

How Segregation Ruins Inference: A Sociological Simulation of the Inequality Equilibrium

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Why do many people underestimate economic and racial inequality and maintain that theirs is a meritocratic society? Existing work suggests that people are rationalizing, misinformed, or misled. This article proposes an additional explanation: Inequality itself makes economic and racial disparities difficult to understand. In unequal societies, individuals establish their networks at formative institutions patterned by class and race. As a result, they unwittingly condition on key causal pathways when making descriptive and causal inferences about inequality. We use a simple agent-based model to show that, under circumstances typical to highly stratified societies, individuals will underestimate the extent of economic and racial inequality, downplay the importance of inherited advantages, and overestimate the relative importance of individual ability. Moreover, we show that they will both underestimate the extent of racial discrimination and overestimate its relative importance. Because segregated social worlds bias inference in these ways, all individuals (rich and poor) have principled reasons to favor less redistribution than they would if their social worlds were more integrated.

Introduction

Public opinion in unequal societies presents a puzzle. Even though modern capitalist societies are neither equal nor meritocratic, many people perceive them to be so (Alesina, Stantcheva, and Teso 2018; Mijs 2021; Starmans, Sheskin, and Bloom 2017). Americans are especially misinformed; they tend to think their society is less unequal (Gimpelson and Treisman 2018; Kenworthy and McCall 2008; Kiatpongsan and Norton 2014; Norton and Ariely 2011; Osberg and Smeeding 2006; Page and Goldstein 2016) and more socially mobile (Alesina et al. 2018; Davidai and Gilovich 2015;

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Kraus 2015; Kraus and Tan 2015; Reynolds and Xian 2014) than it really is.¹ This puzzle has gained new urgency as inequality has reached unprecedented levels (Atkinson, Piketty, and Saez 2011; Morris and Western 1999; Neckerman and Torche 2007) and mobility has declined (Hout 2018; Song et al. 2020). Despite having greater reasons to demand redistribution, our best evidence suggests declining rather than growing concern.

Why do people err in these ways? Social scientists have offered any number of explanations for these errors: psychological mechanisms that reconcile people to the world as it is (Jost 2020); misinformation by media or elites (Kim 2023); and cultural and political forces that encourage people to blame outsiders rather than the rich (Bobo 2017; Bonikowski 2016). This article develops a different but complementary line of argument, emphasizing that people need not be rationalizing, misinformed, or misled. Rather, they may struggle simply because inequality itself distorts their ability to make inferences about it. Because inequality conditions the way in which people experience the world, it shapes how they learn about its nature and its causes and thus what they conclude should be done about it. As such, this paper reveals another path through which an inequality equilibrium is maintained.

We build this theory via a simple agent-based model which illustrates the pathways through which class and racial inequality distort people's descriptive and causal inferences. Our aim is to inform empirical research by clarifying the relevant mechanisms and thereby developing testable hypotheses. Our work shows how computational techniques can advance sociological theorizing. By making our code freely available, we hope to encourage others to extend the model we propose in this paper.²

Drawing on existing research, we note three features of high-inequality societies like the United States. First, people do not form their social worlds at random. Their networks are based in formative institutions such as neighborhoods, schools, and workplaces (McPherson, Smith-Lovin, and Cook 2001; Mijs and Roe 2021; Smith, McPherson, and Smith-Lovin 2014). Second, access to these formative institutions is patterned by privilege. That is, entry into well-resourced neighborhoods, good schools, and prestigious workplaces is conditioned by one's social class and race (Galster and Sharkey 2017; Laurison, Dow, and Chernoff 2020; Reardon and Bischoff 2011). Third, these formative institutions cultivate abilities and confer credentials: Better neighborhoods and schools give significant advantages in a competitive labor market, and coveted jobs come with high compensation, status, and security (Duncan and Murnane 2011; Kalleberg 2011; Workman 2022).

