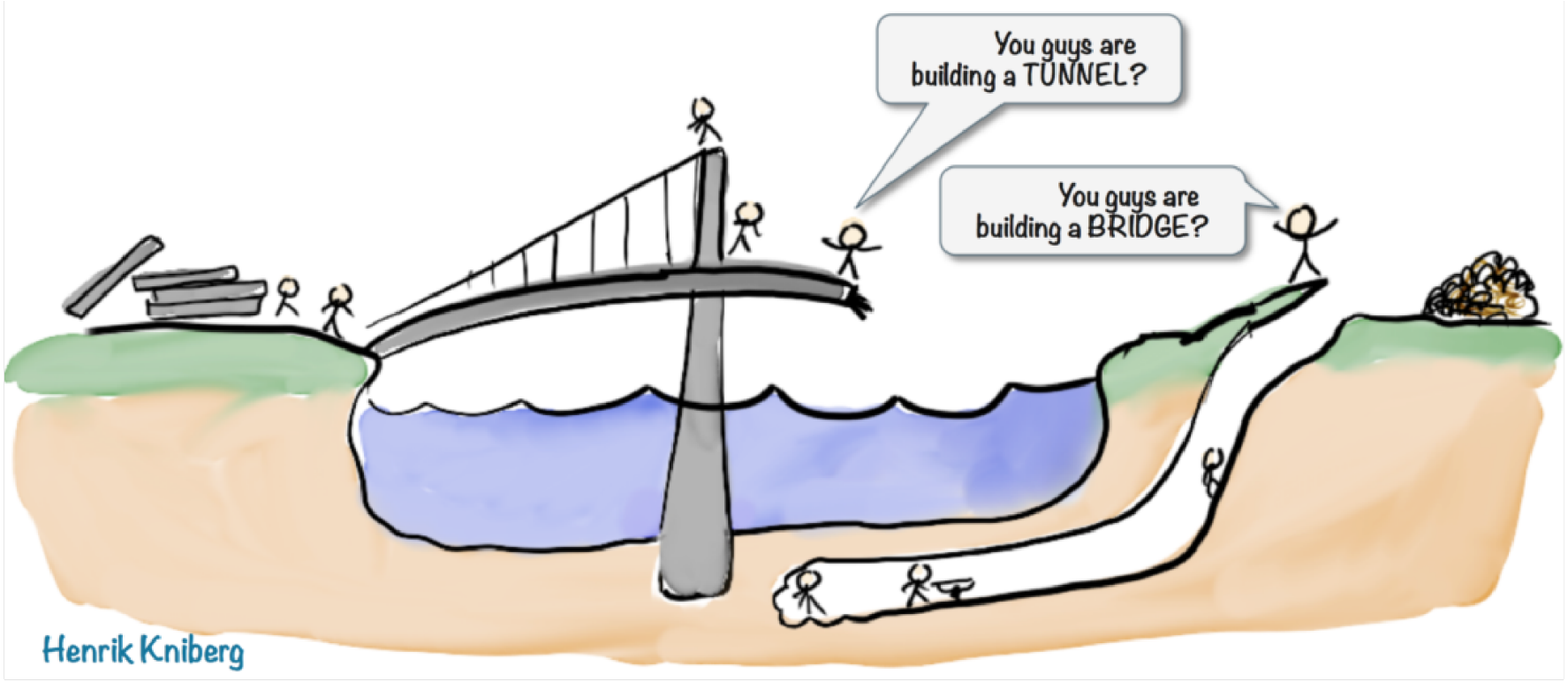
Today's question



How do we know we both know?

Measuring Mutual Understanding

Today's docket

1. Early work

   Interaction chronograph, metacommunication

2. Experimental semiotics

   Sign language, talking heads, Pictionary

3. Mutual understanding

   Tacit communication game

Interaction chronograph

QUANTITATIVE ANALYSIS OF THE INTERACTION OF INDIVIDUALS

By Eliot D. Chapple

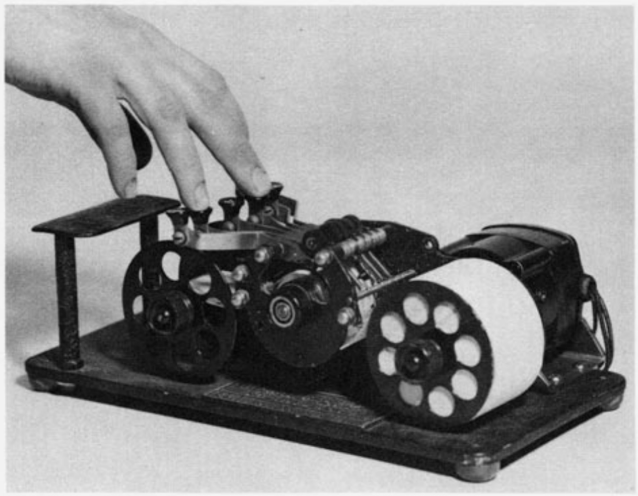


FIGURE 1a

INTERACTION CHRONOGRAPH USED IN THE SQUANTUM INVESTIGATION

(An improved model which greatly reduces the task of scoring was used in the Williams College study, reported in Part II of this report.)

