Human-Computer Interaction

Artificial Agents

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Today's Agenda

- Topic overview: *Artificial Agents*
- Discussion
- Project Q&A, individual feedback

Topic overview: *Artificial Agents*

Why do we have to think about computers as agents?

Software agents

Definition: A software agent is a computer program that acts for a user or other program in a relationship of *agency*.

Definition: An agreement to act on one's behalf.

Agency implies intelligence, autonomy, decision-making

Why do agents need bodies?

We need to locate intelligence, and this need poses problems for the invisible computer. The best example of located intelligence, of course, is the body.

— Cassell, 2001[1]

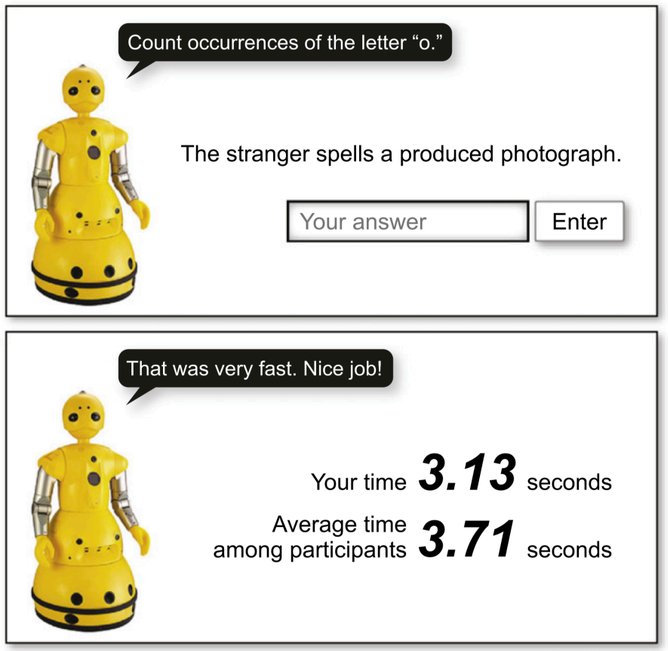
[1] Cassell, 2001, Embodied conversational agents: representation and intelligence in user interfaces

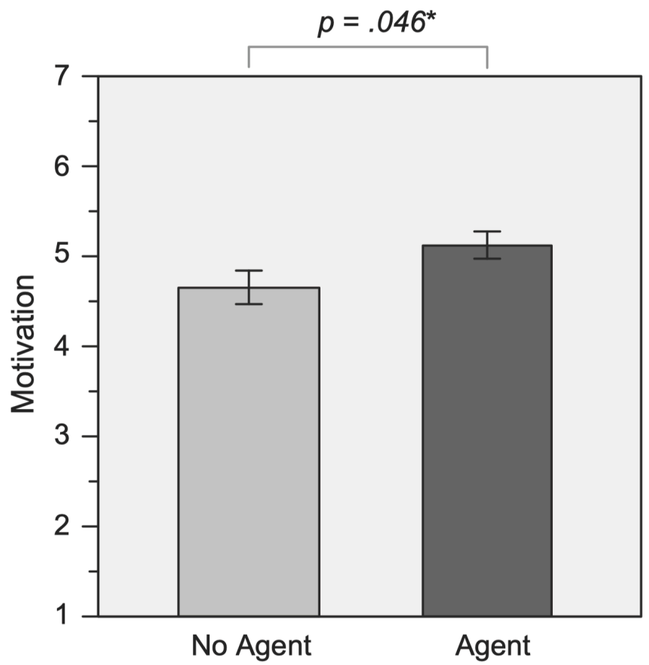
What does a body give us?

- A *locus of attention*—a target toward which we can our attention and behavior
- Cues about the agent's status (e.g., functioning, not broken, speaking, waiting)
- Opportunity to create plausible, coherent characters that signal the agent's role (e.g., a butler, a personal assistant, a collaborator)
- Ability to utilize social mechanisms in interactiond design

Why do we need a locus of attention?