To understand the consequences for people's views about inequality, we simulate the way in which people learn about economic disparities and racial inequities. Our approach builds on Schulz, Mayerhoffer, and Gebhard (2022), who show that income-based homophily in networks leads people to make faulty descriptive inferences about the level of inequality. Our simulation reproduces this result, but we extend their research in three ways. First, we are interested in understanding the consequences of homophily for people's causal and not just descriptive inferences. That is, our aim in this paper is to describe the ways in which people draw incorrect inferences not just about the extent of inequality but also about its nature and sources. Second, our agent-based model has a temporal dimension. We model network formation at different stages of the life course. As a result, homophily in our model is grounded in the idea that networks form at institutions along the life course rather than simply a result of proximity in the income distribution. The site and stage of network formation, we show, have important consequences for how people understand inequality. Third, we model the life course in a race-stratified society, which allows us to explore the consequences of institution-based homophily for causal and descriptive inferences about racial inequality, specifically.

Our sociological simulation shows how unequal societies' three defining features (non-random social networks, unequal access to formative institutions, and formation by these institutions leading to future success) deform agents' inferences. The provocative implication is that residents of societies so characterized may have well-founded reasons not to demand redistribution. Because networks form at important gateways in the life course, people unwittingly condition on

access to those gateways when making descriptive or causal inferences about inequality. Even when armed with accurate information about their peers and making reasonable inferences about what explains a person's earnings, people consistently undervalue the extent of earnings inequality. Further, and perhaps more importantly, they underestimate the causal importance of inherited advantages to earnings. They thus **overestimate** the relative importance of ability.

Segregated social worlds have especially baleful consequences for people's inferences about racial inequality, which is a longstanding concern in sociology and social psychology (Tropp and Pettigrew 2005; Young 2006). Recent work has shown that Americans still grossly underestimate the extent of racial inequality and racial discrimination in their society (Davidai and Walker 2022; Kraus et al. 2019; Mijs, Huang, and Regan 2023; Onyeador et al. 2021). Further, Americans tend to attribute what racial inequality they do see to discriminatory behavior (present-day racism) while mostly ignoring the weight of inherited disadvantages (past racism) (Hunt 2007, 2016). Our simulation shows one way in which these incorrect inferences might arise. In contrast to agents with integrated networks, agents with segregated social worlds dramatically underestimate the extent of racial inequality and racial discrimination. They also misunderstand its causes. Because agents condition on membership in key social institutions in the life course (neighborhoods, schools, and workplaces), the causal role of race in determining access to those institutions disappears. Only subsequent discrimination is visible. Consequently, agents both underestimate the extent of racial discrimination **and** overestimate the share of inequality that can be explained by that discrimination.

As such, our contribution is to demonstrate how segregated social worlds do not foster only antipathy (Tropp and Pettigrew 2005) and misperceptions about inequality (Dawtry, Sutton, and Sibley 2015; Windsteiger 2022), as has been documented by social psychological work on the "contact hypothesis" and more recent interest in "social sampling." More fundamentally, segregated social worlds lead to cognitive distortions, deforming the way in which people make inferences.

We conclude by exploring the consequences for the politics of inequality (Gilens 2009; Homan, Valentino, and Weed 2017; Van Hootegem 2022). We show that when people make inferences about inequality in segregated networks formed along key pathways in stratified societies, they are much less likely to support income redistribution from rich to poor. Together, we show that people in modern societies might be correctly making incorrect inferences. These correctly made yet false inferences may help explain why most Americans do not want more equality despite growing levels of inequality; hence sustaining an inequality equilibrium.

Simulating Stratification

In what follows, we summarize our simulation. This section outlines our theoretical framework, motivates our modeling decisions, and provides a background for the simulation results presented in the findings section. We reserve details for the Supplementary Appendix.

