Detecting Contingency Between Self and Other Triggers Social Behavior.

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Abstract

This study investigates what triggers the shift of human infants' behaviors from self-centered (ScB) to other-depended ones (OdB) for the emergence of social capabilities. Joint attention ability is known to be acquired through a three-staged process, in which infants gradually shift their behaviors from ScB to OdB. The authors have proposed a constructivist model by which a robot learns joint attention through experiences of visual attention. Visual attention is a ScB to gaze at a salient visual stimulus. Employing the model, our robot acquired the sensorimotor coordination of joint attention by detecting a contingency between the image of a human face and a motor command to look at a object. Analysis of the relationship between the learning convergence and the behavioral shift showed that: (a) when gradually shifting from ScB to OdB according to the contingency detection, the robot can acquire joint attention ability; (b) when producing only ScB over the learning phase, the robot cannot acquire a consistent sensorimotor coordination; (c) when adopting only OdB, the robot falls into locally biased behaviors that were experienced earlier. These results suggest that the emergence of infants' social behaviors is triggered when they detect a contingency between their own and other behaviors.