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RPPR Final Report

as of 27-Apr-2023

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Proposal Number: 74780HC

Agreement Number: W911NF-19-1-0281

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Final Report for Period Beginning 01-May-2019 and Ending 30-Oct-2022

Title: Social and Behavioral Science: How inequality and segregation shape (and are shaped by) cooperation and collective action

Begin Performance Period: 01-May-2019

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Submitted By: Brent Simpson

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STEM Degrees:

STEM Participants:

Major Goals: How do inequalities within communities alter patterns of cooperation and collective action among community members? And how does this depend on whether the community is segregated by wealth? Similarly, how does cooperation/collective action alter societal-level inequalities and wealth-based segregation? These questions exist at the intersection of two of social sciences most fundamental problems: i) the emergence and persistence of inequalities and ii) the conditions that give rise to human cooperation and social order.

Because social science has addressed these problems in isolation from one another, existing research cannot answer these core questions. We bridge fundamental insights into inequality and segregation with models of cooperation and collective action to explain how inequalities alter patterns of cooperation/collective action, and how cooperation/collective action, in turn, contribute to sustained societal-level inequalities.

We proposed two large studies, and conducted several small follow-up studies with additional treatments to allow us to rule out alternative explanations. Each main study, along with the follow-ups, has or will produce several papers. Both studies take seriously the fact that societies are almost always characterized by wealth inequalities and wealth-based segregation. And both highlight unrecognized interdependencies between inequality and segregation in both collective action (Study 1) and cooperation (Study 2).

One line of our research used multi-level public goods models to test our argument that, in segregated groups, the focus of collective actions endogenously shifts from global levels (e.g., cities) to local levels (e.g., neighborhoods). Thus, rather than contributing to collective actions that are more globally beneficial, those in wealthier communities contribute to local-level collective actions. This, in turn, leaves those in resource poor neighborhoods to turn inward as well, shifting their focus from global- to local public goods. Because poorer communities produce less valuable collective actions than richer ones, this leads to growing inequalities between communities and the failure of large-scale collective action. We argued and empirically tested our prediction that a very different dynamic plays out in integrated societies. We show that by modeling these dynamics with multi-level public goods we can capture fundamental, but heretofore unrecognized connections between inequality, segregation and (the success or failure of) collective actions.

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A second line of our research focused on networked groups. Prior work shows that dynamic networks promote cooperation, but this literature has not addressed resource inequality, or how agents leverage the social capital of their network ties. We argued that wealth inequality dramatically alters both the evolution of social structure and cooperation. Specifically, we expected homophily to drive wealth-based sorting, giving rise to wealth-based segregation, altered patterns of cooperation, and growing inequalities. In addition to wealth-based segregation, we also address a different form of inequality, namely a novel operationalization of social capital – one based on the benefits derived from interacting with more or less wealthy alters. This captures the (dis)advantages that accrue from interacting with those who possess (less) more social capital. Coupled with wealth-based sorting, we argued that social capital sorting leads to increased inequality over time, something that has been documented in many societies. Our argument suggests that these increases in inequality are partly due to the dynamics of networks and cooperation, a heretofore unrecognized mechanism in the emergence and persistence of segregation and inequality.

As an elaboration of the main networked cooperation studies, we also looked at segregation based on group identities, and how such segregation depends on different reputation systems. This latter paper just received a second revise and resubmit from Nature Communications (Impact Factor = 17.69). That paper only uses half the data from that experiment (namely the dynamic networks conditions). Once that paper is accepted for publication, we will begin writing up data from the static network conditions.

Accomplishments: We collected data for both large experiments described in the goals (and our original proposal), as well as a series of follow-ups to rule out alternative explanations, and to answer novel questions that emerged from the main experiments. Most of our write-ups have thus far focused on the the networks studies. The first paper from this phase of the grant was published in Scientific Reports. That paper addresses two aspects of inequality that shape the evolution of cooperation in dynamic social networks. Results from this paper (N=1080) show that inequality alters the distribution of cooperation within networks such that participants engage in more costly cooperation with their wealthier partners in order to maintain more valuable connections to them. Inequality also influences network dynamics, increasing the tendency for participants to seek wealthier partners, resulting in structural network change. These processes aggregate to alter network structures and produce greater system-level inequality. The findings thus shed critical light on how networks serve as both boon and barrier to macro-level human flourishing.

An additional paper from this project, mentioned in the goals, just received its second (favorable) revise and resubmit from Nature Communications. That paper addresses i) how the introduction of identity information in dynamic cooperation networks shifts the tendency for networks to segregate based on these identities, rather than cooperative tendencies and ii) how this depends on the types of reputations people can develop (e.g., whether a person's reputation distinguishes between how they treat members of one group versus another). These results show how identities and reputations can influence not only cooperation but network-level segregation and social capital. This paper thus sheds light on the social and network conditions that reduce spatial polarization and contribute to the weakening of identity based echo chambers.

