

Ethnographic Data Analysis

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CS-570 Introduction to Human-computer Interaction



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The Problem

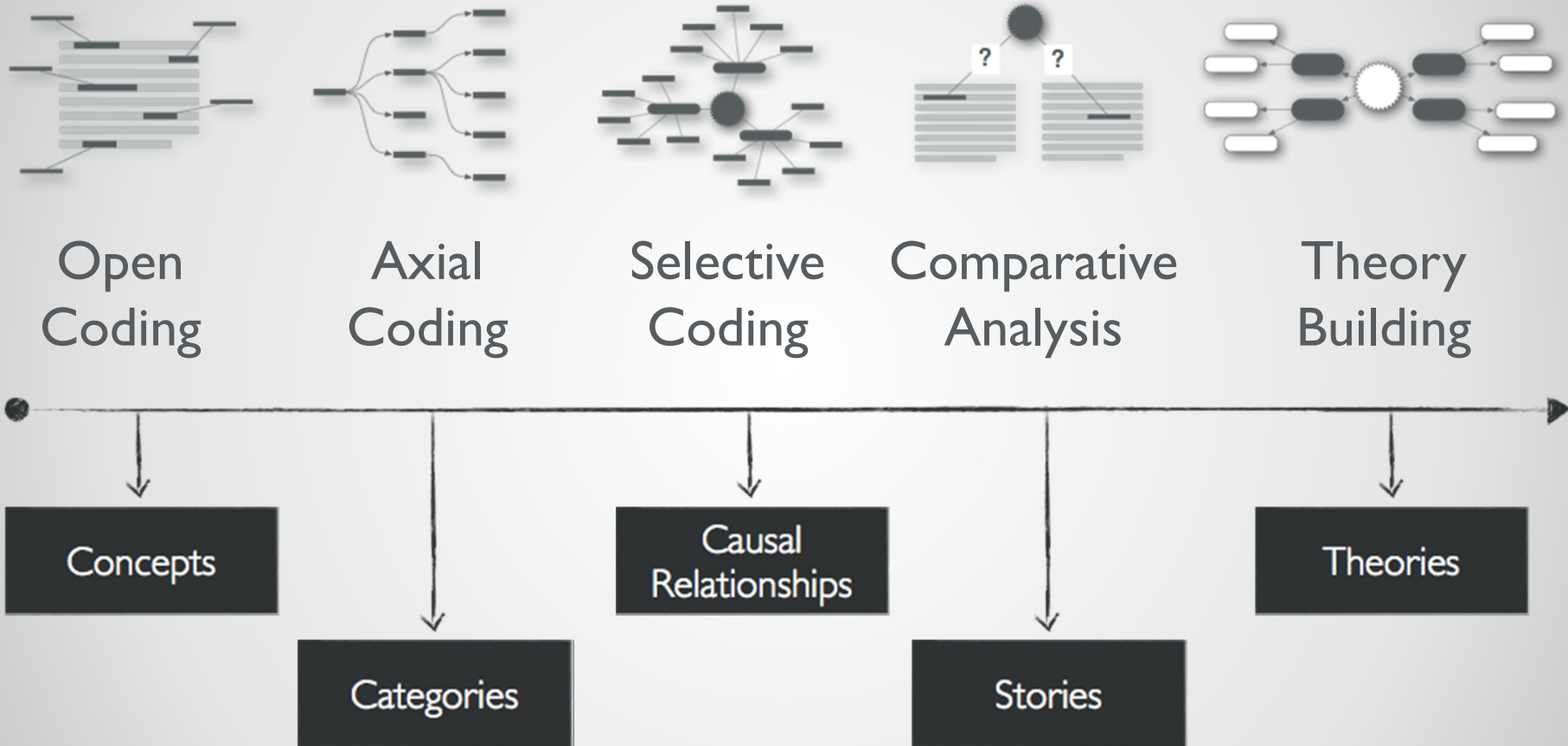
Ethnography can produce vast amounts of data

