Social agent or machine?

An exploration of how the *framing* of a robot affects prosodic mimicry and expressivity

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Research questions

 How does the framing affect how much people empathize, like, or support the robot?



- Do people mimic the robot's voice more if the robot is framed socially (vs. as machine)?
- Are people more expressive when robot is framed socially?

Hypotheses

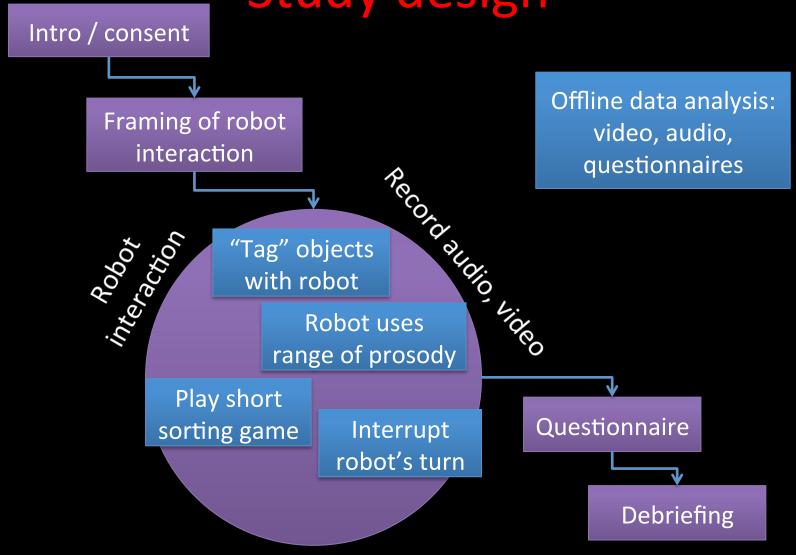
• Socially:

- Support, empathize more
- Mimic more, more expressive
- More considerate (allow robot to finish turn)

• Machine:

- Less expressive, but mimic voice equally
- Less tolerant of robot mistakes
- Less considerate (don't allow robot to finish turn)

Study design



Manipulation

VIDEO

SOCIAL "you, robot"

Condition 1

MACHINE "it, machine"

Condition 2

Robot interaction



Robot interaction





Participants

- 16 people (11 male, 5 female)
- Ages 18-54



- Majority dictated to phone/computer
- Half experience with other robots
- All experienced with CS (12 high knowledge)
 - 6 high AI knowledge
 - 5 high robotics knowledge

Participants

- Partial data for 2
 - 1 did not complete robot interaction
 - 1 had audio quality issues
- -1 due to familiarity with experimenters

= 13-15 participants for all analyses



Data collected

- Video
- Audio
- Questionnaires:
 - Robot Perception Questionnaire
 - Technology Familiarity Survey
 - Demographics

Data analysis

- Transcribed introductory chat
- Transcribed interruption response
- Pitch analysis of audio clips from multiple moments

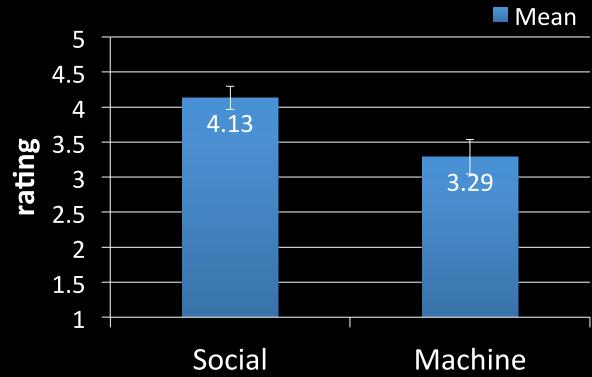
- Future work:
 - More audio analysis
 - Code facial expressions & nonverbal behavior

Pitch analysis

- Cleaning data
- Pitch detection
- Metrics:
 - Percentage voiced / unvoiced
 - Stdev of pitch

