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Self-organized division of labor leads to behavioral contagion in mixed social groups.

The emergence of division of labor is a major transition in the evolution of social organization. Theory suggests that variation in response thresholds among workers can drive specialized behavior. However, few studies consider interactions between workers with distinct behavioral tendencies. We combine mathematical modeling with experiments to study fixed thresholds, the simplest form of response thresholds, as a mechanism for the emergence of specialization in genetically or developmentally heterogeneous groups. These groups exhibit behavioral types that vary in the efficiency with which they perform tasks and in the ability to meet colony needs. Counterintuitively, in the fixed threshold model, mixing two types that differ in task efficiency leads to behavioral contagion. This contagion exhibits asymmetry that depends on how well each type keeps up with colony demands. We then compare our theoretical results with data from camera tracking experiments in colonies of the clonal raider ant, *Ooceraea biroi*, with controlled genetic, demographic, and morphological compositions. We show that the model captures the range of behavioral patterns observed. Fixed thresholds, despite their simplicity, offer a powerful mechanism for behavioral specialization in mixed groups. (Received August 15, 2019)