

First Encounters with Social Robots

Determining the likability gap via users' attribution of mental capacities

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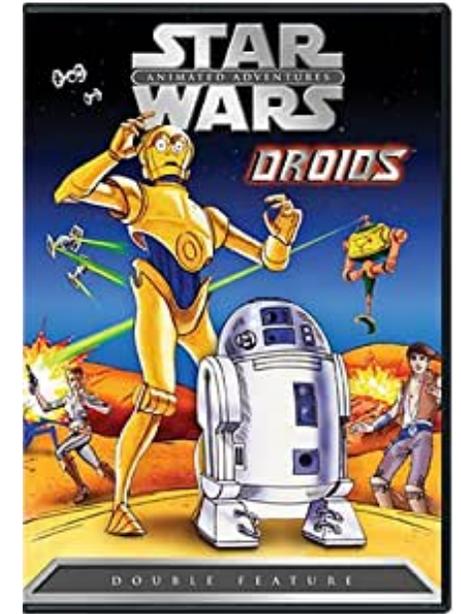
Mental Models of Robots

Most people only experience robots through media representations, not through first-hand knowledge

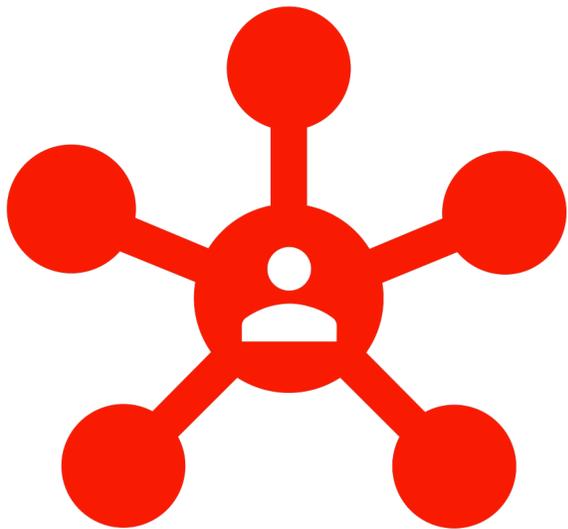
Mental models for robots are based on these media representations

With these models in mind, we can identify gaps that emerge after people's first interactions with robots

(Horstmann & Krämer, 2019)
(Kriz, Ferro, Damera, & Porter, 2010)
(Sundar, Waddell, & Jung, 2016)



The Likability Gap



- Gaps exist when there is a mismatch between a person's mental model of a robot before and after a personal interaction
 - The likability gap refers specifically to a change in a person's likability of robots regarding robots after an interaction
 - Adaptation and expectation gaps refer to peoples' expectations regarding the functions of robots after an interaction

(Komatsu, Kurosawa, & Yamada, 2011)

(Kuhnert & Linder, 2017)

(Lohse, 2011)

Attribution of Mental Capacities

(Malle, 2019)
(Nass & Moon, 2000)
(Gray & Wegner, 2012)

- As an expression of anthropomorphism, people tend to attribute a variety of mental capacities to robots
 - Reality Interaction Mind
 - People perceive agentic mental capacities from the robot in question
 - Affective Mind
 - People perceive emotional and physical mental capacities from the robot in question
 - Social Moral Mind
 - People perceive social and moral mental capacities from the robot in question
- Previous research has shown that people have no problem attributing basic agency to robots (reality interaction mind), but become uncomfortable when they display emotional or social/moral capacities



$n = 117$
 $M = 20.38$ years
 $SD = 3.45$ years

The Study

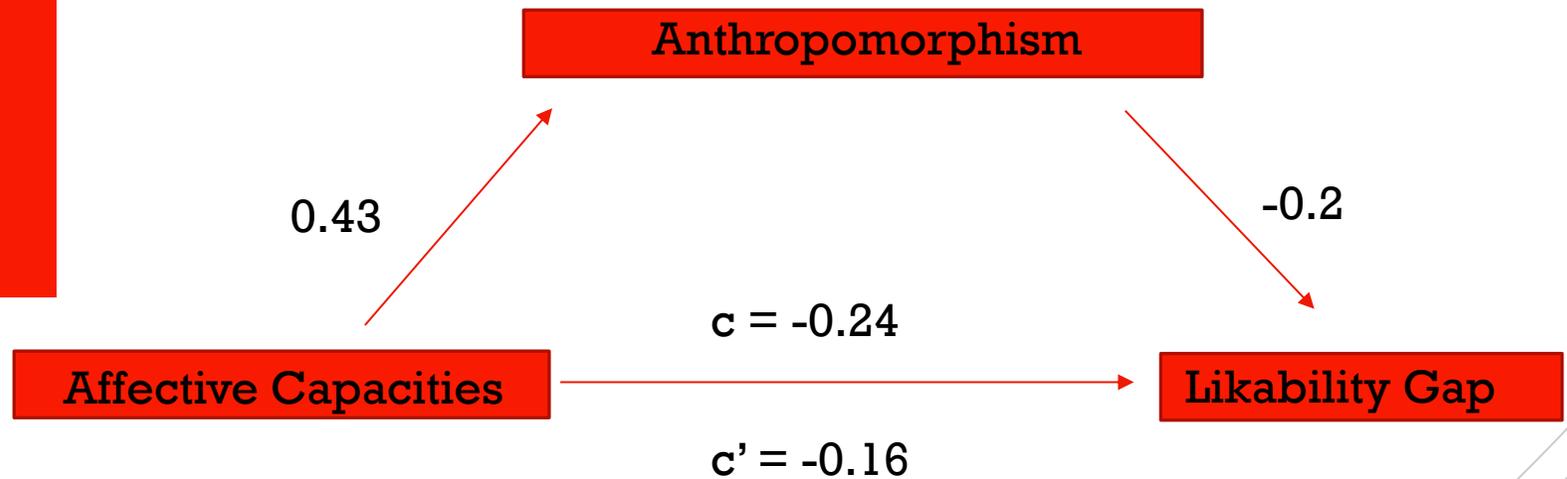
- Can attribution of mental capacities be used to predict people's likability gap after an interaction with a social robot?
- We predicted that the likability gap would be positively predicted by attributions of reality interactive capacities and negatively predicted by social moral and affective mental capacities
- Participants interacted with Ray, a social robot, in conditions randomly varied between social, task, and play
- Data was collected in surveys given prior to and following an interaction with Ray
 - Pre-survey measured attitudes and experiences with robots in general
 - Post-survey measured attitudes and reactions towards Ray in particular