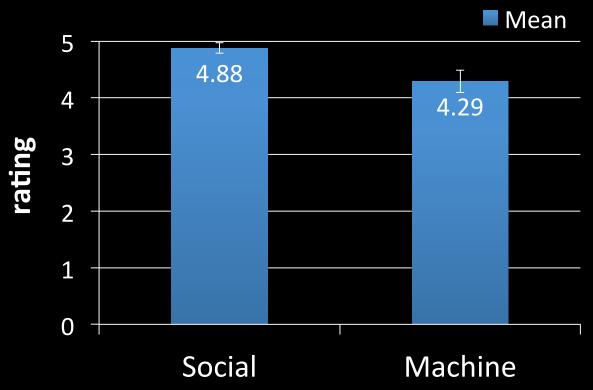
Results: Questionnaires





Results: Questionnaires

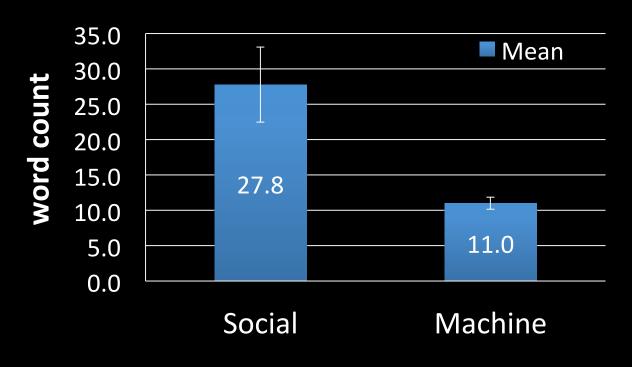
Was Mox interested in the task?



Results: Initial conversation

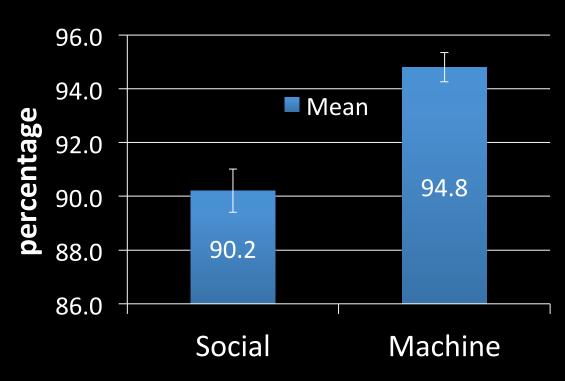
Video

Introductory chat word count



Results: Initial conversation

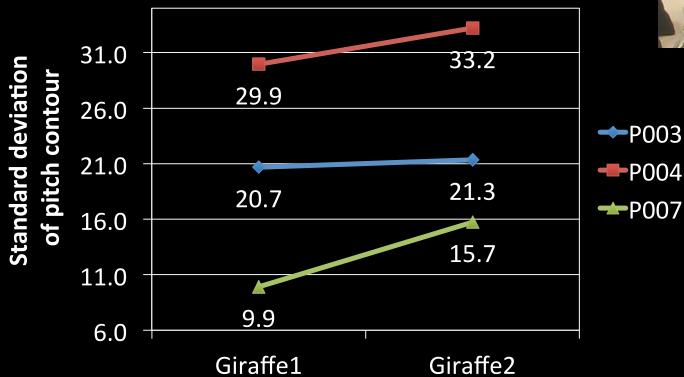
Unvoiced fraction



Results: "No, the giraffe please."

Video + Audio (P002, P007, P011)

Pitch contour - standard deviation





Results: "Will you be my hands?"

Video



Results: "Can you guess why I grouped them like that?"

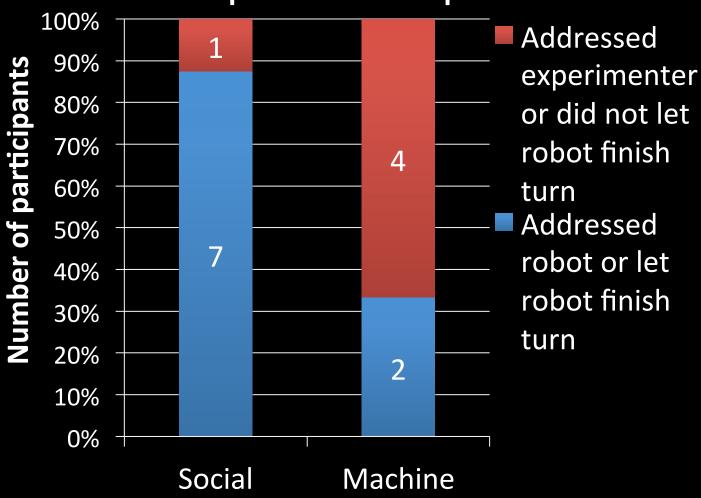
Video



Results: Interruption

Video





Discussion

- Social framing

 people acted more social!
 - Talked more
 - Addressed robot
 - Let robot finish turn
 - Mimicked more? (expressivity)





Discussion

- Social framing → changed judgments of robot
 - Viewed robot as more intelligent
 - Viewed robot as more interested in task
- But did not change much!
 - − Framing → non-conscious effects?

Discussion

- Framing = expectations
 - Context matters
 - Independent of robot



Conclusion

- Framing does have an effect!
- Further analysis to do
 - Audio, linguistic, nonverbal behavior
- Future work:
 - Replicate this study
 - Other framing/priming?
 - Lexical priming

