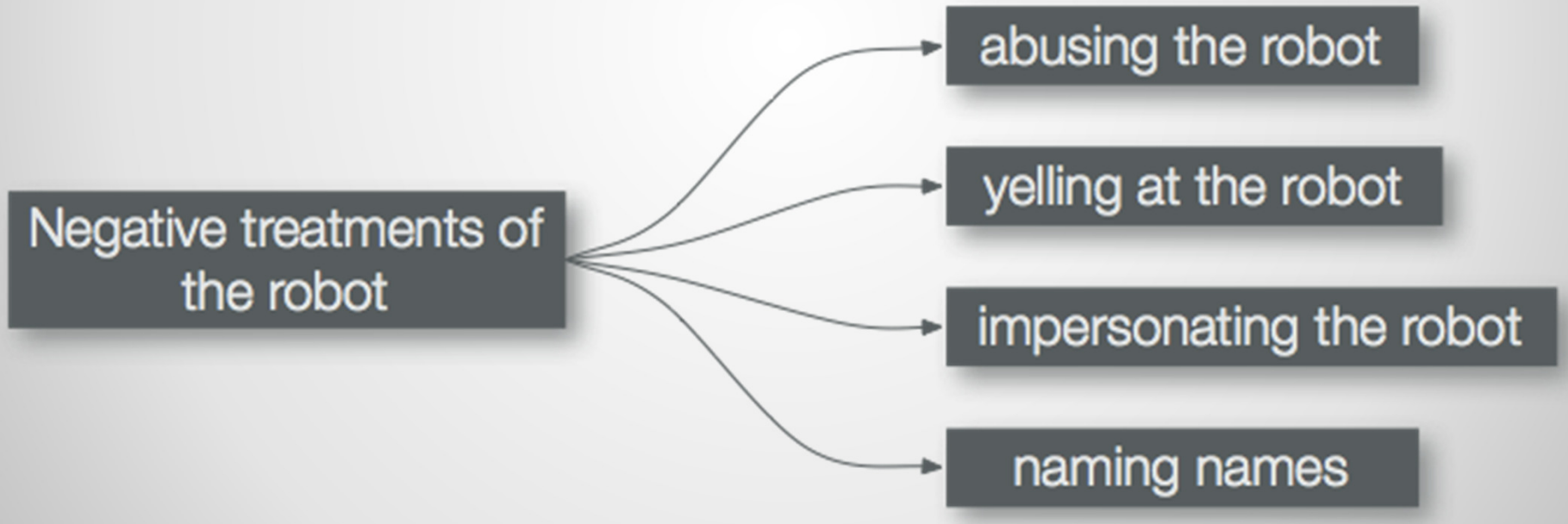
Cohen's Kappa > .70 acceptable

{abusing the robot}

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

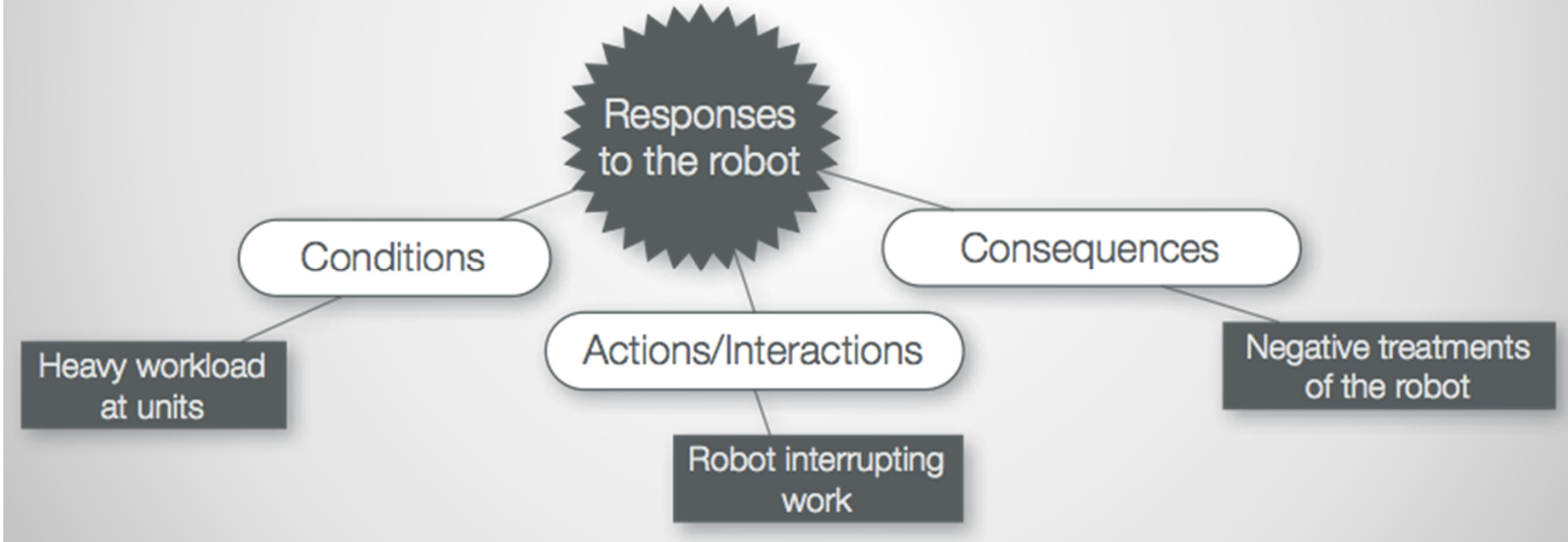
Axial Coding