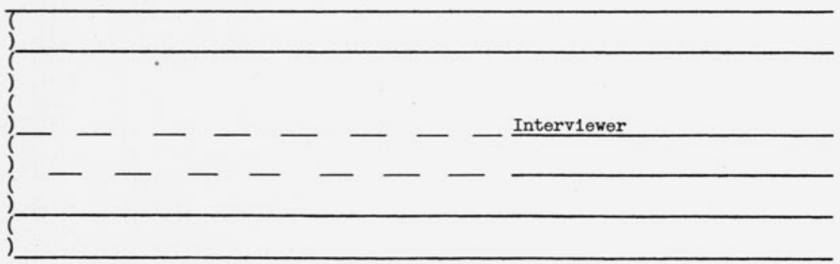


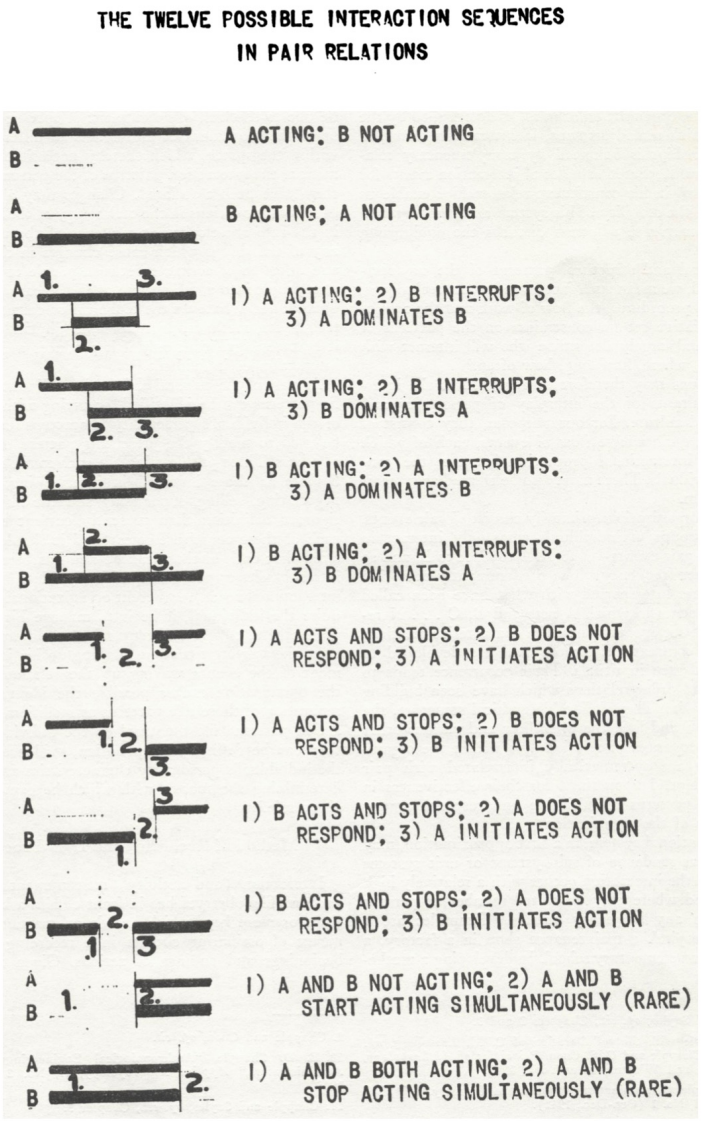
FIGURE 1b

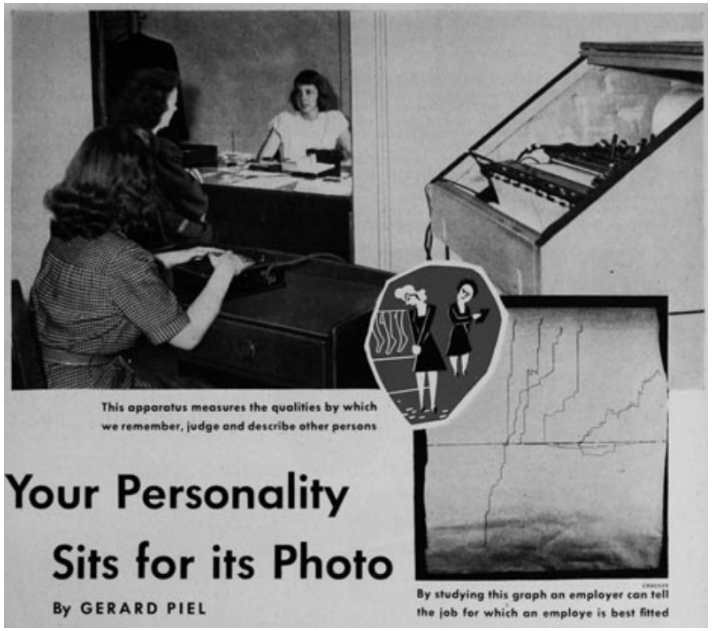
SAMPLE RECORD FROM INTERACTION CHRONOGRAPH

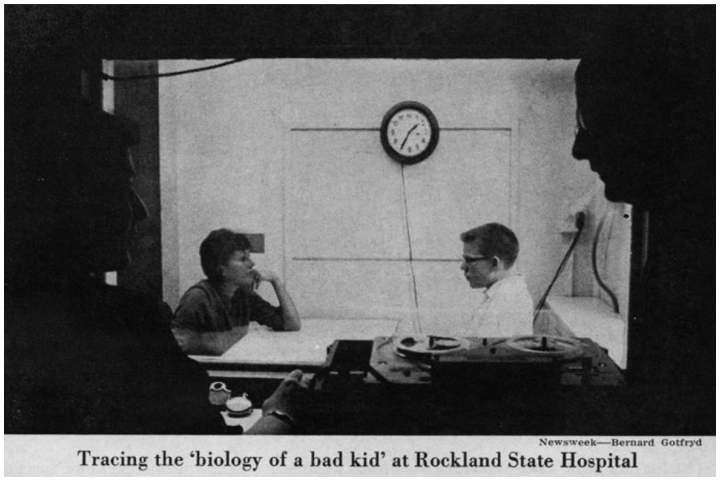
(The record is read from right to left. Breaks in a line represent periods of action.)