Increased presence of, arousal toward, and commitment to another entity with agency.[3]

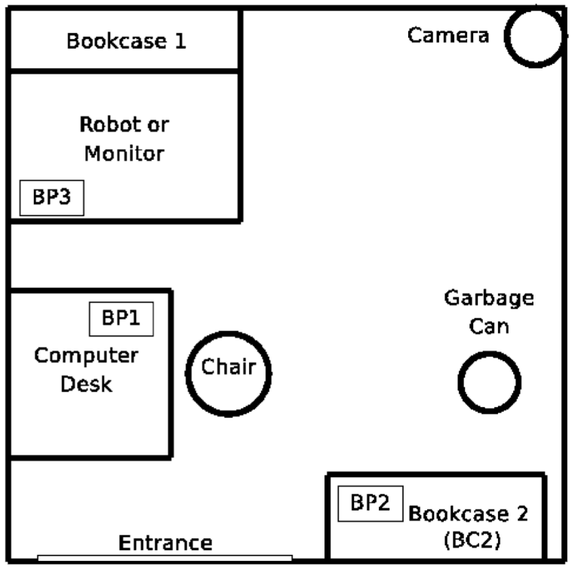


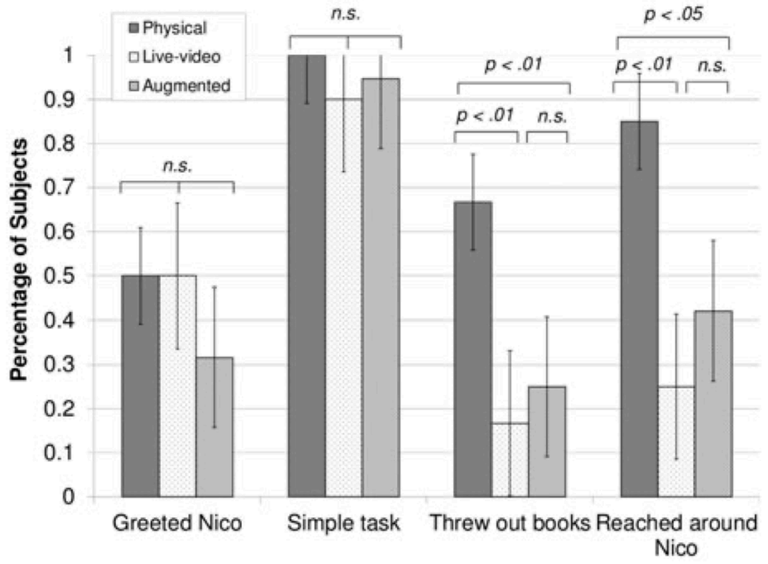


[3] Mumm & Mutlu, 2011, Designing motivational agents

Where should the body be?

Physical bodies further improve social outcomes.[4]





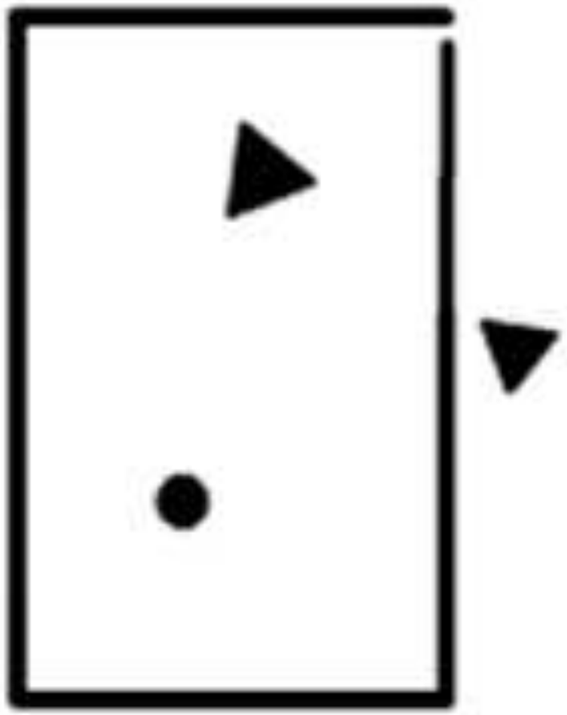
[4] Bainbridge et al, 2011, The benefits of interactions with physically present robots over video-displayed agents

Why do agents need human-like (or animal-like) bodies?

Faced with non-living things of sufficient complexity (i.e., when the observable behavior is not easily understood in terms of its underlying mechanisms), we often apply a social model to explain, understand, and predict their behavior.