Concepts are categorized into explanations of arising phenomena (repeated events, actions, etc.)



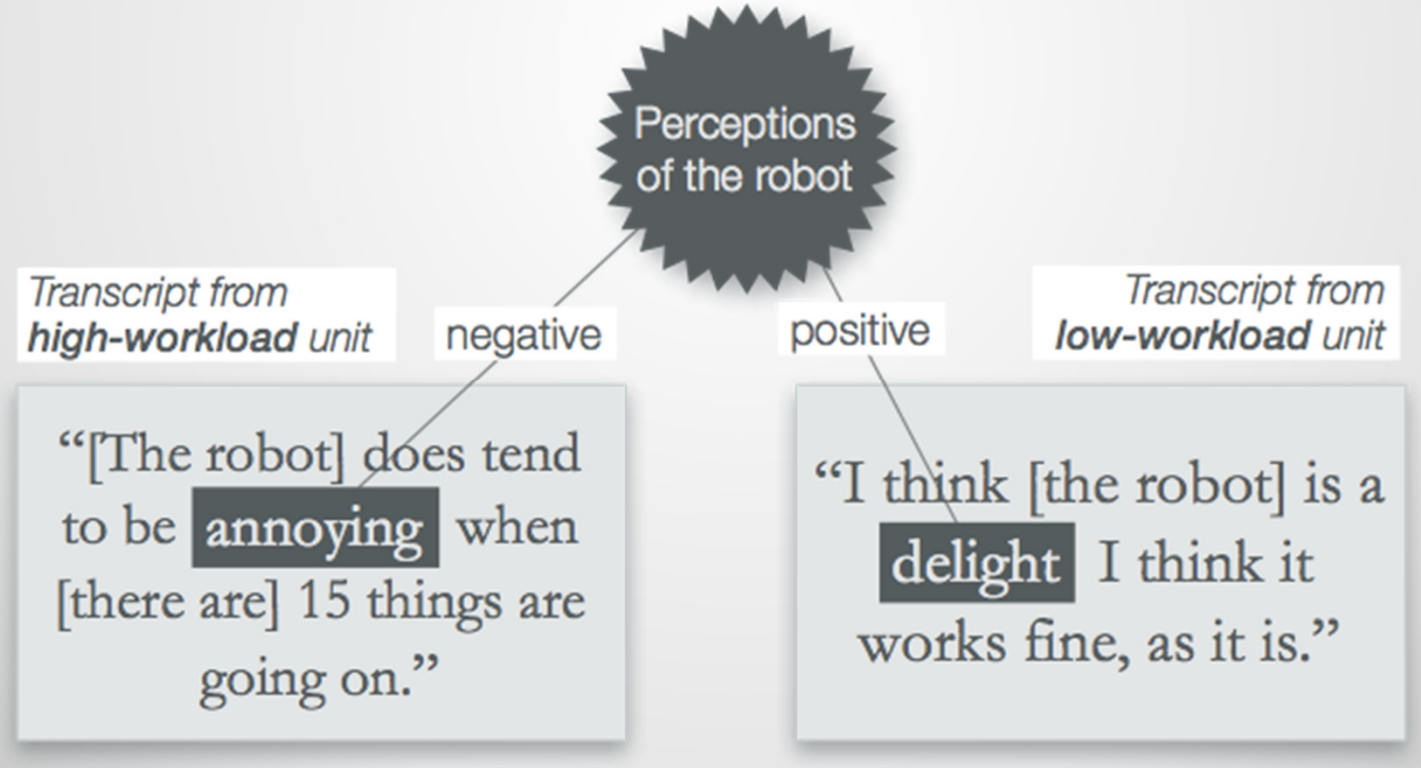
Selective Coding

Integrate categories into a central paradigm – big picture of findings by building relationships



