

Robot's Gestures towards Children
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Varied Human-Like Gestures for Social Robots: Investigating the Effects on Children's Engagement and Language Learning

Reference:

de Wit, J., Brandse, A., Krahmer, E., & Vogt, P. (2020, March). Varied Human-Like Gestures for Social Robots: Investigating the Effects on Children's Engagement and Language Learning. In *Proceedings of the 2020 ACM/IEEE International Conference on Human-Robot Interaction* (pp. 359-367).

Link to original paper:

https://dl-acm-org.tilburguniversity.idm.oclc.org/doi/abs/10.1145/3319502.3374815?casa_token=yMBQLPGsSwUAAAAA:1nzqAX_YZYO4Tu9S40r-abR8KBubeEoXHEUhbaIdMyBCcVgHM4EJHsN_YuN5EmN9m-E-tEs-37ME

In this paper, researchers investigated if a humanoid robot's use of gestures improves children's learning of second language vocabulary, and if variation in gestures would strengthen this effect.

During the study, the following hypothesis was set up:

H1 Children will learn more target words in a second language (H1a) and remember them better (H1b) when a robot produces iconic gestures for the target words than when the robot does not produce such gestures.

In order to make sure that only gestures that participants were likely to recognize were used, the gestures of the robots were based on an already existing dataset. In this dataset, a wide range of categories was used (e.g. tools, objects, animals). During the experiment, 116 participants were included. All of these participants were children. The participants were shown a video of a gesture and were asked to choose one of the six words they thought corresponded with the gesture.

a small game before the test was executed. In this session, the robot introduced itself and proposed to play a little game called *I spy with my little eye* to train the six words in the second language (English). After explaining the game, the robot asked the participant whether he or she understood the concept. If the participant did understand the explanation, he or she had to press a green button. If he or she did not understand the explanation, the participant had to press a red button.

To test the hypothesis set up by the researcher, an experiment was conducted with three different experimental conditions:

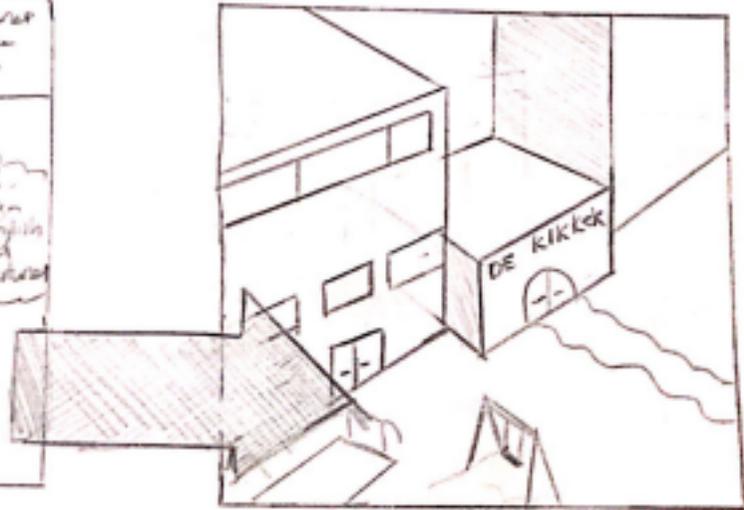
- (1) No gestures
- (2) Repeated gestures
- (3) Varied Gestures

The main experiment consisted out of four phases:

- Group introduction
The researchers let the robot stand for the entire class to familiarize the participants with the robot.
- Pre-test
The pre-test consisted out of a test to measure pre-existing knowledge of the words used in the experiment.
- Training and immediate post-test
The experiment was at least one day after the pre-test. The participants were brought into the experiment room to complete the first round; the *I spy with my little eye*-game. Then, the post-test was executed right after the game to see whether they had learned English in a sufficient way.
- Delayed Post-test
Between one and two weeks, the researcher held a post-test with the participants to measure whether the participant still knew the words in a second language. This test was identical to the post-test.

