Level-k Analysis of Experimental Centipede Games[*]

Toshiji KAWAGOE[+] and Hirokazu TAKIZAWA[⊥]

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Abstract

The centipede game is one of the most celebrated examples of the paradox of backward induction. Experiments of the centipede game have been conducted in various settings: two-person games with linearly increasing payoffs (McKelvey and Palfrey, 1992), two-person games with constant-sum payoffs (Fey, McKelvey and Palfrey, 1996) and three-person games (Rapoport et al. 2003). Several models have been proposed for explaining the observed deviations from the subgame-perfect equilibrium prediction, which include models with fairness concern or altruism. Focusing on the initial responses, this paper attempts to offer another explanation for the observed deviations by using level-k analysis, a non-equilibrium model of strategic thinking. We show that level-k analysis gives consistently good predictions for the results of experimental centipede games. The results suggest that experimental results of centipede games be explained without invoking fairness or altruism.

Keywords: centipede game, level-k analysis, bounded rationality, altruism, experiment
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[+] Department of Complex Systems, Future University - Hakodate, 116-2 Kameda Nakano cho, Hakodate, Hokkaido, 041-1112, Japan.
Phone: +81-138-34-6424, fax: +81-138-34-6301, e-mail: kawagoe@fun.ac.jp
[⊥] Graduate School of Management and Information Sciences, Tama University, 4-1-1 Hijirigaoka, Tama City, Tokyo, 206-0022, Japan.
Phone: +81-42-337-7111, fax: +81-42-337-7103, e-mail: takizawa@tama.ac.jp