Comparative Analysis

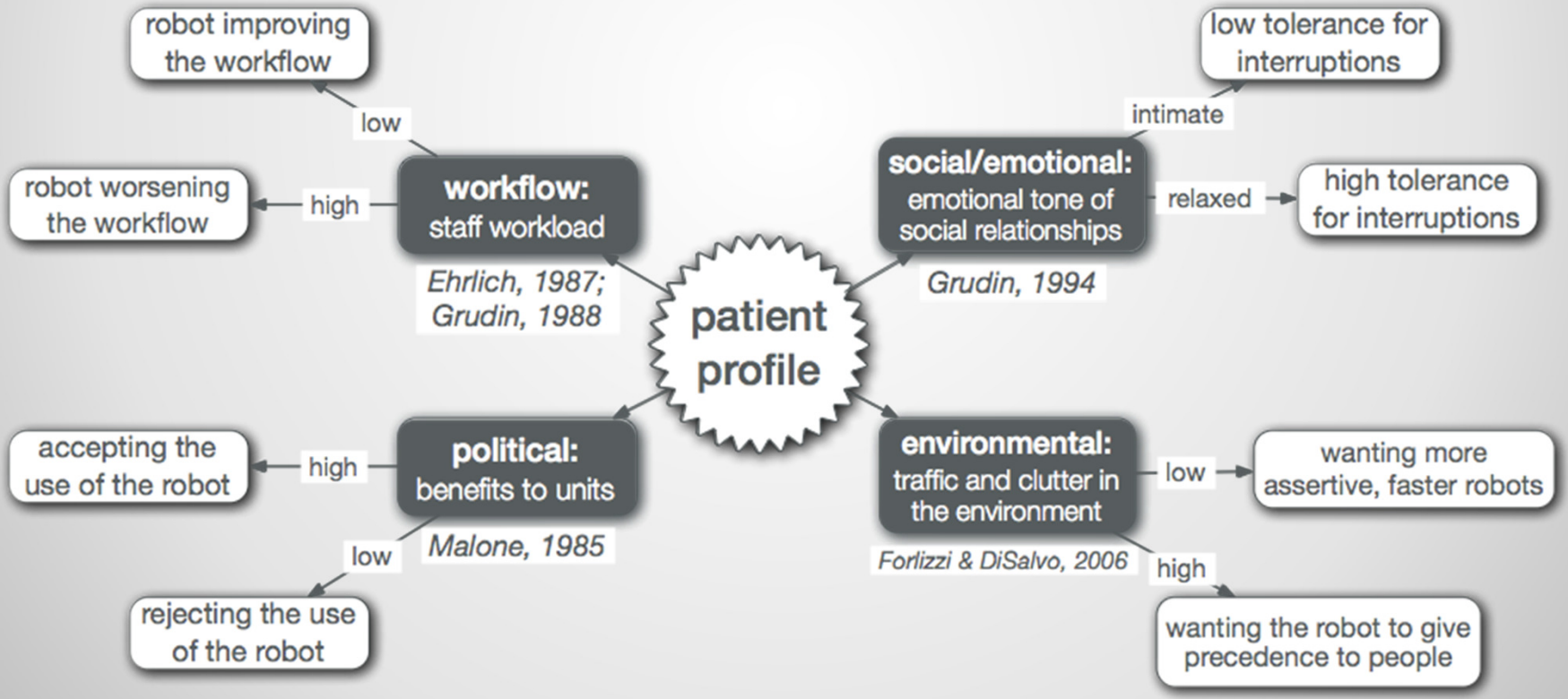
Compare the central phenomenon across dimensions to understand affects of social, physical, or organizational structures