We have a final paper to write up with data on static conditions of our final network experiment. We will draft that paper in the coming months and present it at the European Conference on Social Networks in Slovenia in September 2023. We hope to have it submitted to a general science outlet by the end of the year.

Finally, progress on the collective action studies was slowed due to covid and a higher-than-expected administrative load by the PI (who was department chair and had to over-teach during the project period). However, Simpson will begin his sabbatical in June and will devote part of that time to completing the write-up of these collective action papers.

In addition to these “primary” projects, the grant also supported (and is/will be acknowledged in) Simpson's research on the following projects:

Simpson, Brent, Robb Willer, and Matthew Feinberg. "Radical flanks of social movements can increase support for moderate factions." *PNAS Nexus* 1, no. 3 (2022): pgac110.

Heiserman, Nicholas, and Brent Simpson. "Ideology shapes how workers perceive and react to workplace discrimination: An experimental study on parenthood discrimination." *Social Science Research* 102 (2022): 102642.

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Nicholas Heiserman and Brent Simpson. "Discrimination reduces work effort of those who are disadvantaged and those who are advantaged by it." (Under second round of review at Nature Human Behaviour.)

Eriksson, Kimmo, Pontus Strimling, Irina Vartanova, Brent Simpson. In progress. "The Modern Justifications Theory of Social Norms" (To be submitted to the American Journal of Sociology)

Training Opportunities: Graduate students at both the University of South Carolina and Ohio State University have been involved in the projects and thus have gained extensive experience in designing and conducting lab- and web-based experiments. One or more of these students (depending on their level of interest and intellectual contribution to the projects) were involved in all stages of the write-up process, and graduate student co-authors have been (or will be) included in all papers that come out of the project. One of the students who has been heavily involved in the project (Nicholas Heiserman at USC) just accepted a tenure track job offer at Oklahoma State University.

Results Dissemination: The following papers, which were directly or indirectly, supported by the grant have been published/accepted

David Melamed, Brent Simpson, Bradley Montgomery, and Vedang Patel. 2022. "Inequality and Cooperation in Social Networks." Scientific Reports 12:6789.

Simpson, Brent, Robb Willer, and Matthew Feinberg. "Radical flanks of social movements can increase support for moderate factions." PNAS Nexus 1, no. 3 (2022): pgac110.

Nicholas Heiserman and Brent Simpson. 2022. "Ideology Shapes How Workers Interpret and Respond to Workplace Discrimination: An Experimental Study on Parenthood Discrimination." Social Science Research: 102: 102642.

Additionally, Simpson gave the keynote to the Annual Conference of Experimental Sociology in August 2022 in the Netherlands and presented results from this project. Results from the project will also be presented at the European Social Networks conference and various invited talks during Simpson's Fall sabbatical in the Netherlands.

Honors and Awards: Nothing to Report

Protocol Activity Status:

Technology Transfer: Nothing to Report

PARTICIPANTS:

Participant Type: PD/PI

Participant: Brent Simpson

Person Months Worked: 2.00

Project Contribution:

National Academy Member: N

Funding Support:

Participant Type: Co PD/PI

Participant: David Melamed

Person Months Worked: 2.00

Project Contribution:

National Academy Member: N

Funding Support:

Participant Type: Graduate Student (research assistant)

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Participant: Bradley Montgomery
Person Months Worked: 9.00
Project Contribution:
National Academy Member: N

Funding Support:

Participant Type: Graduate Student (research assistant)
Participant: Jered Abernathy
Person Months Worked: 6.00
Project Contribution:
National Academy Member: N

Funding Support:

Participant Type: Graduate Student (research assistant)
Participant: Nicholas Heiserman
Person Months Worked: 6.00
Project Contribution:
National Academy Member: N

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ARTICLES:

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Article Title: Measuring Perceptions of Economic Inequality and Justice: An Empirical Assessment

Authors: Nicholas Heiserman, Brent Simpson

Keywords: Perceived inequality; just inequality; income inequality; inequality estimation

Abstract: How should we measure people's perceptions of—and attitudes about—economic inequality? A recent literature seeks to quantify the level of inequality that people, especially Americans, perceive and prefer in society. These findings have garnered much attention from both social scientists and the public. But many of the methods used in this literature are either known to have methodological issues or have not been thoroughly compared against other methods. Thus it is not clear which, if any, are valid and reliable measures of perceived, or preferred, inequality. To assess these measures, we conducted a large web-based study (N=?831) to compare key methods for measuring perceived inequality and their related justice attitudes. In addition to comparing the resultant summary statistics, we assess how well the different measures correlate with each other and with Likert scale measures of perceived inequality. Our analysis reveals a range of issues with these measures, including failure ...