Measuring human interaction (Chapple, 1939)

Interaction chronograph







Quantifying personality and temperament characteristics

Interaction chronograph

It is the aim of the authors to contribute to a science of human interaction which is "precise, abstract, and quantitative," and indeed they have succeeded, although the reader is sometimes left with the feeling that they have been too abstract and too quantitative. They seem to present only the barest bones of interaction, by mathematical operations which are at times so far removed from a concrete referent (even to the referent of their own measurements) that the reader is forced to build many of his interpretations out of his own operationally unanalyzed experience. This may be simply a matter of incomplete presentation--the subject could be expanded much beyond the limits of a 147 page monograph. Or it may be due to the difficulty one has in divorcing his diffuse experiential knowledge of human interaction from his approach to a new and highly abstract treatment of interaction. At any rate, wherever responsibility lies, one is left with the impression that precise communication is still an unsolved problem for the social scientist who would be operationally exact.

Ruth Gallagher Goodenough
Cornell University

Metacommunication

- Messages have meanings at multiple contrasting levels of abstraction (e.g., monkey play)
- When someone sends a message, they must also send information about what constitutes the boundaries of the message's interpretation
- However, what is a "message" and "metamessage" cannot be identified in absolute sense
- There was no message, but only metamessages qualifying one another (Haley, 1976)

Communicating about what is being communicated (Bateson, 1951)

Today's docket

1. Early work

   Interaction chronograph, metacommunication

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Research criteria

- Respect collaborative and open-ended nature of human interaction (cf. a conversation)
- Experimental control over communicative environment (log interactive behaviors)
- Experimental control over communicative history (capture emergence of shared representations)

Communication in context

- Psycholinguists: Encoding and decoding of linguistic material by individual agents
  (isolated from the context of interaction)
- Generative linguists: Internal structural dependencies of language
  (focus on pre-defined rules instead of human agents)
- Neuroscientists: Passive observation or production of scripted behaviors
  (knowledge retrieval rather than creation of mutual understanding)
- Exp. semioticians: Language use as joint action
  (taking interactive contexts and generative elements seriously, interested in communication beyond purely linguistic means)

Conceptual Alignment
as a Neurocognitive Mechanism
for Human Communicative
Interactions