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

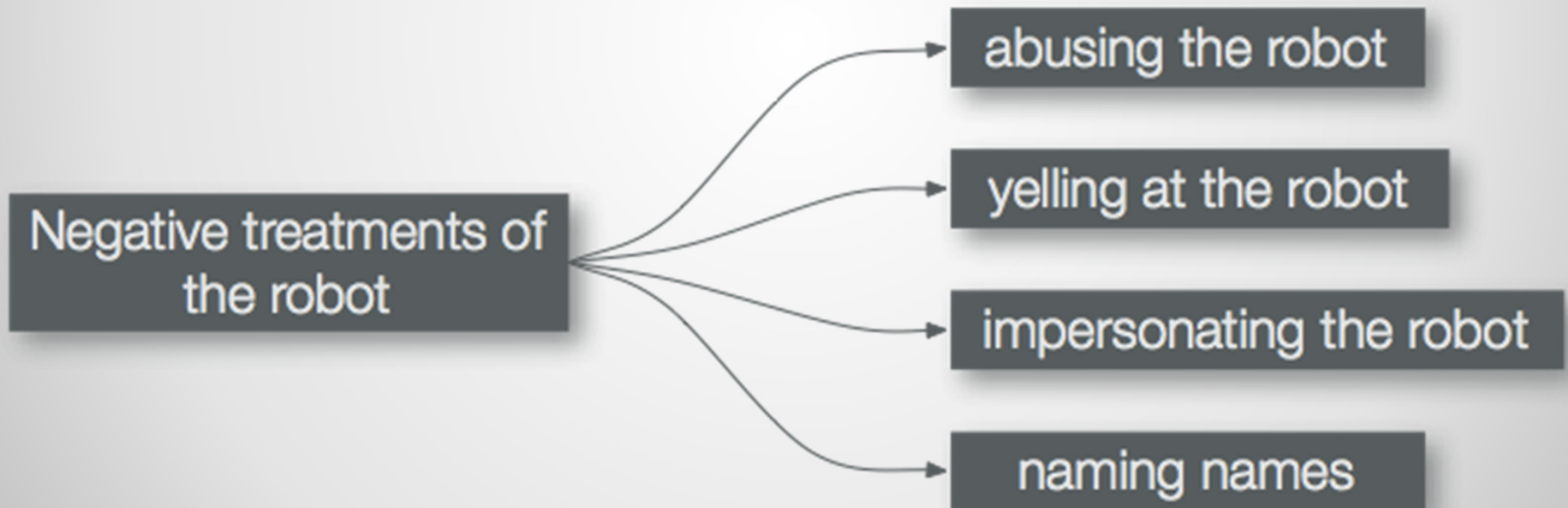
{abusing the robot}

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



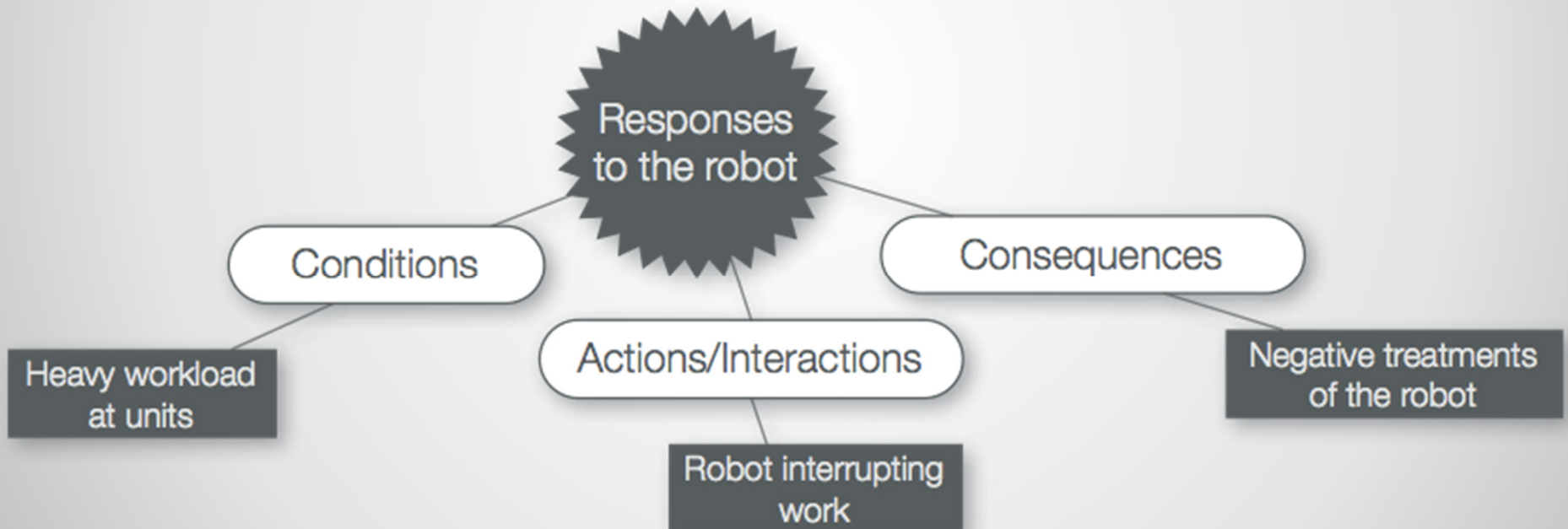
