Conversational puppetry

Purpose
- Explore the variables that influence whether participants adapt their statements to deal ambiguities present in a shared visual array.

Design
- Participants presented with ambiguous situation
- Participants required to disambiguate through language production strategies.
- Pseudo-conversation with:
  - Ostensible task partner (person)
  - Recorded statements (computer: pseudo-confederate)

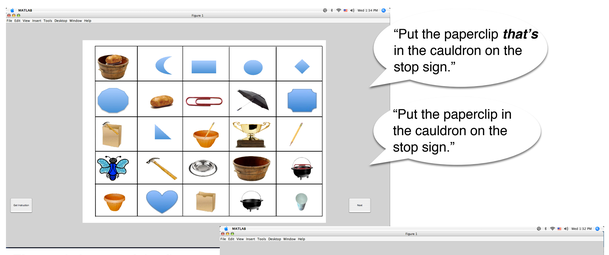


Figure 1. Image of the first experimental screen that includes all objects for that trial.

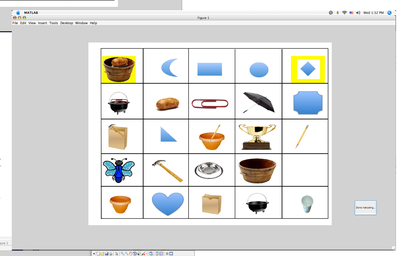


Figure 2. Participant instruction screen. Object to be moved (yellow) onto the geometric shape (highlight).

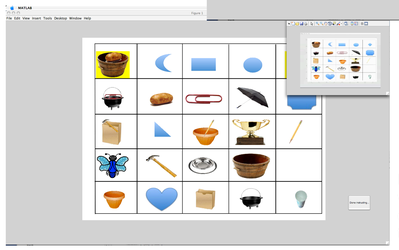
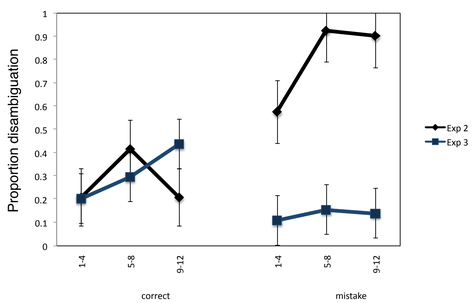
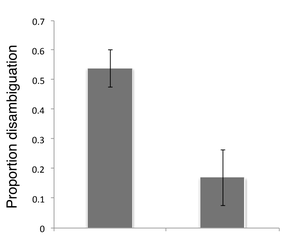


Figure 3. Participant screen with the video of the pseudo-confederate's response to the participant's instruction.

Example result
- Non-verbal behavior cues to communication breakdown promote creative and mindful strategies, but require cognitive flexibility. Rushed participants cannot integrate when their task partner errs.



Exp 2: No time limit Exp 3: Time limit



Example result
- Only participants who truly believe they are interacting are willing to engage in this disambiguation.

Conditions guiding coordinative and adaptive dynamics in human interaction (DHB)

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Introduction

General goal: Our project seeks to identify systematically variables that induce human beings to behave in ways that take into account the behavior of a task partner.

In the past several years, laboratory investigations of this issue in cognitive science have followed two broad agendas. One of these can be referred to as "alignment studies," in which humans are shown to synchronize, or match behavior with a partner. A second agenda, sometimes called "adaptive studies," explores when (or whether) humans integrate the perspective of a task partner when behaving.

Considerable debate has emerged in the cognitive sciences about whether this behavior is a natural "real-time" process, or whether it is merely "offline" strategic, and not a default component of the mental processing involved in human interaction. To approach these issues, our project is using a variety of experimental techniques to explore both alignment and adaptive behaviors.

