

# Diversity, Trust, Conformity

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Philosophers, psychologists and social scientists have explored ways in which diversity might lead to epistemically better science or improve group performance (Aggarwal & Woolley, 2013; Bear & Woolley, 2011; Steel, Fazelpour, Gillette, Crewe, & Burgess, 2018; Kitcher, 1990, 1993; Zollman, 2007; Weisberg & Muldoon, 2009; Phillips, Liljenquist, & Neale, 2009; Page, 2017; Hong & Page, 2004; Wylie, 2003). A prominent line of research, pursued especially by philosophers of science and computational social scientists, has been to employ analytical and computational models that aim to explain how and under what conditions diversity can lead to enhanced group performance (Zollman, 2007; Muldoon, 2013; Weisberg & Muldoon, 2009; Hong & Page, 2004, 2004; Strevens, 2003).

Due to their ability to model emergent outcomes of complex systems in idealized settings, agent-based models have provided a particularly promising tool for studying the impact of group diversity on collective performance (Weisberg & Muldoon, 2009; Zollman, 2007; Hong & Page, 2004; Grim et al., 2019; Rosenstock, Bruner, & O'Connor, 2017; Angere & Olsson, 2017). Despite differences in approach, the notion of diversity is understood in essentially the same way in these models, namely, in terms of the variety of cognitive repertoires that group members bring to bear on the common task. Let us use the term *cognitive diversity* in referring to diversity in this sense.

However, the societal interest in diversity primarily pertains to the diversity of *demographics*. While various policy makers and institutions have turned to agent-based models for evidence regarding the impact of “increasing underrepresented groups” (Grim et al., 2019, p. 98), no direct evidence has been provided by such models. One may thus reasonably ask, “what would happen if we made the groups *demographically* more diverse, while keeping their *cognitive* diversity fixed? Would we observe any benefit for group performance?” According to the dominant view in the fields of psychology, sociology, and organizational research, the answer is negative (see Steel, Fazelpour, Crewe, and Gillette, 2019 for a review of the relevant literature). Demographic diversity can be epistemically beneficial, according to this view, only when it “correlates with or causes germane cognitive diversity” (Page, 2017, p. 9, see also Milliken and Martins, 1996; Joshi, Liao, and Roh, 2011; Lungeanu and Contractor, 2015; Smith-Doerr, Alegria, and Sacco, 2017).

A number of empirical researchers have questioned the dominant view, how-

ever. They have argued that, at least in certain settings, demographic diversity can enhance group performance, even when its influence is not mediated through cognitive diversity (Bear & Woolley, 2011; Phillips, Mannix, Neale, & Gruenfeld, 2004; Phillips, 2017). According to one proposal (Phillips et al., 2009; Phillips & Apfelbaum, 2012; Levine et al., 2014), demographic diversity can be beneficial because it counteracts certain detrimental group influences that may plague homogenous groups. For example, agents in homogenous groups tend to put too much trust in each other’s testimony, resulting in a lack of diligence in processing information from social sources. Similarly, in homogenous groups, agents may refrain from expressing dissenting perspectives for the fear of disapproval from other group members, leading to an unwillingness to share novel and productive ideas. These hypotheses thus suggest that even when cognitive diversity is fixed, demographic diversity can benefit group performance by reducing the influences that negatively impact how the information distributed among the agents is evaluated and elicited (Steel et al., 2019). Instead of socio-demographic diversity just leading to conflict, it can productively unsettle the information processing and decision making practices of a group.

The hypotheses present intriguing possibilities about the benefits of demographic diversity, but a thorough assessment of the hypotheses has been hampered by a variety of factors including relatively small sample sizes, the difficulty of completely decoupling demographic from cognitive diversity, as well as the complications involved in assessing the longitudinal effects of increased diversity in a group of interacting agents, where potential benefits may be overwhelmed by obstacles such as conflict and lack of trust.

Here, by augmenting a model developed by Zollman (2007, 2010), we construct a model for testing the mechanisms suggested by the hypotheses that demographic diversity can positively impact group performance, even in the absence of any correlation with cognitive diversity. We first explain how the hypothesized mechanisms are supposed to work, and why agent-based models are a useful tool for examining these hypotheses. We present the results of two simulations aimed at testing the two hypotheses above: The first simulation tests the claim that demographic diversity positively influences group performance by reducing the excessive mutual trust between group members. The second simulation examines the claim that diversity epistemically benefits the group by reducing the conformity pressure felt by group members.

The results of the two simulations lend support to the main claims of these hypotheses. We provide a general discussion of the results, where we (1) highlight some of the limitations of the proposed model; (2) critically examine the uptake of the results of agent-based models that had not represented demographic identity; and (3) provide suggestion for the use of robustness analysis in evaluating simulation studies that seek to provide empirical insight and practical guidance. We show how emphasis on *empirically sensitive robustness* offers a natural avenue of collaboration between empirical and simulation-based research on diversity.