

HOW IS PRAGMATIC GROUNDING FORMED IN THE SYMBOLIC COMMUNICATION SYSTEMS?

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How does the human linguistic communication system evolve? In the last few years, researchers have begun to investigate the cultural evolution of language using an experimental paradigm to understand the emergence of human communication system (Scott-Phillips & Kirby, 2010). One of the central issues is how the symbol systems emerge from common ground such as conventional behavior. Galantucci (2005) observed in his experiment that routine behavior conveyed implicit information. Scott-Phillips, Kirby, and Ritchie (2009) showed that common ground was important to judge certain behavior to be communicative.

Another critical issue is expressing communicative intentions, a unique feature of human communication (Tomasello, 2003). Humans pragmatically ground their intentions in communicative frame which involves the choice of linguistic items and structures both to indicate speaker attitude and to accommodate to listener perspective. From this viewpoint, important thing is to realize pragmatic grounding, as well as to form shared mappings between meanings and forms.

In order to investigate how pragmatic grounding develops, we designed a game experiment based on the game of Galantucci (2005), in which the pragmatic grounding was observed clearly as a role division (Konno, Morita, & Hashimoto, 2011). In our experiment, the dyads engaged in a coordination game from different sites using interconnected computers. The game environment contained two agents and four intercommunicating rooms. The agents could not move to diagonal rooms. The game was composed of several repeated rounds. At the beginning of each round, the agents were randomly located in two different rooms. Each player, who was unaware of the location of the other, aimed to bring her/his agent to the same room. Each player could send a symbolic message to the other before moving the agent by composing two figures whose meanings and usage were not defined and shared among participants in advance. The messages were displayed on the partners' screen immediately after sending. Thus the player could manage turn-taking, namely, they could decide the first/second sender to some extent.

To solve this game effectively, participants need to divide roles in commu-

nication. For example, one player sends a message representing her/his current location and the other decides on a destination where both agents can move to. They should notice the necessity of the role division and express their intention of taking roles in messages and turn-taking. In our experimental setting, we restrict message exchange and movement of location to once per round in order to make the connection among turn-taking, messages, and movement clearer than the experiment of Galantucci (2005). Thanks to this restriction, we can analyze how their intention of taking roles is grounded in communicative frame composed of messages and turn-taking behaviors.

By analyzing features of the formed communication systems, we confirmed that participants developed communication systems with effective symbol usage, if participants have implicit behavioral tendencies, such as using small number of symbols, meeting at the usual place, and smooth turn-taking (Konno et al., 2011).

We also confirmed that some participants achieved pragmatic grounding. They successfully communicated their intentions, for example, “willing to communicate the present location” and “willing to communicate the destination”. This function was implemented by turn-taking. The intentions of messages with the same form referring to a concrete location were interpreted correctly according to the context in which the first sender or the second sender sent the messages. They could realize the division of roles between the follower who obeyed the leader’s decision, the first sender in the above example, and the leader who decided the destination both participants could move to, the second sender.

It was shown that the implicit behavioral tendencies mentioned above did not contribute to the division of roles using turn-taking. Further qualitative exploration suggested that developing the shared semantic and syntactic rules by integrating the individuals’ partial rules was effective in realizing the pragmatic grounding. When the participants made the whole rules individually, even if the rules eventually shared by accepting the rules of one side by the other side, they tend not to achieve pragmatic grounding.

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