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Children's Trust in Robots

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Final Report
UGP Small Grant (2019-20 AY)

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Brief Summary

The UGP Small Grant (2019-20 AY) was awarded to support research investigating whether children trust a smart speaker (Amazon Alexa) when learning factual information and making moral decisions. The project was amended and extended due to the pandemic. Data collection is on-going and is projected to be completed in April 2023.

Detailed Report

Rather than passively absorbing knowledge from others, children are selective in whom they learn from and prefer to learn from individuals who have a history of accuracy (Corriveau & Harris, 2009; Koenig, Clément, & Harris, 2004; Koenig & Woodward, 2010; Mills, 2013), who are knowledgeable (Jaswal & Malone, 2007; Sabbagh & Baldwin, 2001), or who are confident (Birch, Akmal, & Frampton, 2010; Brosseau-Liard & Birch, 2010; Brosseau-Liard, Cassels, & Birch, 2014; Brosseau-Liard & Poulin-Dubois, 2014; Jaswal & Malone, 2007). It has been argued that children are sensitive to an individual's level of confidence because children view confidence as a marker of knowledge. Yet, confidence may differentially signify credibility depending upon the type (or domain) of knowledge. That is, when dealing with factual information, the research suggests that confident responses indicate greater credibility. However, in domains of knowledge that are less 'black and white', such as moral deliberations, uncertainty may be a better marker of credibility. That is, hesitancy may reflect careful deliberation rather than lack of knowledge, whereas confidence may be interpreted as *over*confidence or a rush to judgment.

During the grant period, I succeeded in developing this line of research with the study nearing completion of data collection (expected April 2023).

Project Amendments and Extension. Due to the pandemic, I had to amend the proposal and extend this project:

- I had planned to use my existing Jibo robot for this study, however due to the company's closure (and resulting shut-down of required servers), I was unable to do so. Fortunately, the UGP small grant funds were approved for re-budget to purchase commercially available smart speakers (Amazon Alexa) for our study stimuli.
- I also received approval for a re-budget to provide $5 Amazon gift cards as participant compensation.
- Due to the halt in face-to-face studies during the pandemic, data collection was significantly delayed.

Confidence and Domain – Smart Speaker Study. My research team and I investigated whether children (5-8 years) trust smart speakers (Amazon Alexa) when learning factual information and making moral decisions. Participants (N=128 planned (current N=96); 5-8 years) were randomly

assigned to either the factual or moral condition. Using the selective social learning paradigm, participants viewed videos of two pairs of informants – one confident and one hesitant – provide different answers to questions about animals (Figure 1). Participants listened to four trials with **human** informants (confident and hesitant) and four trials with **smart speaker** informants (confident and hesitant) (order of informant type was counterbalanced).

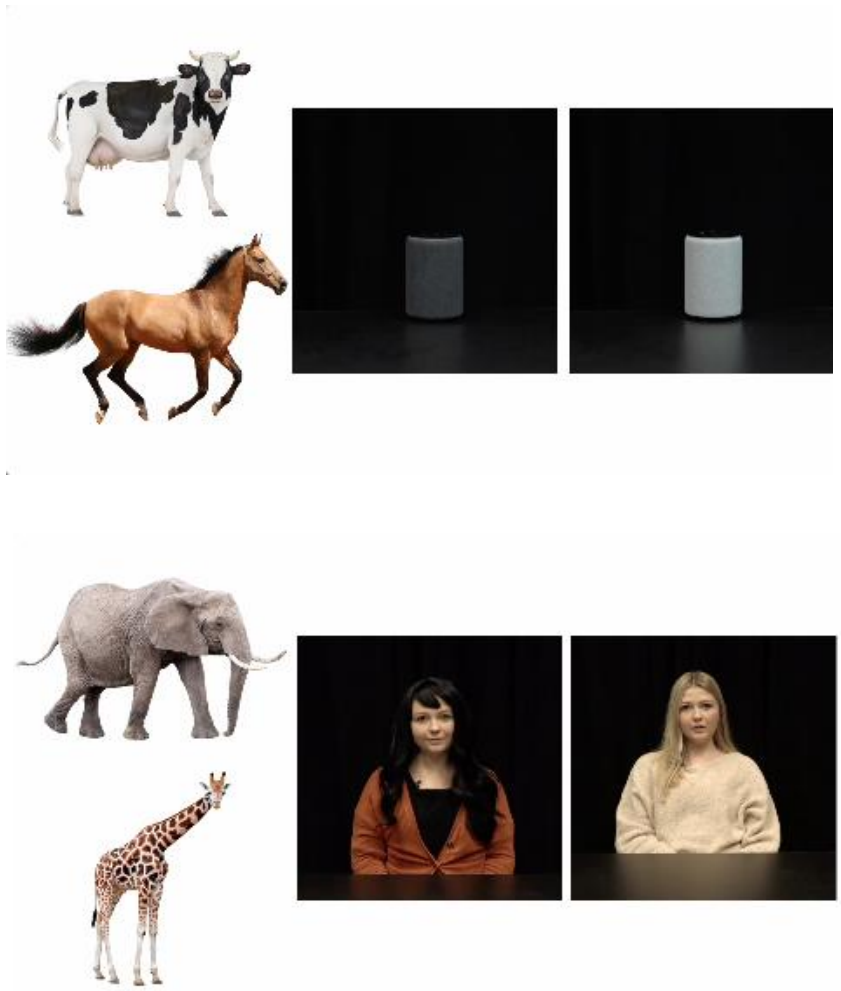

Figure 1. Smart speaker and human models with sample animal pairs.

In the factual condition, participants were presented with factual questions about two animals (e.g., "Here is a cow and a horse. Which of these does not have a toma?"). Novel "facts" were used to control for children's actual knowledge. In the moral condition, participants were presented with questions about animals that invoked moral principles, such as fairness and harm (e.g., "An elephant and a giraffe at the zoo are both very sick, but there is only enough medicine for one of them. Which of these should get to take the medicine?"). Across both conditions, the confident informant selected one animal using linguistic and paralinguistic cues of confidence, whereas the hesitant informant selected the other animal using linguistic and paralinguistic cues of uncertainty. To assess learning preferences, participants were asked which answer they endorsed for each trial (e.g., "What do you think – the horse or the cow?"). Additionally, participants rated both informants in the pair on a 4-point scale (0=not at all to 3=a lot) in terms

of the informant's level of confidence, likeability, and smartness. The procedure was then repeated with the other informant pair (humans or smart speakers). Participants' responses (0 = Hesitant informant; 1 = Confident informant) to the four learning trials were modeled simultaneously with random-intercept logistic regression with age, condition (factual, moral), and informant type (smart speaker, human) as predictors and participant ID as a random effect to account for the repeated responses across trials. Mixed Effects Models were used to test to the effects of condition (factual, moral), informant type (smart speaker, human), and participant age on ratings of the informants' confidence, likeability, and smartness.

Research team. My research team was comprised of 14 psychology undergraduate research assistants and four experimental psychology doctoral student. This team worked on study design, piloting, data collection, data entry, coding, and preliminary analyses. The doctoral students will further be involved in final analyses, conference presentations, and manuscript preparation.

Dissemination. We will be presenting the preliminary results of this study at the Society for Research in Child Development biennial meeting from March 23-25, 2023 in Salt Lake City, UT. Once data collection is complete in Spring 2023 we will finalize the analyses and write the manuscript to submit for peer-reviewed journal publication.