Axial Coding

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



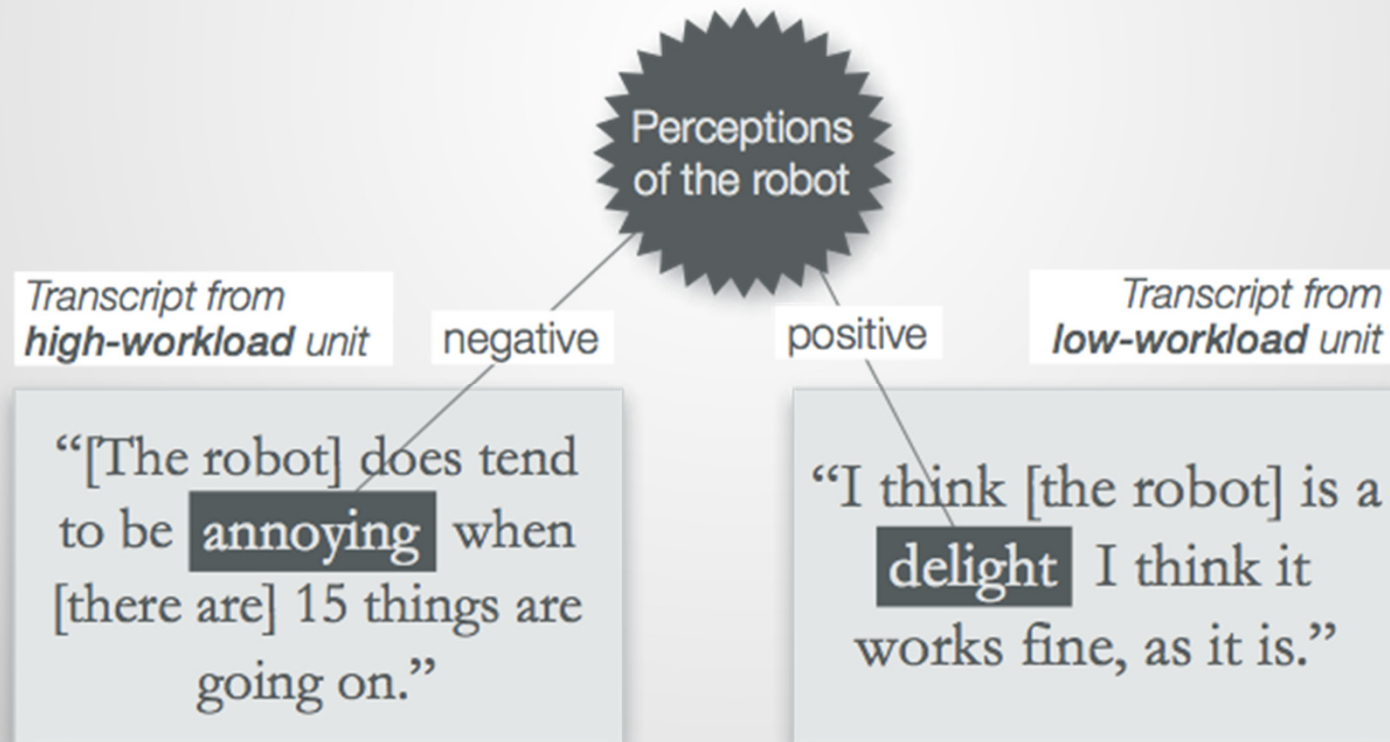
Selective Coding

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