Data Analysis

- Did a meaningful likability gap develop following a participant's interaction with Ray?
 - We found that likability scores shifted post-interaction in a manner and magnitude which signify that **participants tended to like Ray more than they liked robots in general prior to their interaction**
- What role did each attributed mental capacity have in determining the likability gap?
 - We found that an increase of participants' attributions of affective mental capacities **helped predict the scale and direction of the likability gap (i.e., higher affective mind score means higher likability of Ray)**
 - We found that attribution of mental capacities regarding either social moral or reality interaction had **no hand** in predicting the likability gap

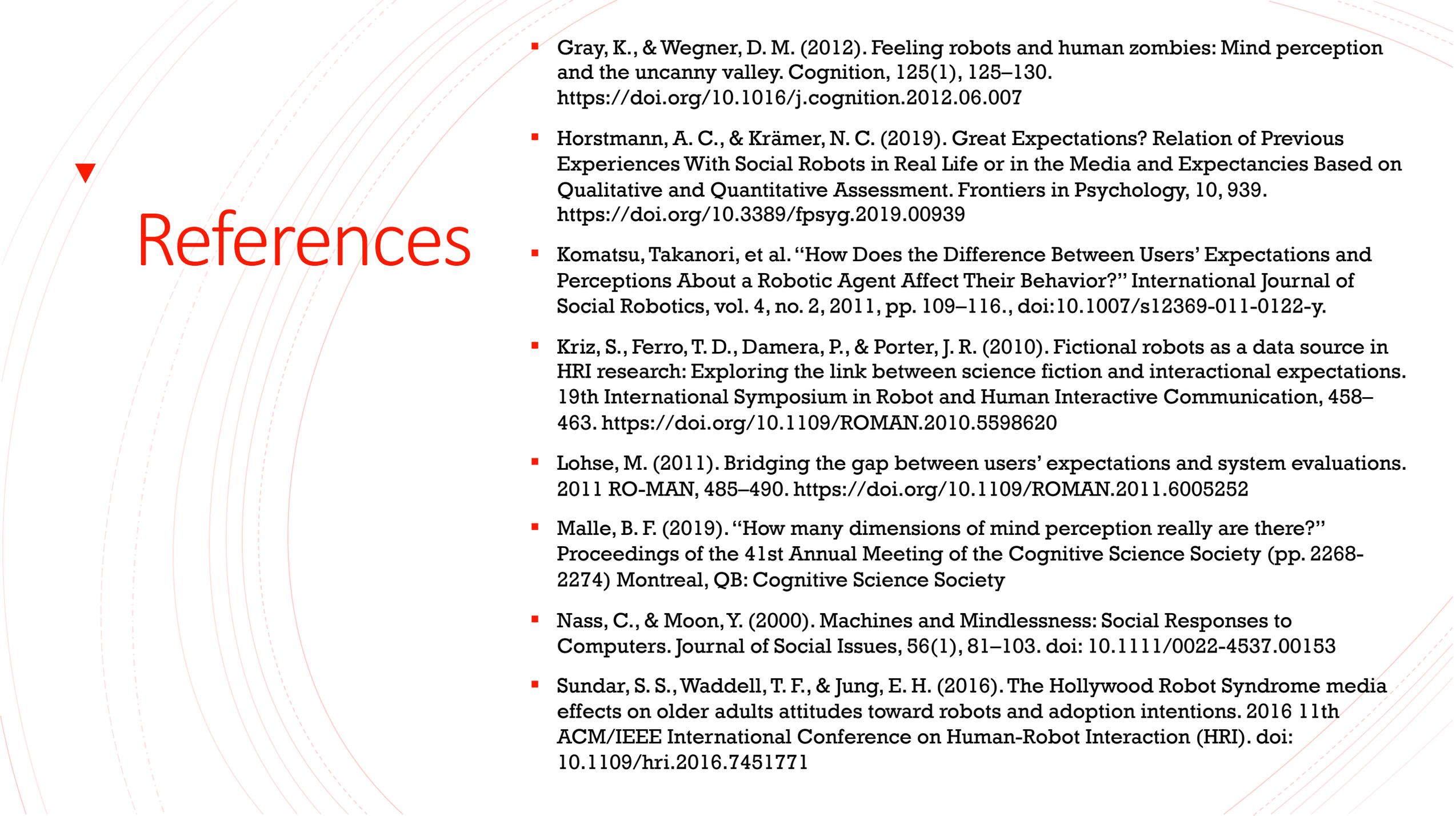
Further Exploration

- Why do perceived affective mental capacities predict the likability gap?
 - A mediation analysis showed that the effect of affective mental capacities could be partially attributed to increased feelings of anthropomorphism
 - People who perceived a stronger affective mind in Ray were more inclined to see humanlike qualities in it and thus, liked it more



What does this mean?

- We were able to establish that there was not only a significant likability gap post interaction, but that attribution of affective mental capacities and increased feelings of anthropomorphism can be used to predict this likability gap



References

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