

A toy-like robot in the playroom for children with developmental disorder

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Fifteen children, with PDD, autism, or other physico-mental handicaps, interacted with a communication robot "Keepon". This report describes our preliminary findings of how the children changed their ways of interaction during 5-month longitudinal observations.

Keepon is a small (12cm in height), soft (made of silicone rubber for safety), simple (yellow snowman-like) robot. It has two video cameras and a microphone at the nose. Keepon can perform two types of motion: (1) expressing its attention by orienting its face to a certain target in the environment, and (2) expressing its emotional states, like pleasure and excitement, by rocking its body left to right and by bobbing the body up and down. Keepon is connected by wireless links to a remote PC, from which a human operator or a computer program controls the motion.

We placed Keepon in the playroom, with a lot of toys to play with, at a day-care center. The children, often with their parents and nursing staffs, could play with Keepon spontaneously anytime during the day-care service (about 3 hours). Through a series of longitudinal observations for about five months (for each child, 12 to 15 sessions), we observed various types of change in the children's ways to interact with Keepon. Here we exemplify two cases:

- 4-year-old boy with PDD: He showed strong interest from Session 1 (hereafter, S1). His touch to Keepon got stronger through S1 to S3. After S4, the interaction became gentle, as if Keepon was specifically belonged to him, and became social gradually over the subsequent sessions — putting a cap on Keepon's head (caregiving), giving a toy cookie (pretense), mimicking Keepon's motion, talking jargons, etc.
- 4-year-old girl with autism: She also showed interest from S1, but did not get close to Keepon. Through S1 to S7, she avoided being looked straight by Keepon (gaze aversion); however she often looked into Keepon's profile; the distance to Keepon gradually got shorter. Her first touch was in S11, since then she started social interaction including eye-contact, putting a cap, talking jargons, etc.

We longitudinally observed the children's behavior from the view point of Keepon as their playmate. The interaction style suggests how the child recognize Keepon — as a moving thing, a living creature, or a social partner. The longitudinal change in the style would imply the way of their social development. These information is beneficial to the remedial service as well as the psychological research.

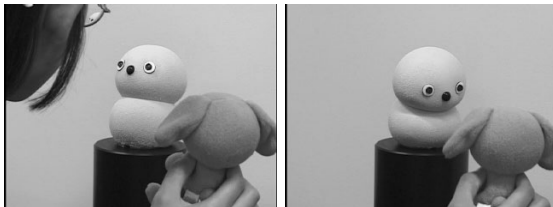


Fig. 1 Keepon, the toy-like robot

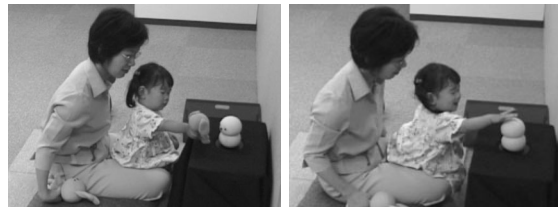


Fig. 2 Interaction with mother and child