Comparative Analysis

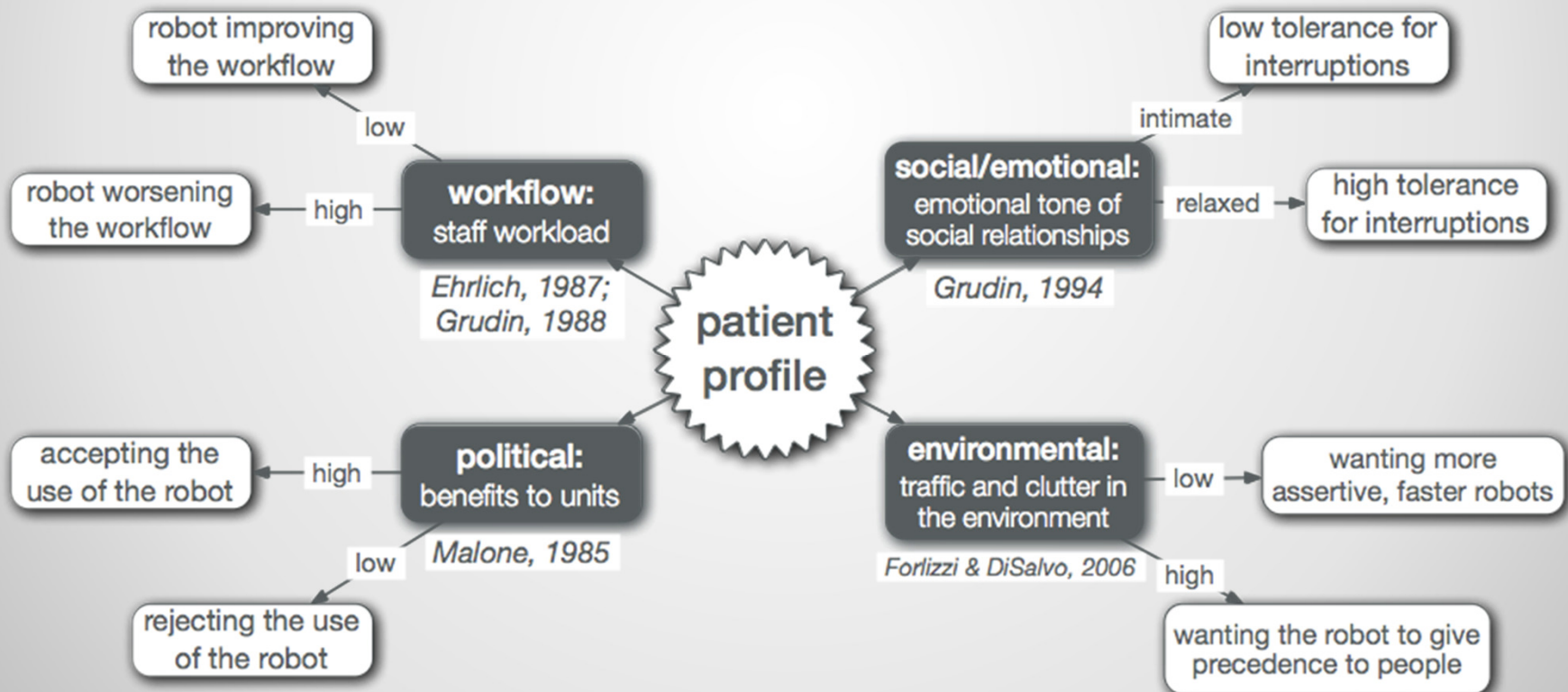
Compare the central phenomenon across dimensions to understand affects of social, physical, or organizational structures