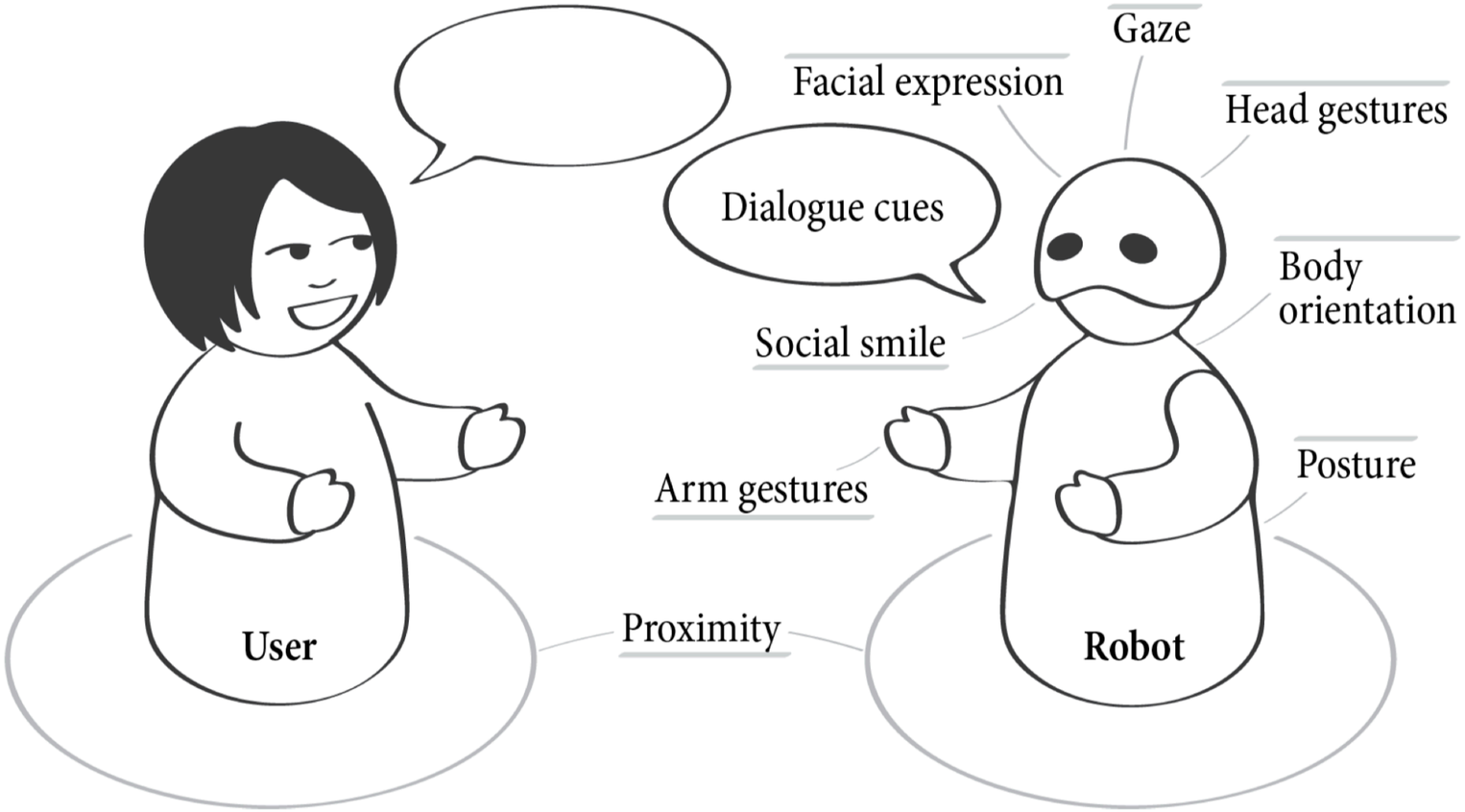
— Breazeal, 2003[5]

[5] Breazeal, C. (2003). Toward sociable robots. Robotics and autonomous systems, 42(3-4), 167-175.