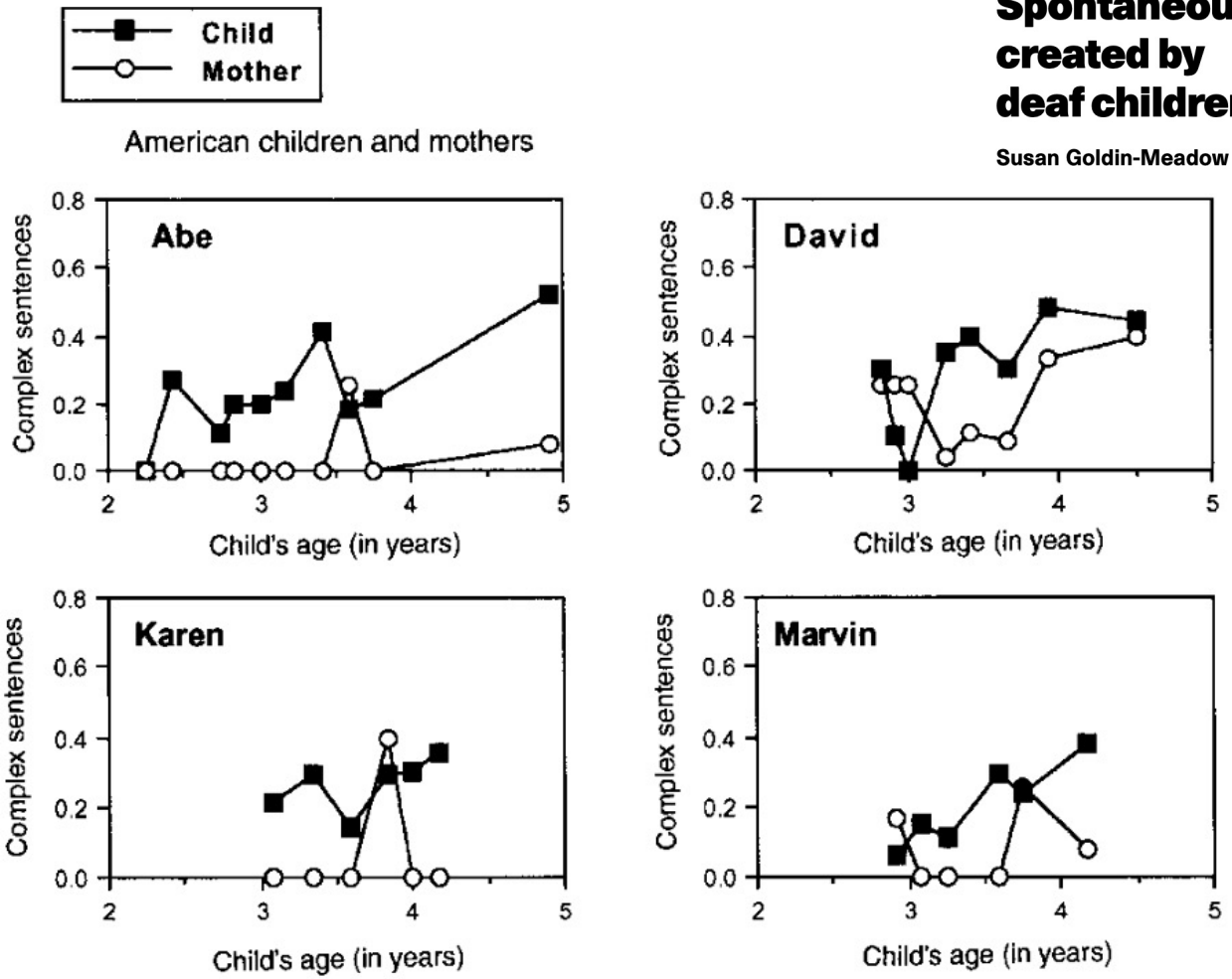
IVAN TONI AND ARJEN STOLK

Nicaraguan sign language

Home sign language

Spontaneous sign systems created by deaf children in two cultures

Susan Goldin-Meadow & Carolyn Mylander



Deaf children spontaneously introduce language-like structure into gestures

Research criteria

✓ Respect collaborative and open-ended nature of human interaction (cf. a conversation)

✗ Experimental control over communicative environment (log interactive behaviors)

✗ Experimental control over communicative history (capture emergence of shared representations)

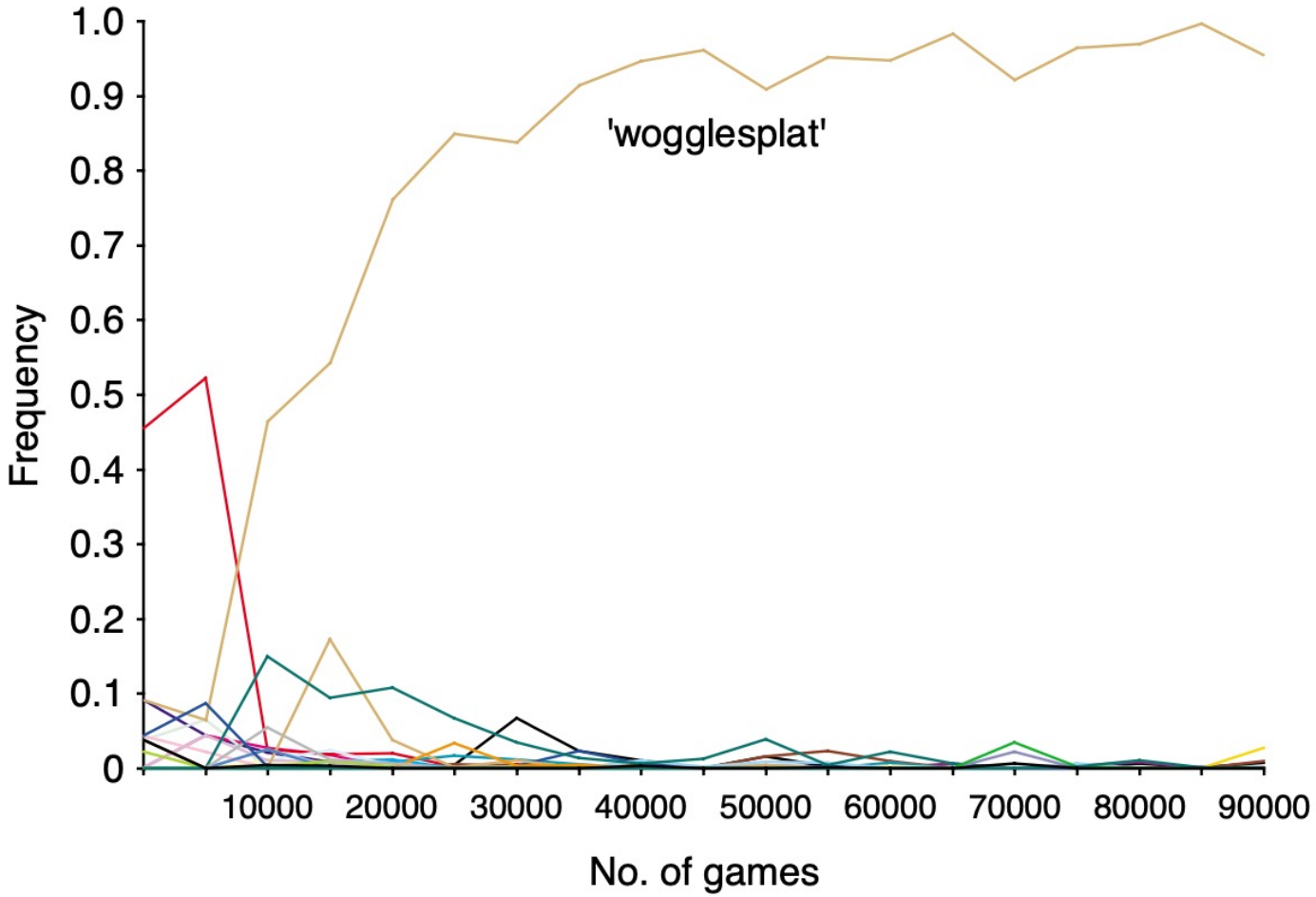
Talking heads

Evolving grounded communication for robots

Luc Steels

Computer simulations

Talking heads



Establishing arbitrary mappings requires many thousands of interactions

Research criteria

✖ Respect collaborative and open-ended nature of human interaction (cf. a conversation)