The first two years

Here we focus on the empirical, psychological work:

1 **What influences a person to use speech that adapts to a listener's needs?**
(Lead student: Jennifer Roche)

2 **What variables influence alignment during computer-mediated interaction?**
(Lead student: Monica Riordan)

3 **What guides a listener to take into account the perspective of another person?**
(Lead student: Nicholas Duran)

Approach: Minimal interactive tasks. Latter two projects have been conducted using recent **"crowdsourcing" techniques**, through Amazon's Mechanical Turk, permitting us to vary a wide variety of variables of interest, and explore their impact on alignment and adaptive behavior.

Interdisciplinary agenda
- Regular meetings have connected empirical psychological work to philosophical theories of joint action (and vice versa) (e.g., Tollefsen & Dale, under review; Tollefsen, 2009). (Led by Dr. Deborah Tollefsen, Department of Philosophy)
- Final year: applying computational methods to interaction data, and development of data-driven alignable chat bot (permitting careful experimental control of pseudo-interactions). (Led by Dr. Andrew Olney, Institute for Intelligent Systems)

Final year

Computational agenda
- Working with computer scientist Co-PI to further analyze interaction data using NLP semantic and structural models.
- Development of a data-driven chat bot that permits experimental exploration of modulated alignment during the chat micro-task.

Developing synthesized theory of alignment and coordination
- Psychological team working with philosopher and computer scientist to synthesize currently collected data into a novel theoretical approach with explicit mechanistic implications that may be simulated in a computational model, with impact cutting across fields (e.g., joint action in philosophy).

For papers, posters, and other materials please visit: http://cognaction.org/rick

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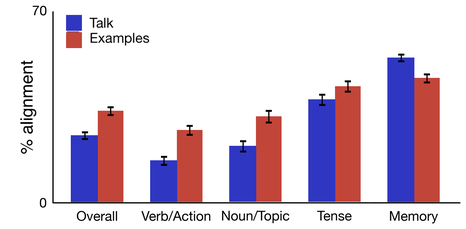
Multidimensional alignment

Purpose
- Explore patterns of alignment, across multiple dimensions, between participants and pseudo-confederate chat partners.

Design
- Uses a computer-based pseudo-interactive environment.
- Participants believed they were either interacting with someone ("talk" condition) or seeing examples from a database ("examples" condition).
- This exchange consisted of a modified game of "I never."

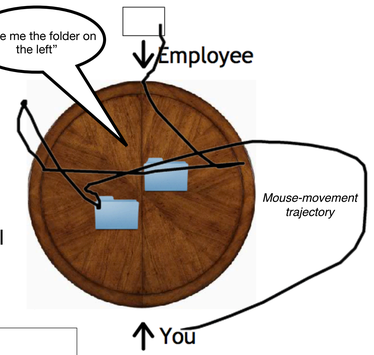
Example result
- Those who believed they were seeing examples aligned more than those who believed they were interacting with another person.
- However, those who believed they were interacting remembered more of the exchanges.
- Working theory: During natural interaction, alignment may fall within a natural range in order to accommodate creative conversation building.

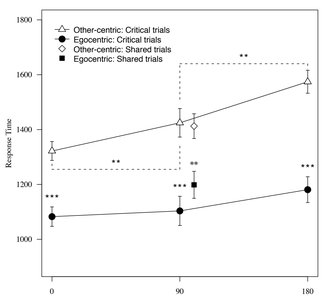


Dynamics of perspective

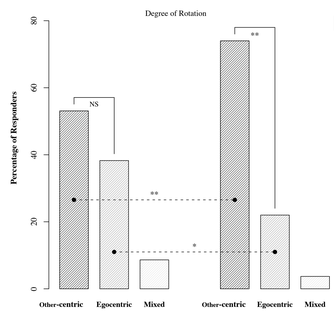
Purpose
- Explore what conditions guide whether you take your own frame of reference, or that of another person.

Design
- Participants received sometimes-ambiguous instructions from either a simulated task partner, or were given the impression they had connected to a real person over the Internet.





Example result
- Participants will invest in an other-centered mode of responding despite cognitive cost (left, higher RTs).



Example result
- Perspective-taking is not always dictated by minimizing processing demands, but by more potent factors in the social context (left: Study 2 changed belief about partner)