

## **“Patterns of innovation and imitation in human collective behavior”**

Whenever people make choices in an environment that consists largely of other people also making choices, they face a crucial decision of when to imitate other people’s choices and when to try to innovate on their own. My laboratory has been interested in how individuals decide whether and how to innovate, and the how these decisions affect the entire social network’s ability to collectively search a problem space. In laboratory experiments, we study the dissemination of innovations in social networks. The results indicate that complete information is not always beneficial for a group, and that problem spaces requiring substantial exploration may benefit from networks with mostly locally connected individuals. We model the dissemination of innovations in these experiments using agents that probabilistically select choices guided by their own and their neighbors’ explorations. In a real-world extension of this work, we study how parents in the United States name their babies. Using a historical database of the names given to children over the last century in the United States, we find that naming choices are influenced by both the frequency of a name in the general population, and increasingly by its “momentum” in the recent past. By this momentum bias, names which are growing in popularity are preferentially chosen. Across both laboratory and real-world studies, we find evidence for several strategies for determining whether to imitate or innovate based on: similarity, choice popularity, timing, and success. We also describe the effect that these individual-level choices have on group-level outcomes such as choice diversity, problem space coverage, and overall group performance.