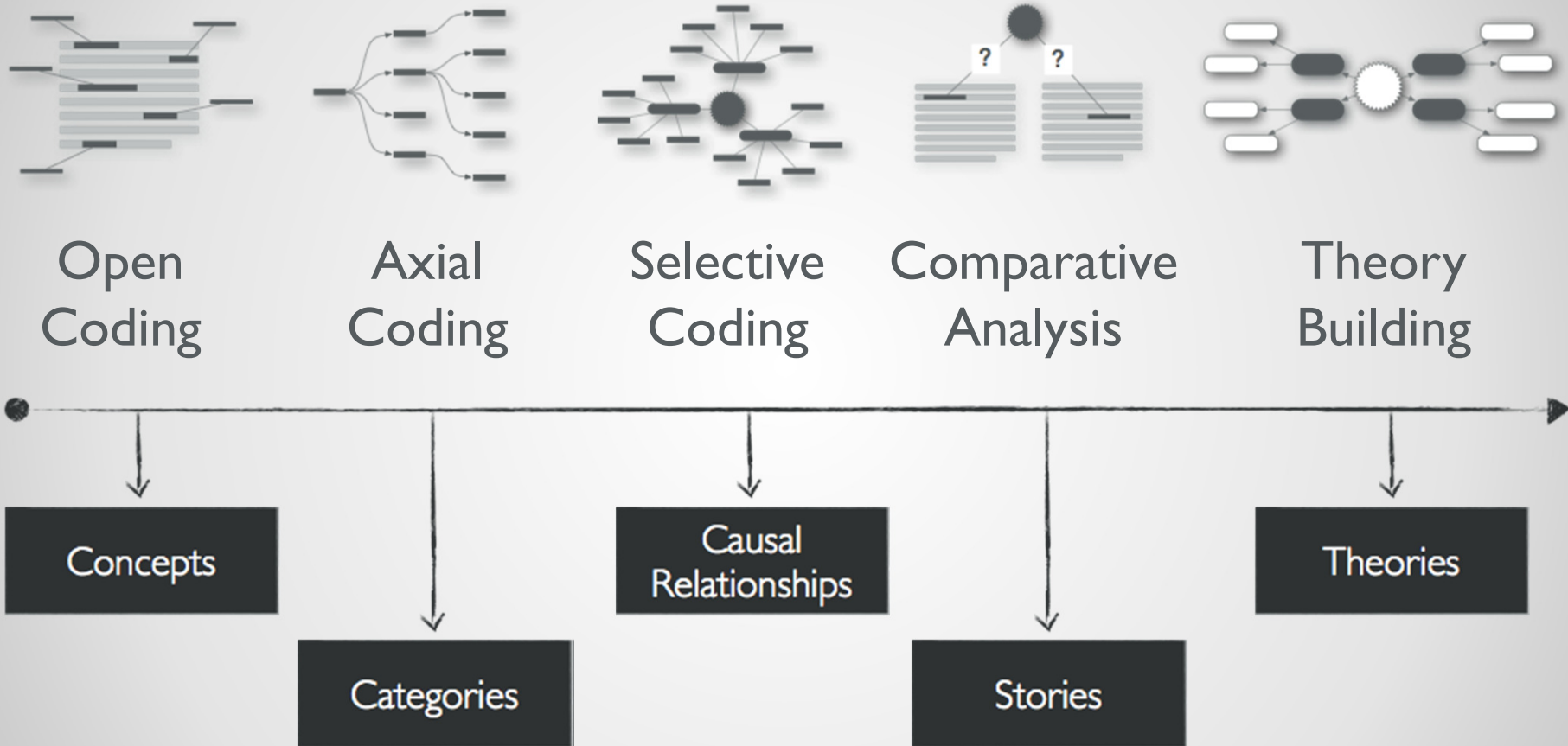
Theory/Model Building

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

The screenshot shows a software interface for video analysis. It features a table for key coding, a list of additional video files, and a table for data metrics.

Key	Name	Color	Range
p	Non-Child Audio	Red	<input checked="" type="checkbox"/>
h	Smiling	Red	<input type="checkbox"/>
z	Grin	Teal	<input type="checkbox"/>
j	No Face	Olive	<input type="checkbox"/>
k	Oriented @ Scrn	Blue	<input type="checkbox"/>
l	Auditory Focus	Brown	<input type="checkbox"/>
q	Laugh	Green	<input checked="" type="checkbox"/>
w	Non-Speech Voc	Purple	<input type="checkbox"/>
e	Speech-Like Voc	Brown	<input checked="" type="checkbox"/>
r	BIGmack Switch	Purple	<input type="checkbox"/>
f	Turn Taking	Red	<input type="checkbox"/>
s	Open Posture	Orange	<input type="checkbox"/>

Additional Video Files	Offset
ScreenCap.mov	207
CameraB.mov	-104

Data Metric	Color	Show	Style
Color Alpha	Red	<input type="checkbox"/>	Bar
Color Hue	Olive	<input checked="" type="checkbox"/>	Points
Pos X	Blue	<input type="checkbox"/>	Bar
Last Sentence Length	Green	<input checked="" type="checkbox"/>	Line
Color Bright	Purple	<input type="checkbox"/>	Bar
Utterance	Brown	<input type="checkbox"/>	Bar
Volume	Red	<input checked="" type="checkbox"/>	Bar

Movie: telele-...n-6d.mov Choose...
Data File: LOG-viz...2.236.txt Choose...
Offset: 1189266741869

Video Coding

The screenshot displays a video coding software interface. At the top, a video player shows a child sitting at a desk with a computer. To the right of the video is a small inset showing a green neural network visualization. Below the video is a timeline from 15 to 18 seconds, overlaid with various behavioral codes represented by colored diamonds and horizontal bars. The codes include 'l', 'b', 'd', 'a', 'j', 'c', 'f', 'h', 'e', 'm', and 'i'. Below the timeline are several tracks: a red line graph, a purple histogram, and a blue waveform. On the right side, there is a list of coding categories, each with a color-coded header and buttons for 'In', 'Mark', '+Note', and 'In Chair'. The categories are: p Non-Child Audio, h Smiling, z Grin, j No Face, k Oriented @ Scrn, l Auditory Focus, q Laugh, w Non-Speech Voc, e Speech-Like Voc, r BIGmack Switch, f Turn Taking, s Open Posture, d Look Away, x Differed Imitation, c Immediate Imitation, and m In Chair. At the bottom right, there is a section for 'Interval Playback Mode' with options for 'Continuous Intervals' and 'Interval' (set to 3).