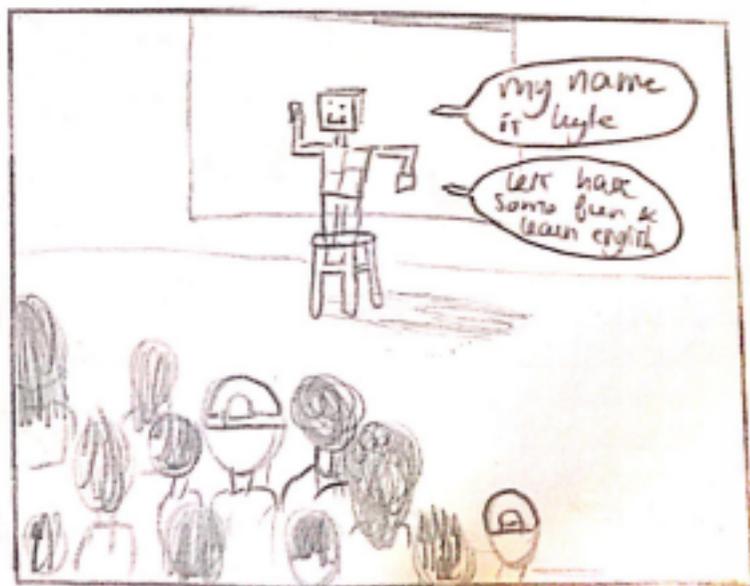
The results of this study show that having a robot performing gestures for children, results in a higher engagement and an increased learning gain. However, there were no additional benefits for using varied gestures.

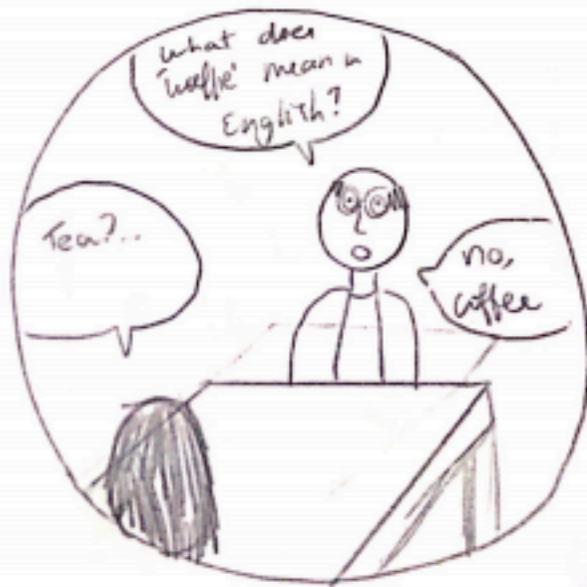
In order to make sure only children that participate were likely to be bilingual were used, ... was chosen based on an existing database



'I'll need 16 children to participate in that study...'

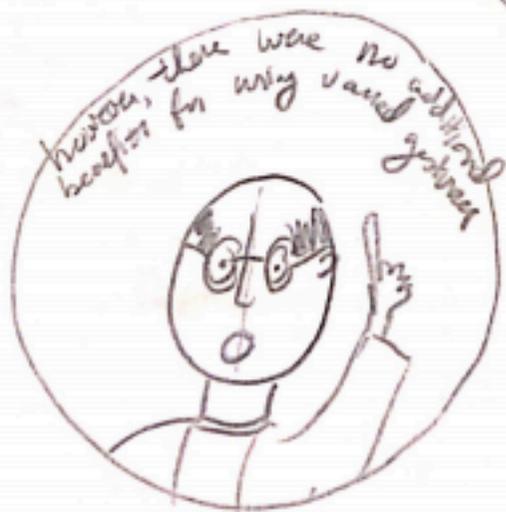
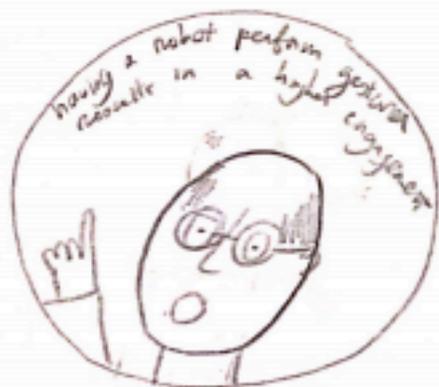












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