"Ew! That robot is creepy!" Children's perceptions of mind impact feelings about robots

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Introduction

- Robots are currently used to teach children English (Powell, 2014) and to help children with motor (Mejías et al., 2013) and autism-spectrum disorders (Ricks & Colton, 2010)
- If children find these machines unnerving, it would severely undermine their helpfulness
- **Uncanny Valley:** adults prefer robots that are somewhat human-like, but find very-human-like robots unnerving
- Research with adults reveals that the more robots are seen to have human feelings, the more unnerving they seem (e.g., Gray & Wegner, 2012)
- Our research is the first to test this phenomenon developmentally in children

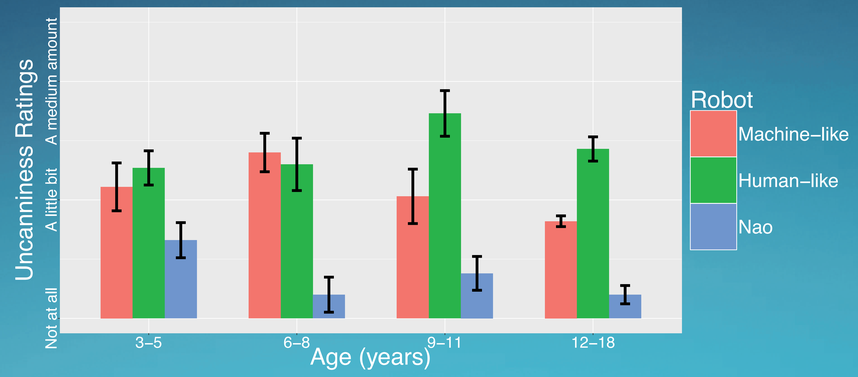
Is the Uncanny Valley innate or developed?

Is the Uncanny Valley related to the ascription of mind?

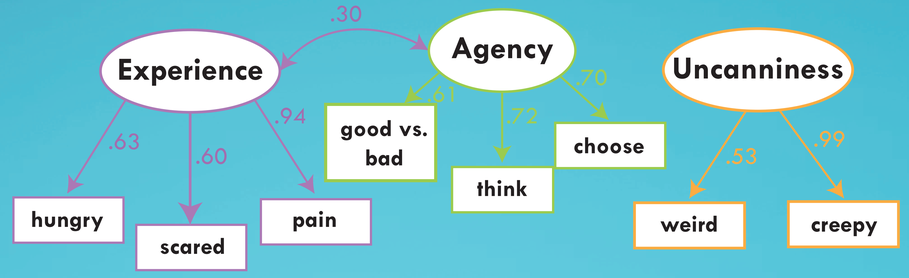
Methods

- 240 children (117 girls), 3 to 18 years old
- Children watched a 16s video of a machine-like robot or human-like robot and a 16s video of Nao
- Children rated their feelings toward the robots and the robots' mental capacities

Results



Legend: The focal comparison was between human-like and machine-like robot, a 2 (Robot: human-like, machine-like) x 2 (Age: younger, older than 9) ANOVA yielded the expected interaction between robot and age, $F(1,230) = 5.35$, $p = .02$, and no main effects of robot, $F(1,230) = 2.62$, $p = .11$, or age, $F(1,230) = 3.09$, $p = .08$.



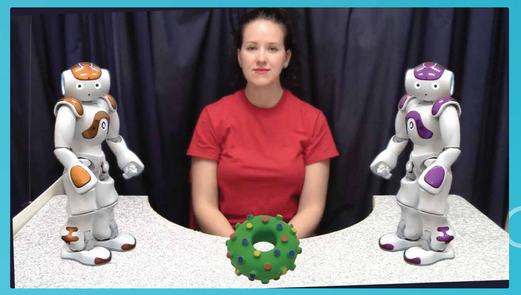
Legend: As outlined in the figure, an EFA confirmed that questions loaded as expected onto three factors: uncanniness (α=.68), agency (α=.68), and experience (α=.79)

Discussion

- The uncanny valley is acquired through development
  - Younger children found the human-like and machine-like robot equally not very creepy, whereas older children found the human-like robot much creepier—similar to adults
- Uncanniness not only increases with age, but children's perceptions of mind statistically mediate this change
- As perceptions of agency and experience were robustly correlated, these results might be best summarized as: robots are unnerving to the extent that they have human-like minds

Future Directions

- Cultural differences
  - Children raised in cultures with more human-like robots (e.g., Japan) may acquire different expectations about robots and may find them less unnerving
  - Children raised in cultures with no robots at all (e.g., hunter-gatherers) may also fail to show the uncanny valley because they may not acquire expectations about robots
- Generational differences
  - As human-like robots become more common in societies over time, children may come to believe that robots generally do look human, and should have minds. Perhaps tomorrow's adults will not find even very human-like robots uncanny
- Impact on Interactions with Robots: Trust in Testimony
  - 81 children (46 girls) 3 to 4 years old
  - Children watched a video in which two robots named a series of familiar objects. One robot always correctly named the objects while the other was always incorrect
  - After children were familiarized to the accuracy of these two robots, they watched videos in which the wo robots named novel objects



- When children attributed more agency to the robots, they were more likely to endorse the accurate robot
- Older children were more likely to endorse the accurate robot

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