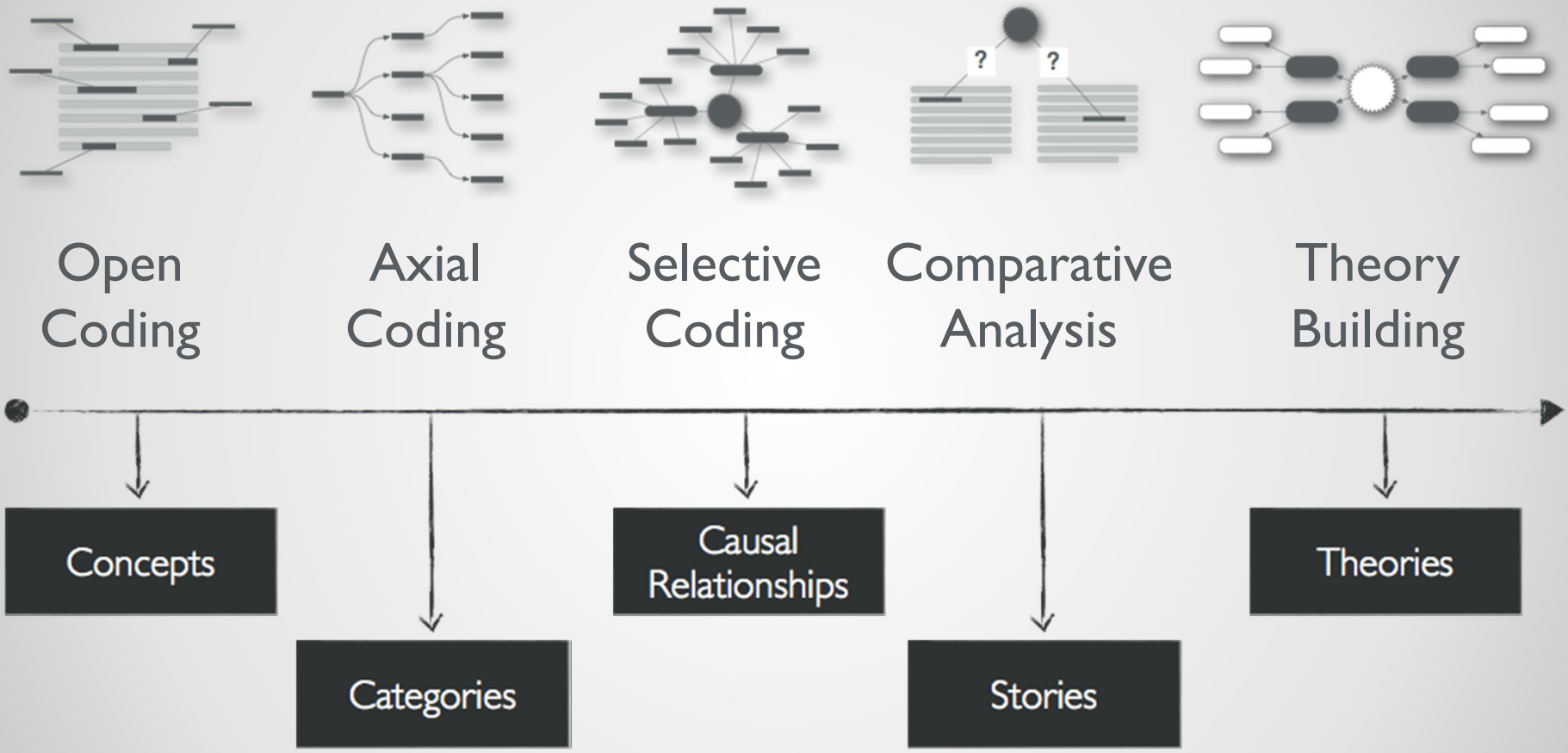
Theory/Model Building

Build a final theoretical model based on results

"Embed" existing theory in this model



The Process



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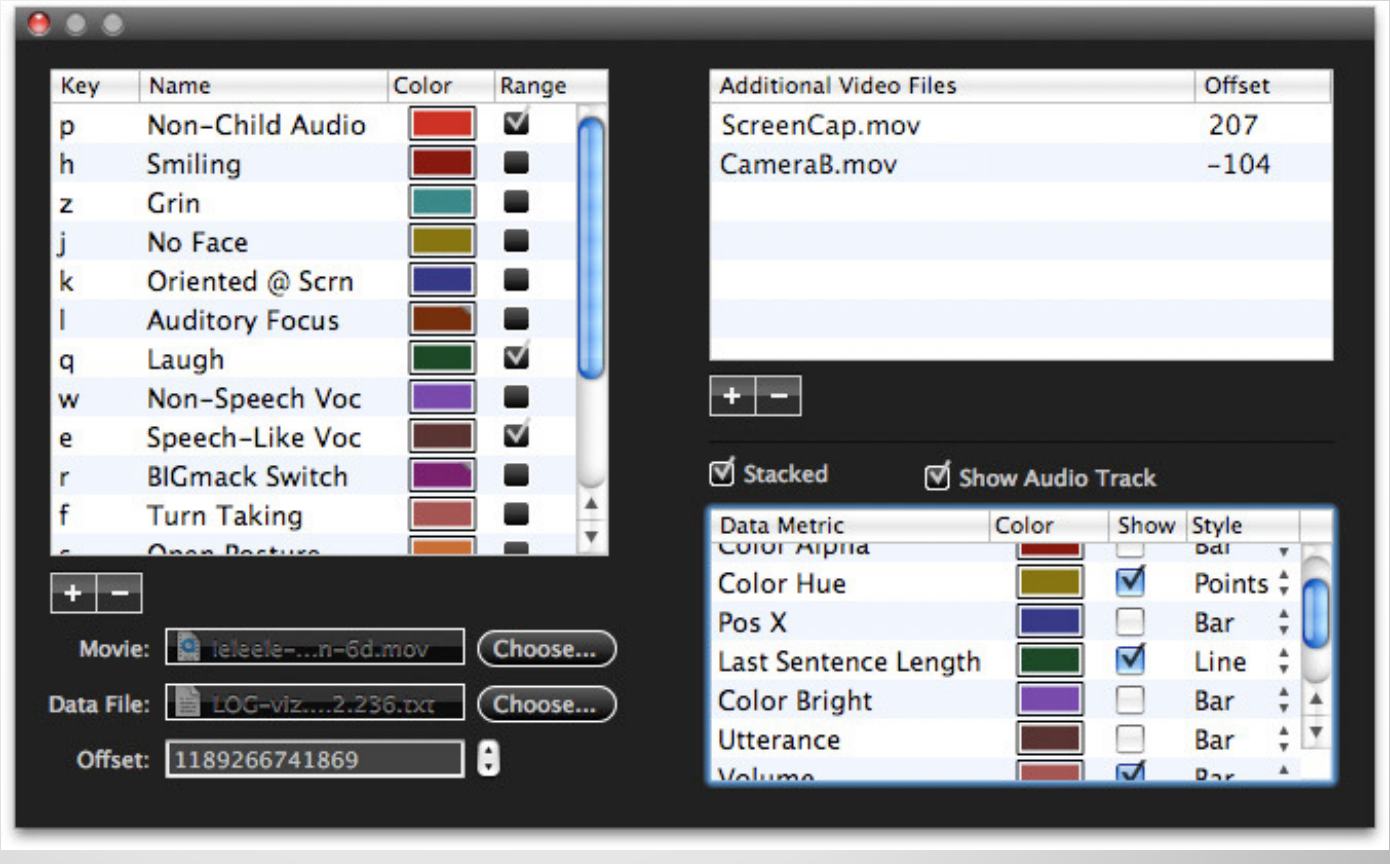
Coding

