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The influence of cryptic cognitive diversity on the productivity of scientific teams

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Abstract

The complexity of fisheries issues in concert with a greater degree of specialization has resulted in the growing use of working groups or other forms of teamwork to address pressing issues in marine management. Theory predicts that diversity in team composition will increase creativity and productivity of groups. The notion of a strong effect of diversity on scientific team performance is not backed by reliable and generalizable evidence. Moreover, diversity in scientific working groups is typically characterized by observable traits such as gender, ethnicity, nationality, or professional discipline, and the potential profound impact of cognitive diversity has not been examined. In this study, we investigated the impact of this cryptic cognitive diversity on creativity, cooperation, conflict and adaptability of scientific teams. We first developed fuzzy-logic cognitive maps for all team members, using the Baltic Sea pelagic system as a case study. We then used variability in network traits of these mental models as the principle axis of diversity, and created teams of varying levels of diversity. We next performed an experiment in which teams participated in a cooperative, decision-making game, with the hypothesis that more diverse teams would exhibit higher creativity and conflict, and lower productivity than less diverse teams. Team members showed enormous cognitive diversity with mental models varying greatly in linkage number, density, centrality and node membership. Experimental results suggested that this diversity played an important, but complex role in team functioning, with impacts on both the magnitude and frequency of conflict as well as overall team success.

Keywords: Mental model, fuzzy-logic cognitive mapping, behavioral economic experiment, Baltic Sea, diversity

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