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Acknowledged Federal Support: Y

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Peer Reviewed: Y

Publication Status: 1-Published

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Publication Location:

Article Title: Inequality and cooperation in social networks

Authors: David Melamed, Brent Simpson, Bradley Montgomery, Vedang Patel

Keywords: networks, inequality, cooperation, wealth, productivity

Abstract: Social networks are fundamental to the broad scale cooperation observed in human populations. But by structuring the flow of benefits from cooperation, networks also create and sustain macro-level inequalities. Here we ask how two aspects of inequality shape the evolution of cooperation in dynamic social networks. Results from a crowdsourced experiment (N = 1080) show that inequality alters the distribution of cooperation within networks such that participants engage in more costly cooperation with their wealthier partners in order to maintain more valuable connections to them. Inequality also influences network dynamics, increasing the tendency for participants to seek wealthier partners, resulting in structural network change. These processes aggregate to alter network structures and produce greater system-level inequality. The findings thus shed critical light on how networks serve as both boon and barrier to macro-level human flourishing.

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Article Title: Ideology shapes how workers perceive and react to workplace discrimination: An experimental study on parenthood discrimination

Authors: Nicholas Heiserman, Brent Simpson

Keywords: Discrimination, Legitimation, Family, Gender ideology, Ideal worker

Abstract: Employers use ideologically-tinged rhetoric to justify workplace discrimination. We argue that workers will be less likely to label biased treatment against them as discriminatory when they subscribe to those ideologies as well. We tested this prediction and the consequences of labeling for work attitudes and performance using an experiment that assigned parents to a low-status position in a work group, varying whether the decision invoked biased, ideological assumptions about parenthood. As expected, ideology drove mothers' (but not fathers') labeling. Mothers were less likely to label biased treatment against them as discriminatory when they were conservative and when they subscribed to separate spheres and ideal worker ideologies. Mothers who labeled their treatment as discriminatory had more negative work attitudes than those who did not, but also tended to appeal the decision. Ideology thus shapes whether people label discrimination when it occurs as well as their subsequent work

Distribution Statement: 2-Distribution Limited to U.S. Government agencies only; report contains proprietary info

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Partners

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I certify that the information in the report is complete and accurate:

Signature: Brent Simpson

Signature Date: 4/27/23 10:04AM

Papers that have been published, forthcoming, or have received at least one revise and resubmit.

“Reputation, Cooperation, and the Emergence of Political Segregation in Networks”

Brent Simpson, Bradley Montgomery, and David Melamed

Paper invited for second revise and resubmit at *Nature Communications* (Impact Factor = 17.69)

Abstract

Reputation systems have powerful effects on cooperation and tie formation in social networks¹⁻⁴. But how reputations affect cooperation and the evolution of networks is less clear when societies are characterized by fundamental, identity-based, social divisions like those centered on politics in the contemporary U.S.⁵. Using a large web-based experiment with participants embedded in networks (N=1,073) where ties represented the opportunity to play an iterated prisoner’s dilemma⁶⁻⁸, we investigated how cooperation and network segregation varies with whether and how reputation systems track behavior toward outgroup members, i.e., members of the opposing political party. As predicted, when participants knew others’ political affiliation, early cooperation patterns showed in-group favoritism. As a result, networks became segregated based on politics. However, we were able to reduce such favoritism and network-level political segregation by revealing to everyone how participants had behaved towards participants from both their own party and participants from the other party. These findings have implications for our understanding of reputation systems in polarized contexts, and for reducing the tendency for societies to segregate based on fundamental social identities.

Melamed, David, Brent Simpson, Bradley Montgomery, and Vedang Patel. "Inequality and cooperation in social networks." *Scientific Reports* 12, no. 1 (2022): 6789. Impact Factor = 4.99

Abstract

Social networks are fundamental to the broad scale cooperation observed in human populations. But by structuring the flow of benefits from cooperation, networks also create and sustain macro-level inequalities. Here we ask how two aspects of inequality shape the evolution of cooperation in dynamic social networks. Results from a crowdsourced experiment (N = 1080) show that inequality alters the distribution of cooperation within networks such that participants engage in more costly cooperation with their wealthier partners in order to maintain more valuable connections to them. Inequality also influences network dynamics, increasing the tendency for participants to seek wealthier partners, resulting in structural network change. These processes aggregate to alter network structures and produce greater system-level inequality. The findings thus shed critical light on how networks serve as both boon and barrier to macro-level human flourishing.