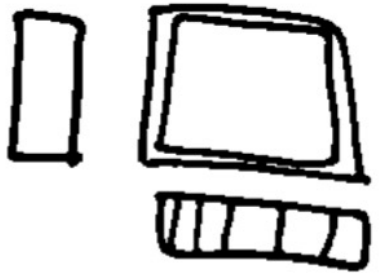
Prespecified word and figure options

✓ Experimental control over communicative environment (log interactive behaviors)

✓ Experimental control over communicative history (capture emergence of shared representations)

But not quite like how humans converge on a meaning

Pictionary task

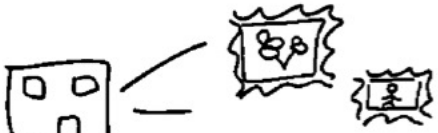
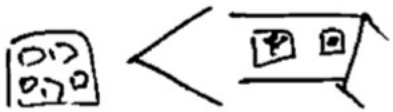
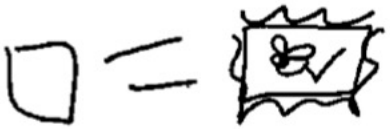
		
Block 1 (CF)	**Block 2 (CF)**	**Block 3 (CF)**
		
Block 4 (CF)	**Block 5 (CF)**	**Block 6 (CF)**

Foundations of Representation: Where Might Graphical Symbol Systems Come From?

Simon Garrod[a], Nicolas Fay[b,c], John Lee[d], Jon Oberlander[d], Tracy MacLeod[a]

Capturing the creation of conceptual pacts

Pictionary task

		
Block 1	**Block 2**	**Block 3**
		
Block 4	**Block 5**	**Block 6**

Increasing simplicity without reduction in semantic complexity

Research criteria

✗ Respect collaborative and open-ended nature of human interaction (cf. a conversation)

Prespecified and limited set of referents

✓ Experimental control over communicative environment (log interactive behaviors)

✓ Experimental control over communicative history (capture emergence of shared representations)

