

Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Division of Labor in the Absence of Task-Switching Costs SHANE MEYER, SONYA BAHAR, University of Missouri at St. Louis — The evolution of division of labor is a question of critical importance in biology. Mathematical models have consistently shown that some sort of tradeoff is required in order for specialization to evolve. In some models, the tradeoff is an explicit cost of *task-switching*, where it is easier to continue one task than it is to begin a new one. We have developed an agent-based model to investigate other forms of tradeoffs which could naturally lead to specialization. The model includes two populations competing for one essential resource. Agents in the model have two traits which influence their probabilities to forage for resource or socialize with another agent, allowing sharing of resource to occur. Results from the model show that restricting agents to perform one task at a time, along with risks associated with foraging for essential resources in the environment, can lead to a population where some members evolve to avoid foraging. This demonstrates that some degree of division of labor can indeed evolve in the absence of task-switching costs.

Sonya Bahar
University of Missouri at St. Louis

Date submitted: 11 Nov 2016

Electronic form version 1.4