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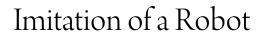## ScholarWorks at University of Montana

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# Imitation of a Robot

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**Final Report**
**UGP Small Grant (2017-18 AY)**

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**Brief Summary**
The UGP Small Grant (2017-18 AY) was awarded to support research investigating whether children conceive of robots as "social others". I succeeded in developing this line of research with one study completed (manuscript in-preparation) and a second study currently in-progress.

**Detailed Report**
Children will increasingly interact with sophisticated personified technologies, whether in formal or informal learning environments or their homes. Indeed, many of these technologies are specifically developed to interact with children as teachers or as personal assistants. A critical question that emerges is whether and how children will understand these interactive technologies. The current work supported by the UGP Small Grant sought to develop a line of research investigating children's conceptions of one class of personified technologies – social robots – as as social others, as sophisticated technologies (but as objects nonetheless), or as somewhere in-between (what we have dubbed the New Ontological Category hypothesis; Kahn, Severson, & Ruckert, 2009; Severson & Carlson, 2010) – and the social and moral implications of children's conceptions (e.g., Kahn, Kanda, Ishiguro, Freier, Severson, et al. 2012; Kahn, Kanda, Ishiguro, Gill, Ruckert, et al., 2012; Severson & Carlson, 2010).

During the grant period, I succeeded in developing this line of research with one study completed (manuscript in-preparation) and a second study currently in-progress.

*Study 1: Confidence and Domain of Knowledge.* My research team and I investigated children's (*N*=96; 3-8 years) credibility judgments of individuals (humans) who differed in their level of confidence (confident vs. hesitant) in two domains of knowledge (factual vs. moral). We found that children differentially interpret confidence as a cue to one's credibility depending on the domain. That is, children preferred the confident individual when learning factual information, but not when deliberating about moral claims. It appears that when considering moral claims, children interpreted a hesitant individual as being more deliberative. These results suggest that children are actively making inferences about individuals' credibility and knowledge, and these interpretations are sensitive to the context. In other words, children are not blindly using behavioral cues of confidence to infer knowledge, rather they consider these cues in relation to domain of knowledge (factual vs. moral). This study establishes baseline work on children's judgments of humans. We are now poised to replicate this study with a robot in place of humans in order to investigate whether children will similar trust a confident robot when learning factual information, but be wary of that confident robot when considering moral claims.

*Study 2: Intentions and Culpability.* The second study (in-progress) assesses whether children understand a robot as intentional and culpable for its actions. Children (3-5 years) view a robot either interacting in a socially-contingent or non-contingent manner. Then they observe the robot

attempt (but fail) to pull apart a small dumbbell, and then give children the dumbbell to see if they imitate the robots exact (failed) action or the *intended* action. If children understand the robot as an intentional agent, they will imitate the *intended* action rather than the failed action. We expect children reproduce the intended action if they previously observed the robot interacting in a socially-contingent way and not if they previously viewed the robot interacting in a socially non-contingent manner. In the second part of the procedure, we investigate whether intentions and culpability are linked by assessing whether children view the robot as being responsible for its actions. In addition to the two robot conditions, we also have two control conditions: human condition to establish ceiling levels and baseline condition (no model of dumbbell action) to establish the baseline level at which children spontaneously pull the dumbbell apart. We are currently in the midst of data collection at my on-campus laboratory as well as at spectrUM Discovery Center.

*Research team.* My research team was comprised of nine psychology undergraduate research assistants and one experimental psychology doctoral student. This team worked on study design, piloting, data collection, data entry, analysis, and presentation of results. The UGP small grant provided support for one undergraduate RA to oversee these studies. In addition, a psychology undergraduate and a computer science Master's student were responsible for programming the robot.

*Dissemination.* We have presented the results of study 1 at GradCon 2018, UMCUR 2018 (received Best Social Science Poster Award), and an international developmental psychology conference. I am currently writing the manuscript to submit for peer-reviewed journal publication.