Text coding

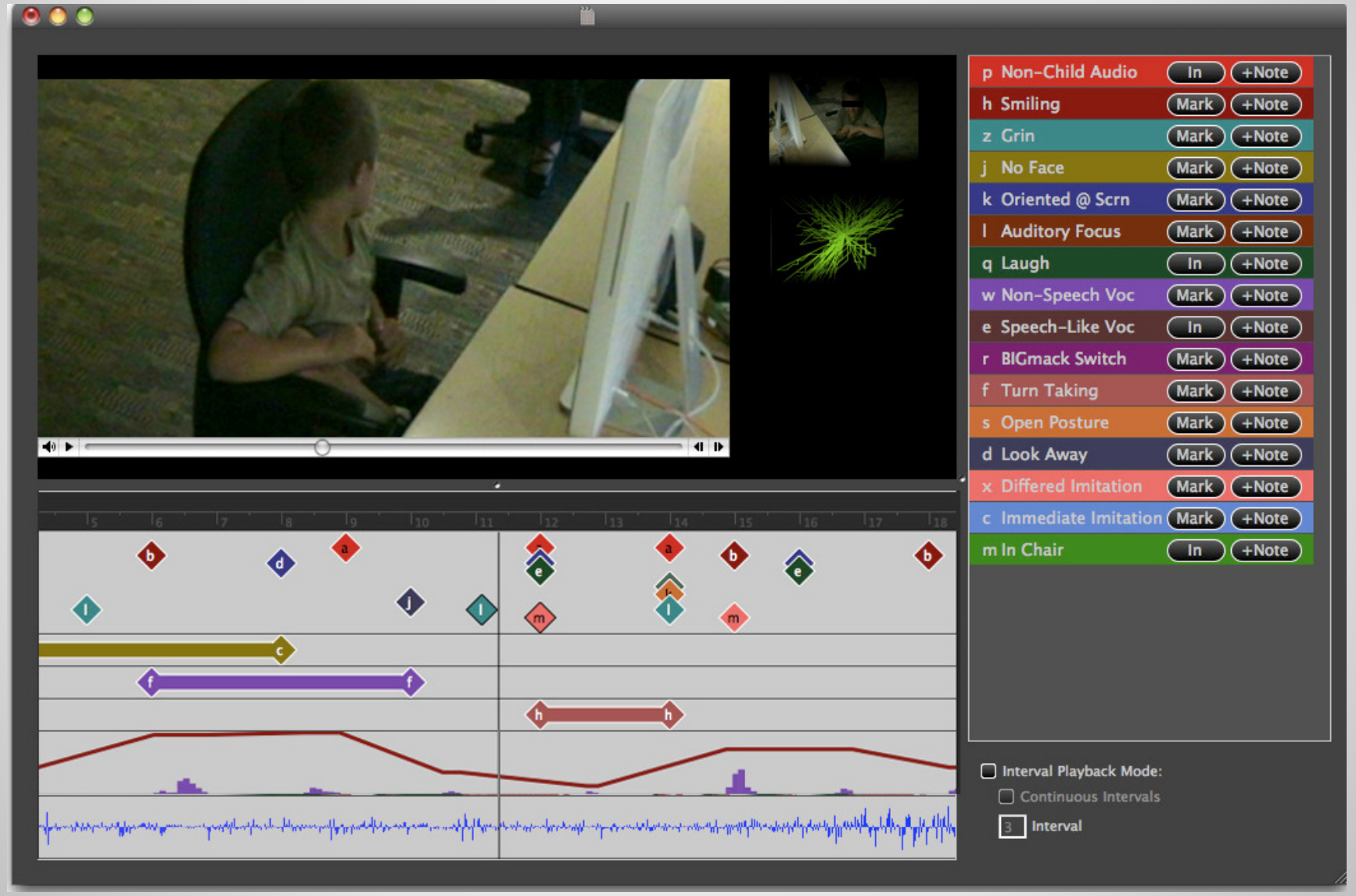
{abusing the robot}

kicked it before, and I was told not to…[laughs]…when it first came. *

Video coding



Video Coding



Going from codes to models

Abstraction can be tough

Representing complex interactions among people, people/artifacts, is not easy

There is an art to choosing the appropriate representation

Abstraction is the key in choosing the right representation

Levels of Abstraction

Low-level variables

Time, space, artifacts, information, etc.

Mid-level mechanisms

Behaviors, cognitive processes, etc.

High-level processes

Social outcomes, context, etc.

Examples of things to code

Space

How information relevant to the task/interaction is distributed in space

Areas of interest (left vs. right, etc.)

Key locations (someone's face, etc.)

Clusters of points of interest (bookshelf, etc.)

Speaker

Addressee 2

Addressee 1

Three-party Conversation

People in Space

Gaze Location

Time

The unfolding of events, actions, interactions, & changes in information over time

Intervals (heartbeat, knocking on door, etc.)

Co-occurrences (looking away while speaking, etc.)

Patterns of events (nodding after speech, etc.)

Cognitive Processes

People's representations of the world, task, other people

Task model (GOMS, etc.)

Mental model (how a mouse moves, etc.)

Behavioral Variables

Proactive and reactive human actions of significant importance to the interaction

Human behavior (nodding = agreement, etc.)