Category	Action	Note
p Non-Child Audio	In	+Note
h Smiling	Mark	+Note
z Grin	Mark	+Note
j No Face	Mark	+Note
k Oriented @ Scrn	Mark	+Note
l Auditory Focus	Mark	+Note
q Laugh	In	+Note
w Non-Speech Voc	Mark	+Note
e Speech-Like Voc	In	+Note
r BIGmack Switch	Mark	+Note
f Turn Taking	Mark	+Note
s Open Posture	Mark	+Note
d Look Away	Mark	+Note
x Differed Imitation	Mark	+Note
c Immediate Imitation	Mark	+Note
m In Chair	In	+Note

Interval Playback Mode:
 Continuous Intervals
 Interval: 3

**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

Storyteller



Addressee 1



Camera



Addressee 2

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

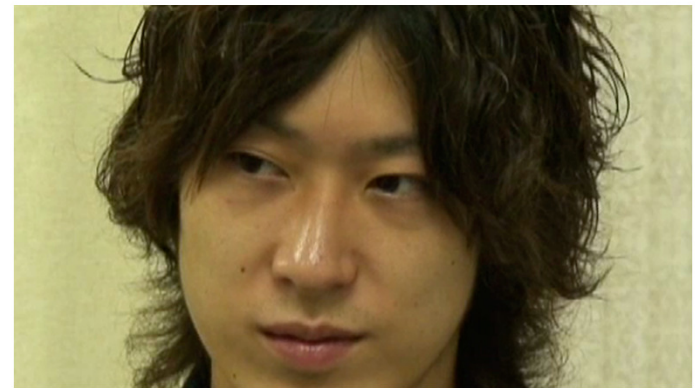
Three-party conversation

Speaker

Speaker

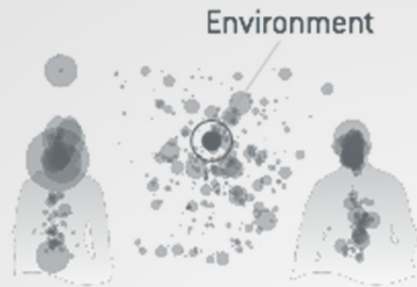
Addressee 2

Addressee 1



Addressee 1

Addressee 2

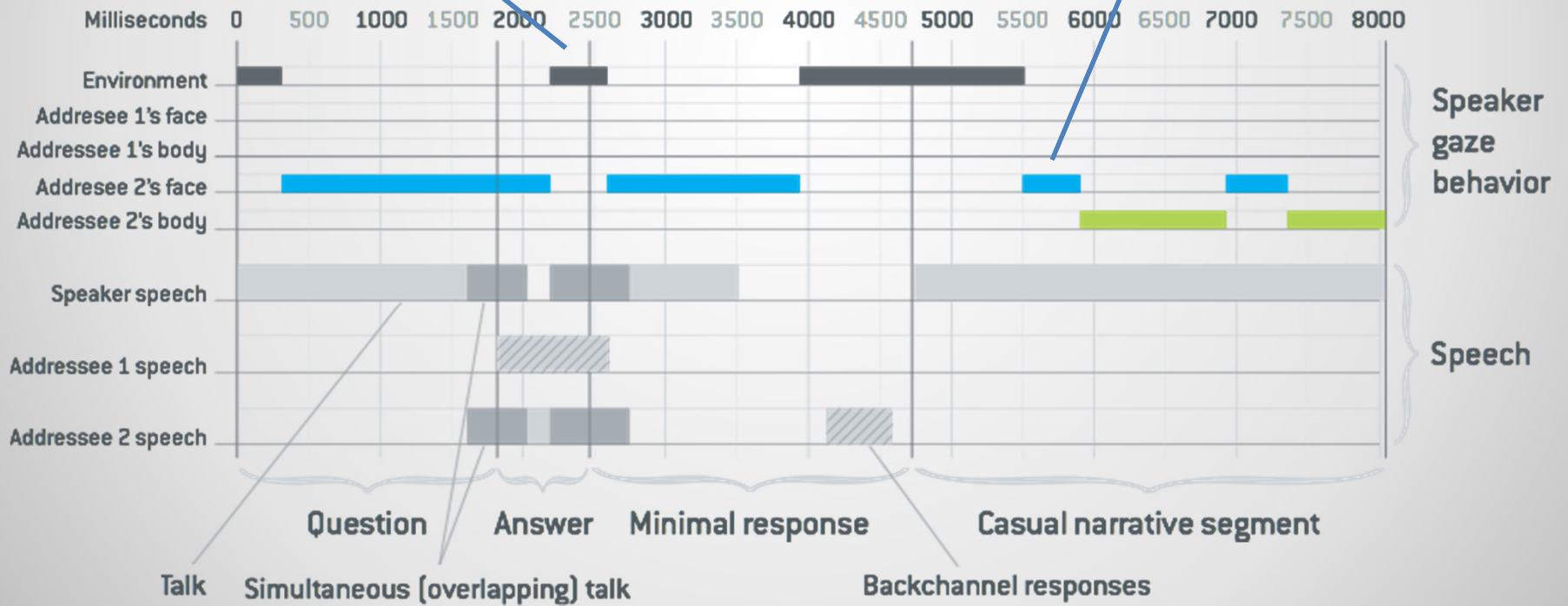


Environment

[Floor-holding gaze signal]

Addressee's face

[Turn-yielding gaze signal]