Depictions rely on conventions and iconicity at first

Today's docket

1. Early work

   Interaction chronograph, metacommunication

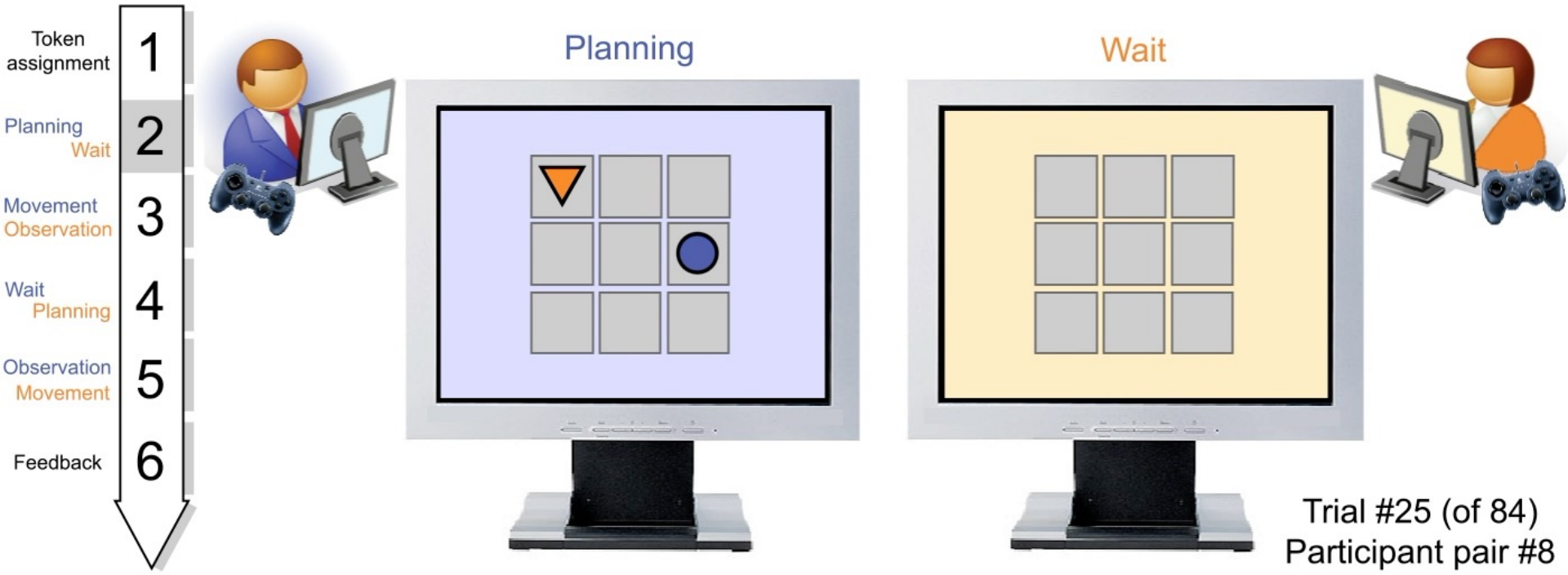
2. Experimental semiotics

   Sign language, talking heads, Pictionary

3. Mutual understanding

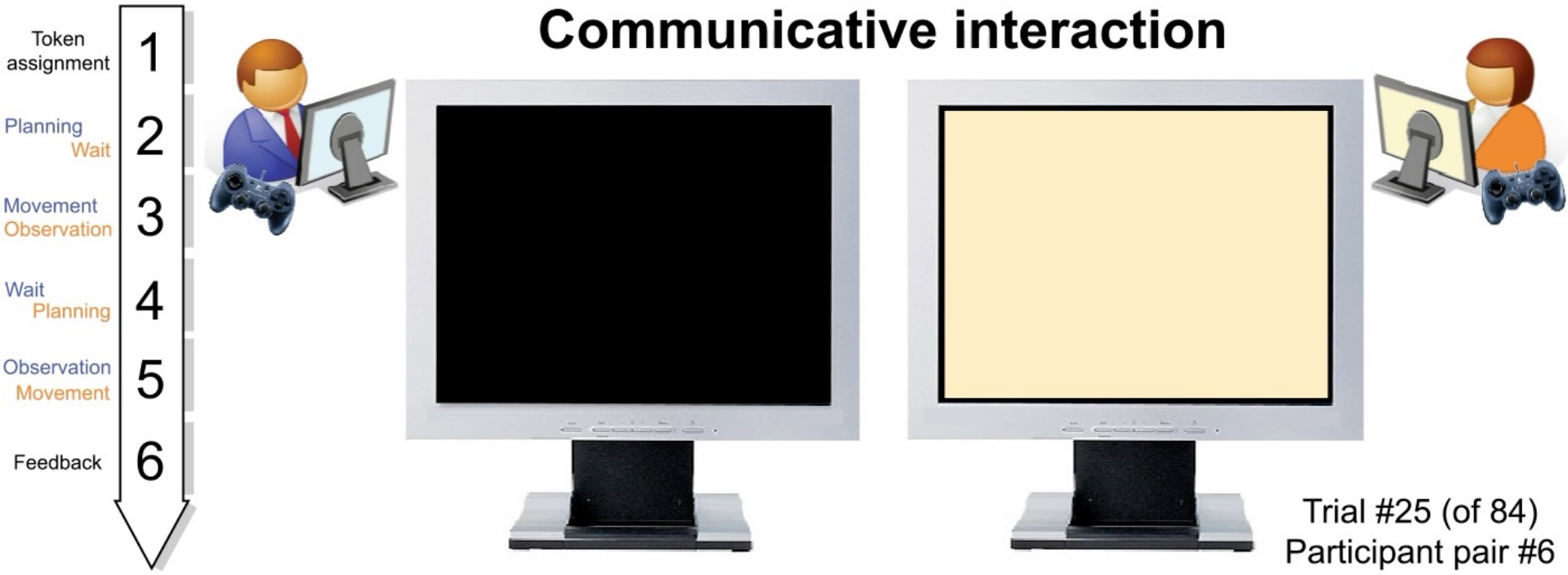
   Tacit communication game

Tacit communication game



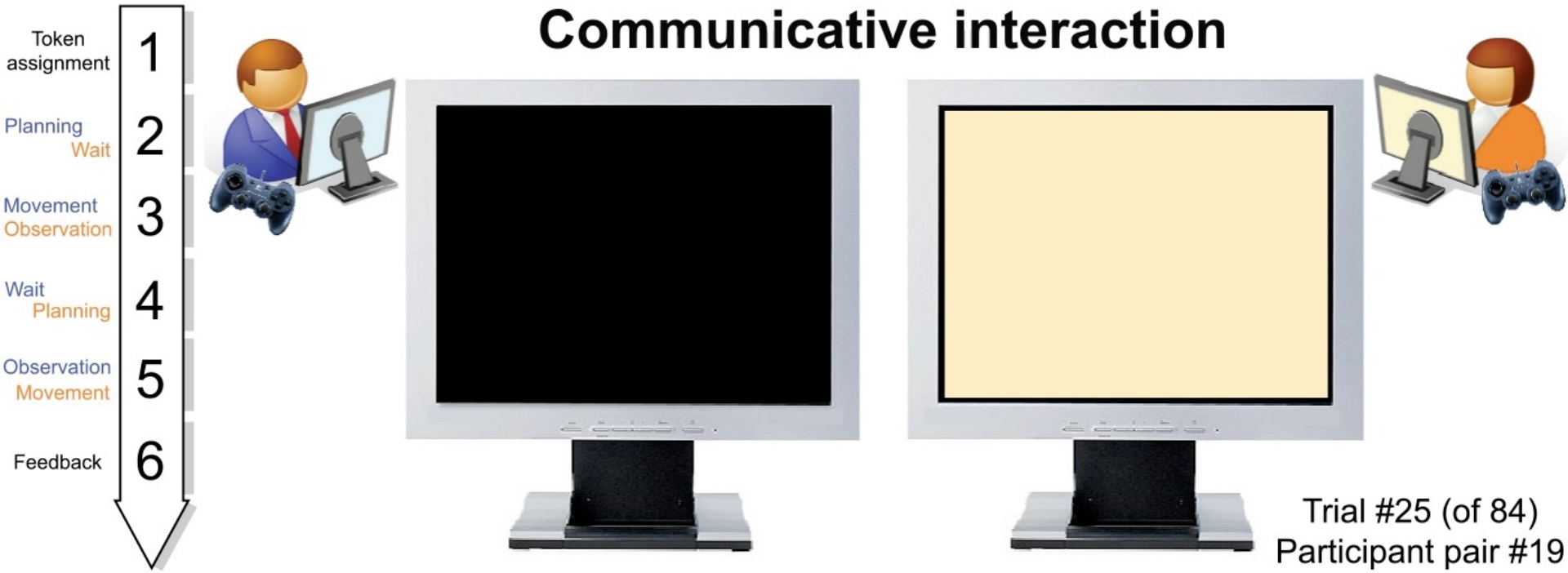
The Communicator (blue player) must use his own assigned shape to "tell" the Addressee (orange player) her shape's target location and orientation