“Discrimination reduces work effort of those who are disadvantaged *and* those who are advantaged by it”

Nicholas Heiserman and Brent Simpson

Revise and Resubmit at Nature Human Behavior (Impact Factor = 24.25)

Abstract

Research shows that discrimination is widespread in work organizations, yet we know little about the causal effects of discrimination on employees' work effort. Here we argue that, by decoupling effort from rewards, discrimination reduces the work effort of those who are disadvantaged by discrimination *and those advantaged by it*. We test these arguments against the results of five experiments designed to model promotion situations in organizations (total $N=1,184$). The studies show that when supervised by a manager with a discriminatory preference, both disadvantaged and advantaged workers reduce their work effort relative to a control condition where the manager is not discriminatory. The negative effect of discrimination is larger for those disadvantaged by it. These effects are mediated by employees' beliefs about how strongly work will impact their chances of reward. We then demonstrate that the relatively greater effort of advantaged – vs disadvantaged – workers in discriminatory organizations leads to a self-fulfilling prophecy: when faced with this effort differential, managers ($N=119$) who did not have a priori discriminatory attitudes judged the advantaged category as more competent and deserving of workplace advancement than the disadvantaged category. Our results show that even though discrimination reduces all workers' effort, it ultimately produces outcomes that reify and entrench discriminatory beliefs.

Simpson, Brent, Robb Willer, and Matthew Feinberg. "Radical flanks of social movements can increase support for moderate factions." *PNAS Nexus* 1, no. 3 (2022): pgac110. (New journal. No Impact Factor yet)

Abstract

Social movements are critical agents of social change, but are rarely monolithic. Instead, movements are often made up of distinct factions with unique agendas and tactics, and there is little scientific consensus on when these factions may complement—or impede—one another's influence. One central debate concerns whether radical flanks within a movement *increase* support for more moderate factions within the same movement by making the moderate faction seem more reasonable—or *reduce* support for moderate factions by making the entire movement seem unreasonable. Results of two online experiments conducted with diverse samples ($N = 2,772$), including a study of the animal rights movement and a preregistered study of the climate movement, show that the presence of a radical flank increases support for a moderate faction within the same movement. Further, it is the use of radical *tactics*, such as property destruction or violence, rather than a radical *agenda*, that drives this effect. Results indicate the effect owes to a contrast effect: Use of radical tactics by one flank led the more moderate faction to appear less radical, even though all characteristics of the moderate faction were held constant. This perception led participants to identify more with and, in turn, express greater support for the more moderate faction. These results suggest that activist groups that employ unpopular tactics can increase support for other groups within the same movement,

pointing to a hidden way in which movement factions are complementary, despite pursuing divergent approaches to social change.

Heiserman, Nicholas, and Brent Simpson. "Ideology shapes how workers perceive and react to workplace discrimination: An experimental study on parenthood discrimination." *Social Science Research* 102 (2022): 102642. Impact Factor 2.62

Abstract

Employers use ideologically-tinged rhetoric to justify workplace discrimination. We argue that workers will be less likely to label biased treatment against them as discriminatory when they subscribe to those ideologies as well. We tested this prediction and the consequences of labeling for work attitudes and performance using an experiment that assigned parents to a low-status position in a work group, varying whether the decision invoked biased, ideological assumptions about parenthood. As expected, ideology drove mothers' (but not fathers') labeling. Mothers were less likely to label biased treatment against them as discriminatory when they were conservative and when they subscribed to separate spheres and ideal worker ideologies. Mothers who labeled their treatment as discriminatory had more negative work attitudes than those who did not, but also tended to appeal the decision. Ideology thus shapes whether people label discrimination when it occurs as well as their subsequent work attitudes and justice-seeking behaviors.

Heiserman, Nicholas, and Brent Simpson. "Measuring perceptions of economic inequality and justice: An empirical assessment." *Social Justice Research* 34, no. 2 (2021): 119-145. Impact Factor = 1.70

Abstract

How should we measure people's perceptions of—and attitudes about—economic inequality? A recent literature seeks to quantify the level of inequality that people, especially Americans, perceive and prefer in society. These findings have garnered much attention from both social scientists and the public. But many of the methods used in this literature are either known to have methodological issues or have not been thoroughly compared against other methods. Thus it is not clear which, if any, are valid and reliable measures of perceived, or preferred, inequality. To assess these measures, we conducted a large web-based study ($N = 831$) to compare key methods for measuring perceived inequality and their related justice attitudes. In addition to comparing the resultant summary statistics, we assess how well the different measures correlate with each other and with Likert scale measures of perceived inequality. Our analysis reveals a range of issues with these measures, including failure to provide logical responses, large method effects on point estimates of inequality, and low correlations between methods and with criteria measures. We conclude our analysis with three recommendations for researchers aiming to measure inequality perceptions and preference.

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