Interactional Processes

Processes and variables that unfold through interaction

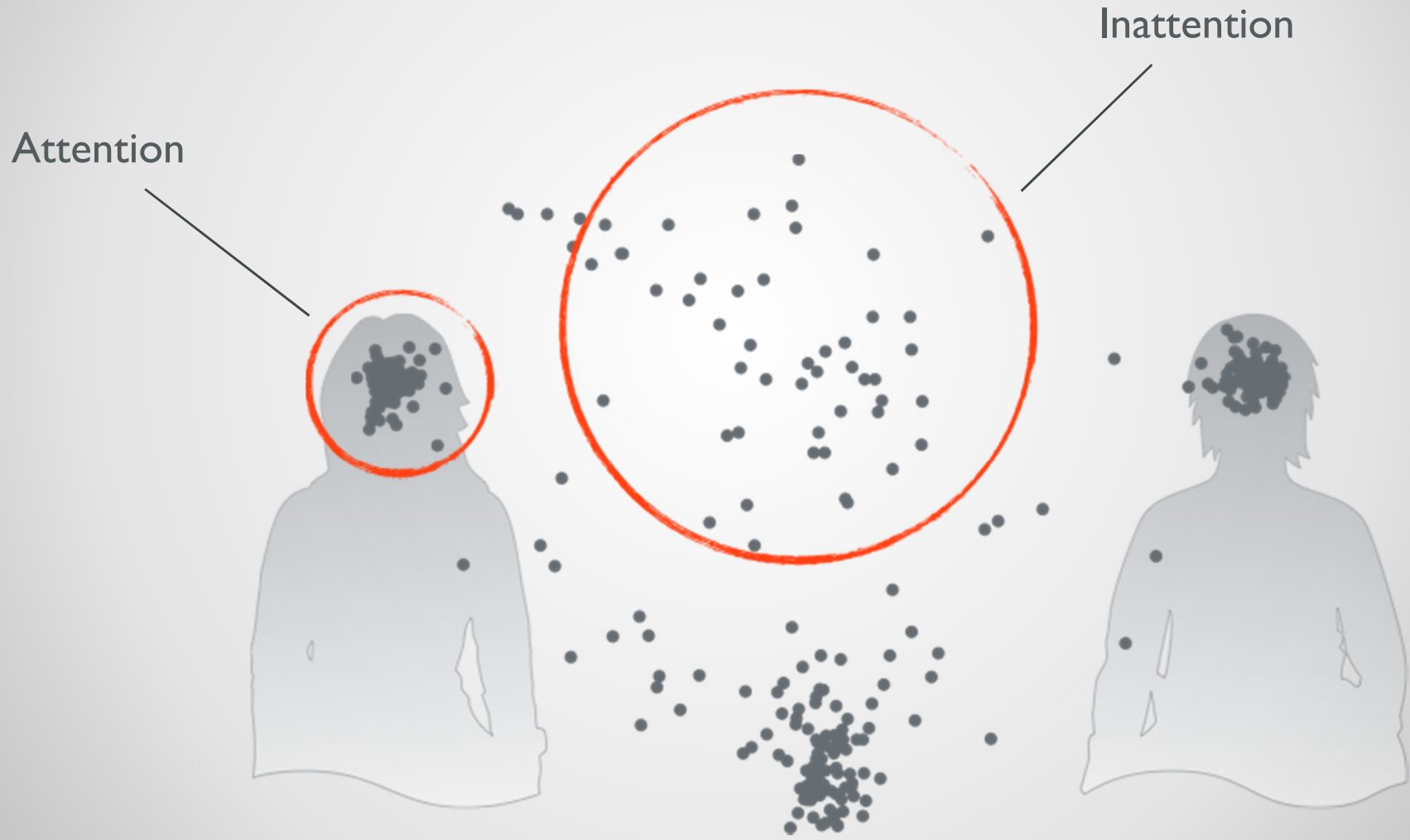
Inherent social info