Tacit communication game

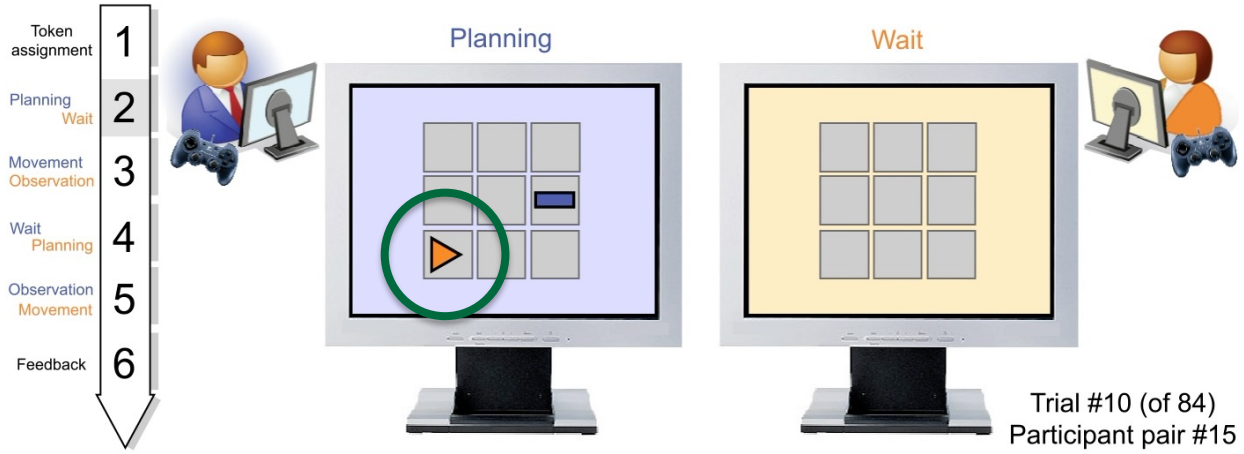


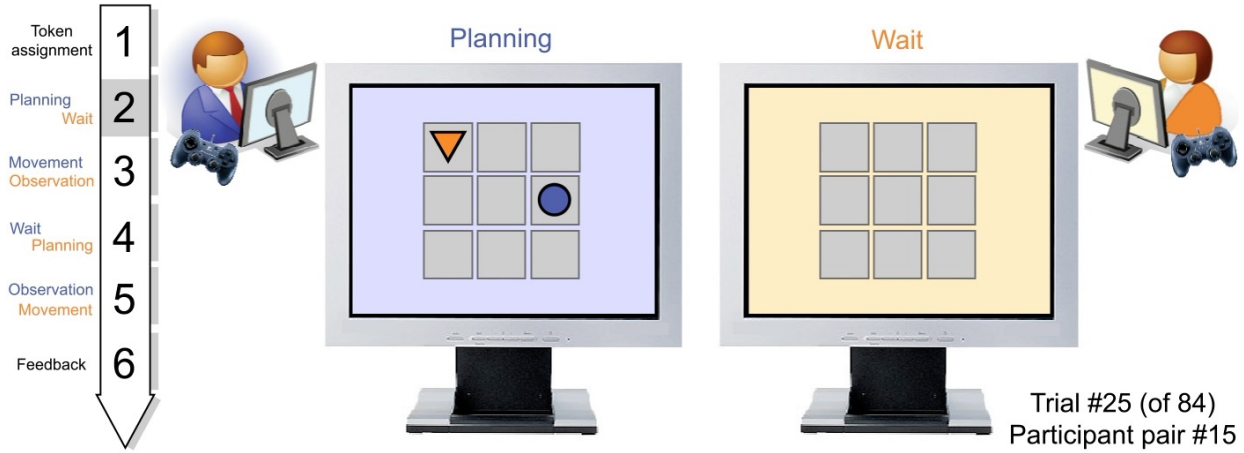
What is this Communicator "telling" you using his blue shape?