The Life Course

We develop an agent-based model conceived to mimic key aspects of the intergenerational transmission of advantage in modern capitalist societies (Duncan and Murnane 2011; Hout 2018). Agent-based models are "computer programs in which artificial agents interact based on a set of rules and within an environment specified by the researcher" (Bruch and Atwell 2015). Typically, researchers' focus is on the dynamic consequences of these interactions since simple rules of interaction at the micro-level have been shown to generate unanticipated patterns at the macro-level. In our case, the focus is on individual agents' inferences about others and about their social world. Agents form inferences based on information about the life trajectories of other agents, but these inferences do not in turn affect the environment in which future agents make future inferences. This would be one natural way to extend our model. As we explain later in this paper, it might be especially generative to study how inferences in the present affect inferences

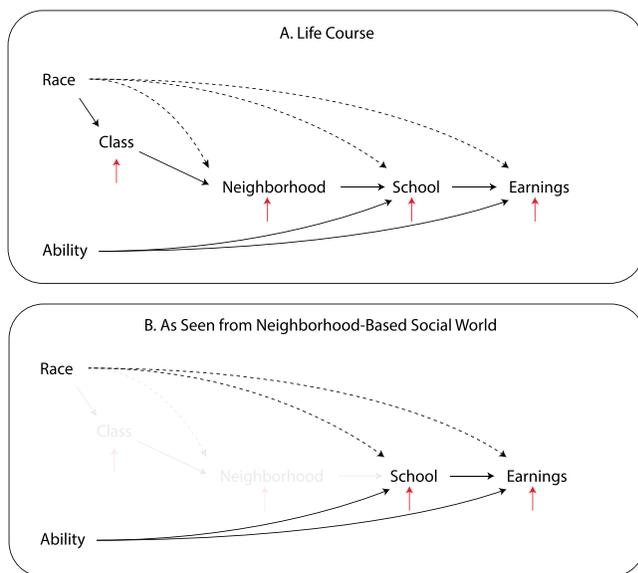


Figure 1. Life Course in a Stratified Society. Note: Panel A visualizes the life course that structures our agent-based simulation. Panel B illustrates the guiding intuition of the paper: Agents in modern societies base their inferences on information they get from their social networks, but these social networks are patterned by the causal processes that are the very object of those inferences. The result is that key causal pathways disappear from view.

in the future via their impact on redistribution (and thus, segregation). Our goal in the present work, however, is to demonstrate a logically prior point: We hope to show that segregation ruins descriptive and causal inferences for reasons that have not yet been fully appreciated.³

In what follows, we represent any given individual's life course in four stages, as shown in figure 1A. First, a given agent inherits either majority or minority racial status and an innate attribute that we call ability. Note that, in principle, racial status here could stand in for a broader array of group-based disadvantages. We do not consider what our conclusions might teach us about the kinds of inferences people might make about these other disadvantages, but this is surely a profitable area for future research. Inherited ability is randomly drawn and normally distributed. Minority status is assigned to 36% of agents, mirroring the demographic makeup of the United States. Minority status and ability are uncorrelated.

Each individual then inherits a class position, which is a function of one's racial status and a randomness parameter. Initial class position is thus not discrete, but continuous. Its real-world analog is something like parental income. We call it "class" so as not to confuse it with earnings, which each agent is assigned only in the final stage of the simulation (see below). Together, an individual's starting position in the joint distribution of race and class represents an inherited level of advantage. This describes the first stage.

From the first stage follow three subsequent stages of network formation in institutions governing life in socially stratified societies: the neighborhood, school, and market. We include multiple stages of network formation because we are interested not only in the fact that networks form at formative institutions but also in the stage at which networks form. In suggesting that these correspond to different stages, our point is not, obviously, that people cease to live in neighborhoods or are unaffected by labor markets until they enter them. Rather, we are operating on the stylized notion that childhood networks are more likely to form in neighborhoods, adolescent networks in schools and colleges, and adult networks in workplaces. We show below that different stages have different consequences for the inferences that agents make.

In the second stage, agents sort into neighborhoods of varying quality, which are the first of three formative institutions in this society. As shown in [figure 1A](#), neighborhood access is determined by social class and minority status, reflecting the present-day United States ([Duncan and Murnane 2011](#); [Galster and Sharkey 2017](#); [Reardon and Bischoff 2011](#); [Workman 2022](#)). The first denotes that access to good neighborhoods requires money, while the second denotes racial discrimination by residents and institutions.