Speaker

Addressee 2

Addressee 1

Three-party Conversation

Three-party conversation

Speaker

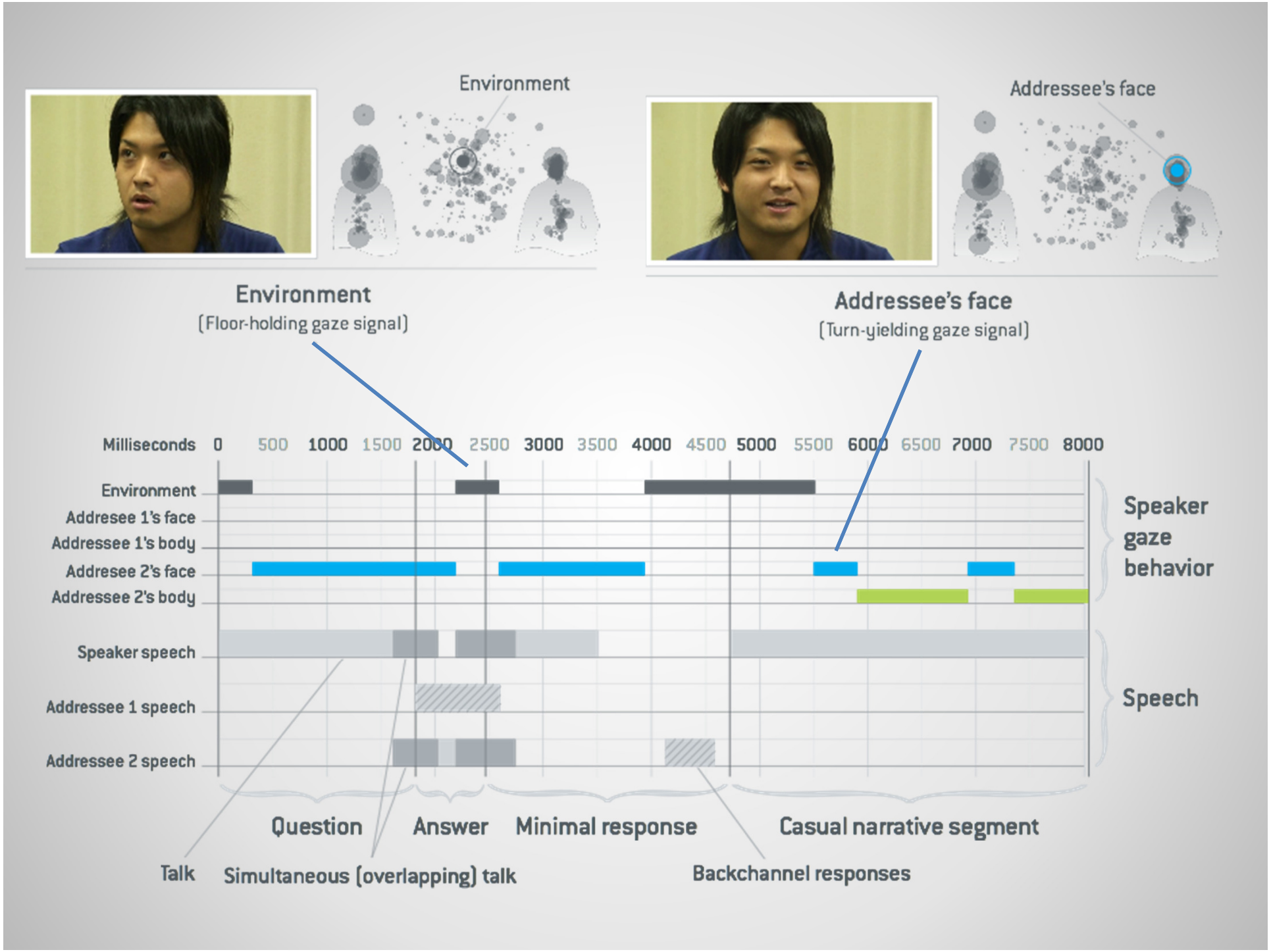
Speaker

Addressee 2

Addressee 1

Addressee 1

Addressee 2


Environment
Addressee's face
Environment
(Floor-holding gaze signal)
Addressee's face
(Turn-yielding gaze signal)
Milliseconds
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
6500
7000
7500
8000
Environment
Addresee 1's face
Addressee 1's body
Addresee 2's face
Addressee 2's body
Speaker speech
Addressee 1 speech
Addressee 2 speech
Speaker gaze behavior
Speech
Question
Answer
Minimal response
Casual narrative segment
Talk
Simultaneous (overlapping) talk
Backchannel responses