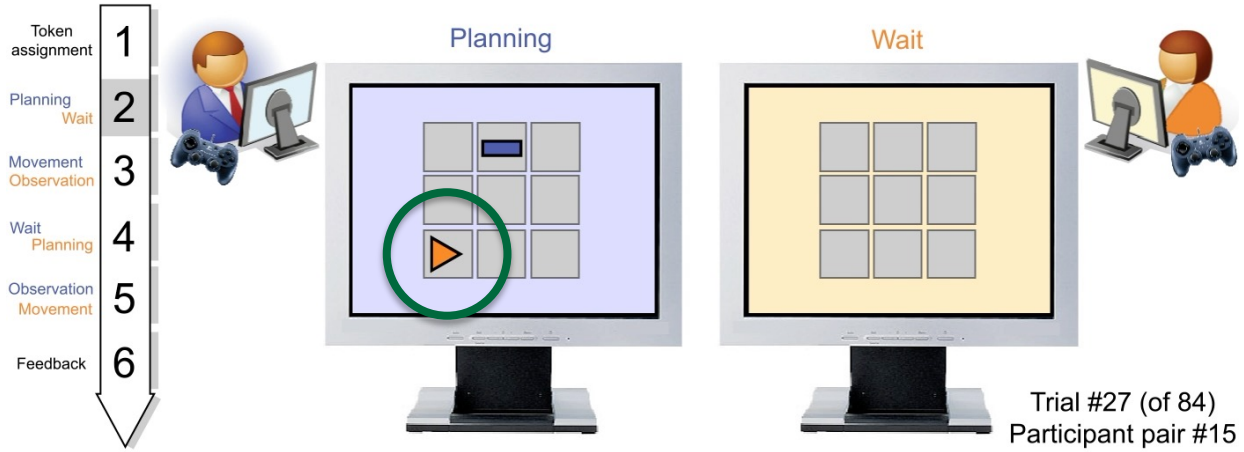
Tacit communication game



And what is this Communicator "telling" you?


Token assignment
1
Planning
Wait
2
Movement
Observation
3
Wait
Planning
4
Observation
Movement
5
Feedback
6
Planning
Wait
Trial #10 (of 84)
Participant pair #15


Token assignment
1
Planning
Wait
2
Movement
Observation
3
Wait
Planning
4
Observation
Movement
5
Feedback
6
Planning
Wait
Trial #25 (of 84)
Participant pair #15


Token assignment
1
Planning
Wait
2
Movement
Observation
3
Wait
Planning
4
Observation
Movement
5
Feedback
6
Planning
Wait
Trial #27 (of 84)
Participant pair #15

Research criteria

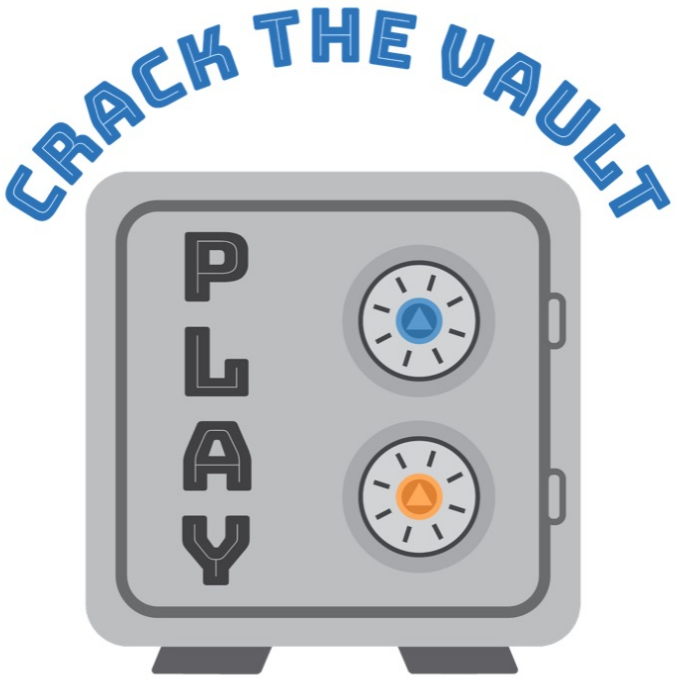
- ✓ Respect collaborative and open-ended nature of human interaction (cf. a conversation)
- ✓ Experimental control over communicative environment (log interactive behaviors)
- ✓ Experimental control over communicative history (capture emergence of shared representations)

Take-home concepts

- People are endowed with a special interactional intelligence that allows them to communicate successfully even without any conventions
- Experimental semiotics strips everyday communication of conventions to gain reliable access to this core interactional intelligence

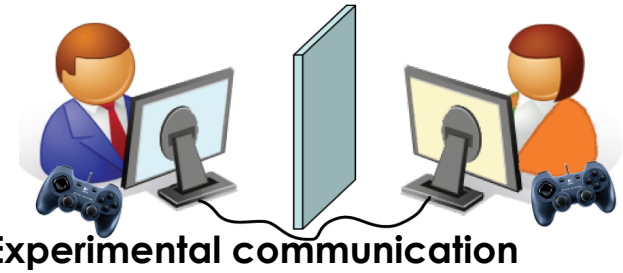
Next up

- Lab 3: Tacit communication game
- Play the Game at
  www.MutualUnderstanding.nl
- Bring your laptop



Bonus: Natural vs. experimental dialogue

DARTMOUTH



What's different?

Multiple communication channels
(vocalizations, bodily and facial postures/movements, eye contact)

Single communication channel
(movements of a geometric shape: experimental control over communicative environment)

Access to pre-existing conventions
(a common language, body emblems, facial expressions)

Novel communicative signals
(lack of pre-existing shared representations: experimental control over shared cognitive history)

Spontaneous turn-taking

Experimentally-controlled roles
(isolation of production and comprehension)

What's identical?

Dynamic communicative context
(jointly built, updated according to the fleeting idiosyncrasies of an ongoing interaction)

www.MutualUnderstanding.nl/game