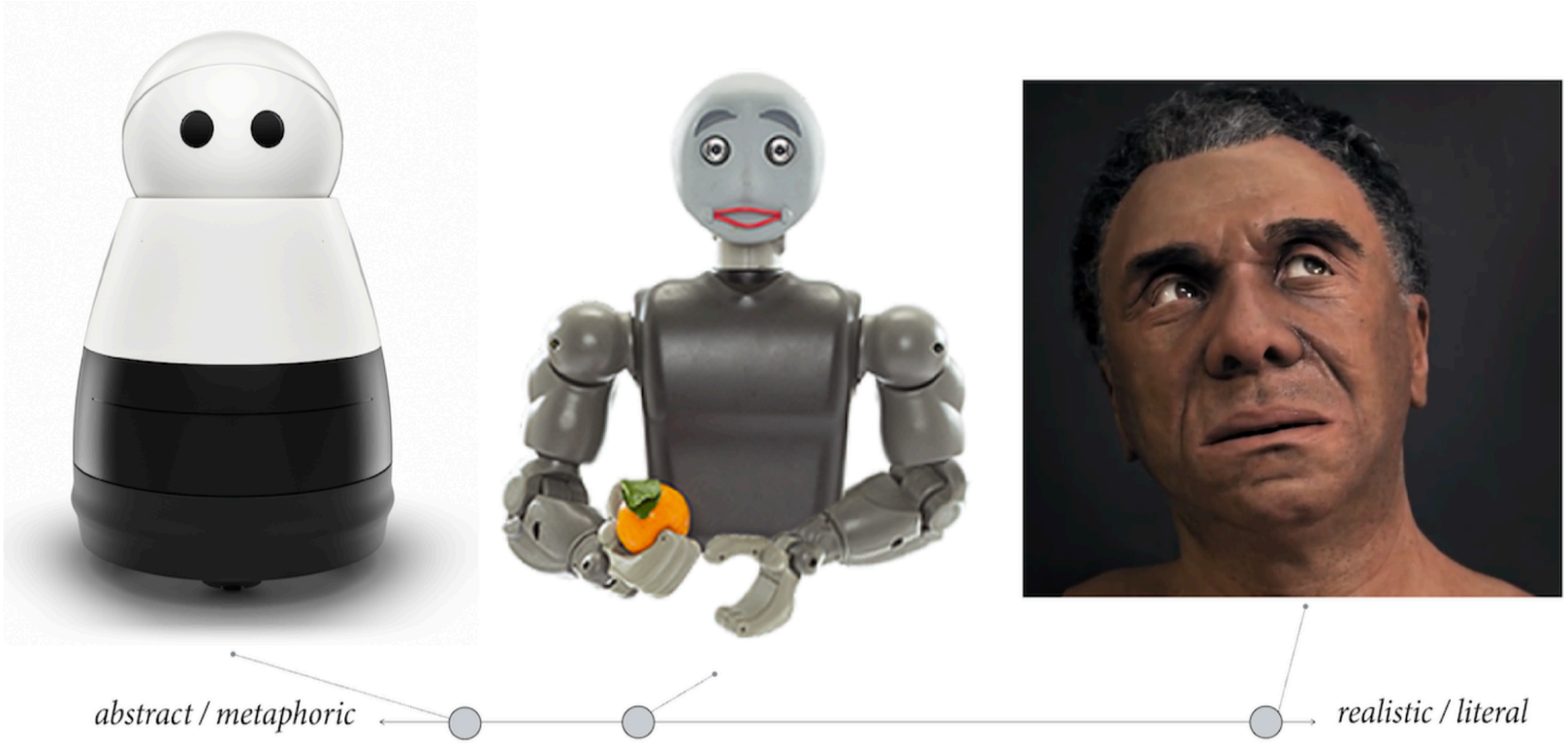
Simmel, 1944, An experimental study of apparent behavior

How do we capitalize on social models?[8]



[8] Mutlu, 2011, Designing embodied cues for dialog with robots

How do we design for social interaction?[9]



[9] Deng et al., 2019, Embodiment in socially interactive robots

Discussion Questions

- What are some of the agents you interact with day to day?
- What are your interactions like?
- What are advantages and disadvantages of agents with bodies?
- What are advantages and disadvantages of applying a social model?
- Interesting findings from your external source?
- …