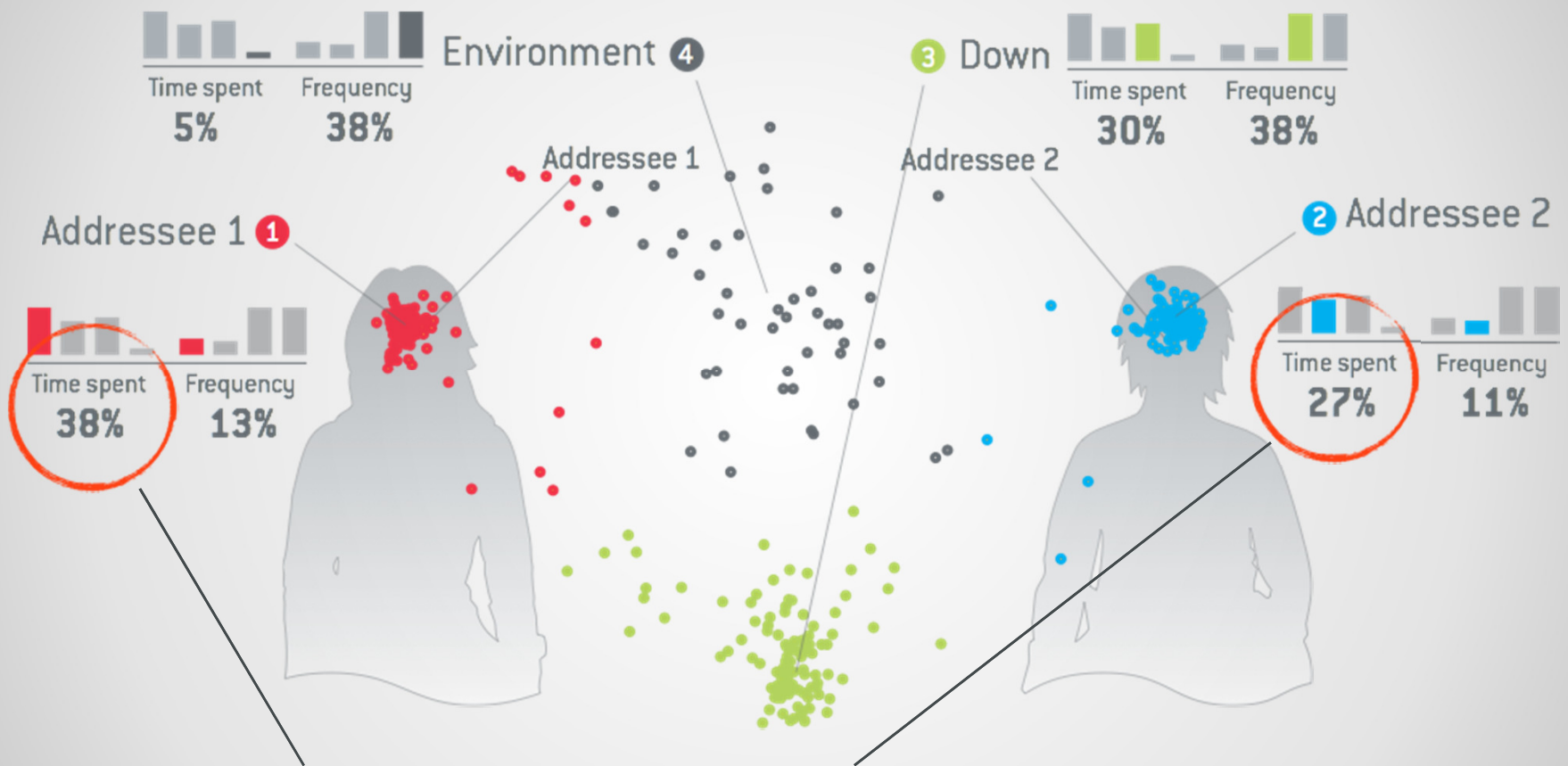
e.g., looking at a face vs. looking in the environment has different meanings

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?