Aggregating decisions from simple tasks to predict complex network behavior: An experimental test

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Abstract

There is a long tradition in experimental economics, and microeconomics more generally, of modeling complex environments from the ground up by focusing on the behavior of individual elements in the environment rather than focusing directly on aggregated behavioral indicators. Many interesting phenomena can be explained, in the aggregate, from interactions between individual agents following simple behavioral rules. Here, we apply the same "ground-up" intuition to networks. We decompose the decision problem of an individual agent (who resides on a node of the network) into various sub-decision problems and then ask the question: "is understanding the agent's behavior in the sub-decision problems sufficient for understanding the behavior of the agent in the original decision problem?" Furthermore, by studying the sub-decision problems in isolation, we are able to compare subject performances across different aspects of a network game.

Behavior in the sub-decision problems predict network behavior well on one dimension (endogenous link formation) but predict poorly on a second dimension (information aggregation). Given that our sub-decision problems are very similar to our network environment, we interpret this as providing evidence that, in general, understanding individual level behavior in sub-decision problems is not sufficient for understanding behavior in information transmission games in networks.

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