Interactional Processes

Processes and variables that unfold through interaction

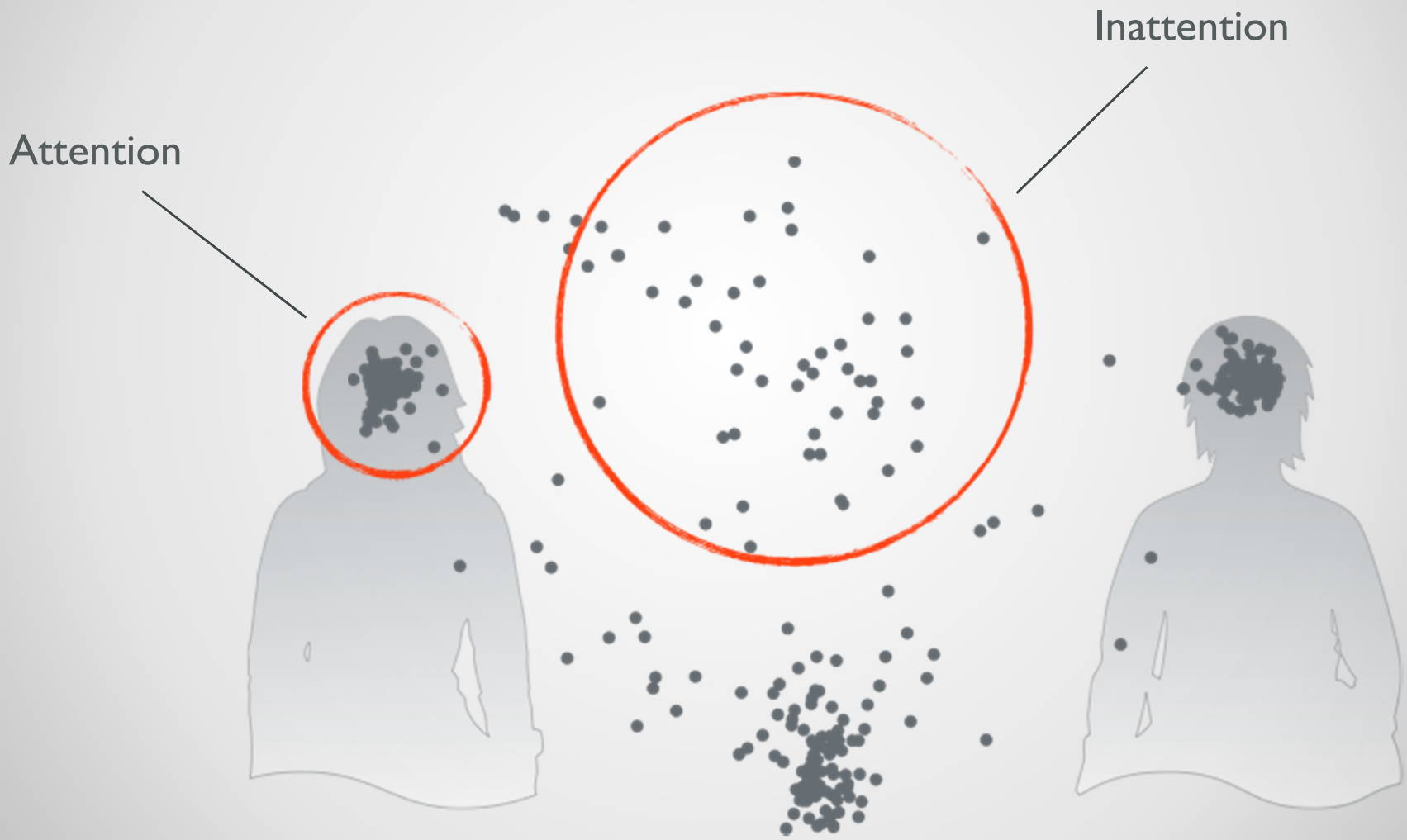
Inherent social info

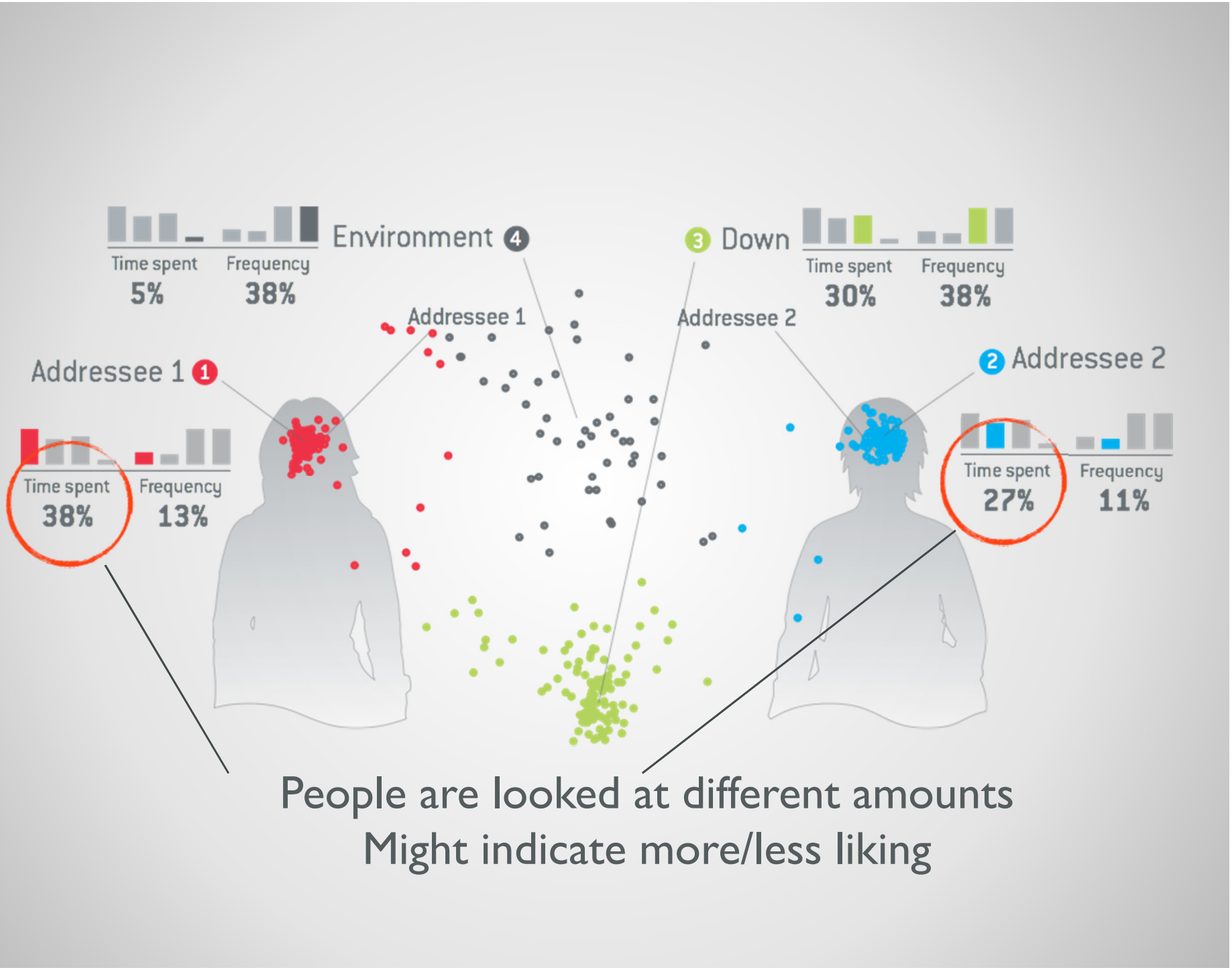
- e.g., looking at a face vs. looking in the environment has different meanings

Person perception

- e.g., we like some people more than others

Interactional Processes Example





People are looked at different amounts
Might indicate more/less liking

Context

Variables can have different values/meanings depending on context, task, goal, and inherent qualities of the interpreter

Goal/task relevant info

- e.g. pointing at something directs attention

Cultural interpretations

- e.g. low proximity can be closeness or a threat

Examples of gaze models

Questions?