Note that our underlying measure of neighborhood quality is continuous rather than discrete, reflecting intra-neighborhood inequality in access to private and semi-public goods (some people have bigger houses, better amenities, etc.). Like all processes of sorting and selection in our simulation, the process is not deterministic: Some people from lower social class and minority backgrounds make it into predominantly higher social class and racial majority neighborhoods (and vice versa). These randomness parameters are illustrated by the red arrows in [figure 1](#).

Subsequently, agents sort into schools, which are the second of three formative institutions in this society. They do so on the basis of minority status, inherited ability, and the quality of their neighborhood since neighborhoods may cultivate abilities that might otherwise go uncultivated, grant access to cultural, social, and financial resources, or shield agents from harm ([Alvarado 2016](#); [Burdick-Will 2016](#); [Ludwig et al. 2012](#)). Thus, while schools select applicants based largely on their credentials, they do also discriminate against minority candidates. Note that school selection is not deterministic, so there is again some luck involved, as indicated by the vertical arrows.

Finally, agents receive earnings. One might think of this step as including all the ways in which individuals derive economic returns from their educational degree, be it by securing employment or starting a business. Agents' earnings are a function of these credentials and agents' inherited abilities. They are also a function of minority status, reflecting well-established patterns of racial discrimination in contemporary societies ([Pager, Western, and Bonikowski 2009](#); [Quillian and Midtbøen 2021](#); [Stainback 2008](#)). This is the fourth and final stage of our simulation.

Inference in Segregated Social Worlds

The Life Course section described the social stratification process. The next and key step in our simulation is that each agent is asked to make a set of inferences about their society. As in [Piketty \(1995\)](#), agents infer the causal importance of inherited status (race and social class) and individual ability by sampling from their social world. Crucially, this inferential process is conditioned by the same formative institutions that stratify society ([Mijs 2018, 2023](#)). These institutions thus shape the formation of agents' social worlds by acting as "brokers" ([Gose and Small 2020](#)), limiting the type and range of persons that make up people's group of friends and acquaintances.

To do this, we give each agent a social world consisting of ties to other agents in the simulation. We vary the origins of these ties in four ways. They can be (1) drawn at random from all other agents; (2) patterned by neighborhood, meaning ties are formed exclusively with other agents in their neighborhood; (3) patterned by school, meaning ties are formed exclusively with agents who attend the same school; and (4) patterned by earnings, meaning ties are formed exclusively with agents who are close to them in the earnings distribution. In each case, we derive the relevant ties by generating a small-world network consisting of the relevant agents ([Watts and Strogatz 1998](#)). We fix the parameters of these small-world networks such that each agent is connected to roughly 80% of the agents to whom they could be connected. This number is arbitrary, but other choices do not affect our substantive conclusions (only the confidence intervals around them). We use small-world networks for the reason that these best resemble networks in the real world, but, since the results are driven by homophily rather than network structure, they are unaffected by other ways of forming these ties.

While World 1 is racially and socioeconomically integrated by design, Worlds 2–4 are characterized by substantial homophily. They are thus "segregated social worlds." Note that we use the term "segregation" to refer to the patterning of people's networks by institution rather than to refer to class or racial segregation in neighborhoods. Segregation in this latter sense is also

characteristic of our world: Race and class position govern access to good neighborhoods. But, throughout this paper, we reserve the term segregation to refer to the patterning of individuals' networks. Note also that we make no further assumptions in generating this kind of homophily. Within the constraints described above, people are indiscriminate (random) in whom they choose to befriend. Networks in real life are not formed in these ways, but the purpose of this choice is not realism. Rather, it helps illustrate the effects of *this* kind of network segregation on people's inferences about inequality.

Based on their segregated social worlds, agents make four sets of descriptive and causal inferences about the broader society.

1. They estimate overall earnings inequality, which they measure by the overall variance of the earnings distribution in their network.
2. To gauge how meritocratic their society is, they use all data at their disposal to estimate the total effect of class and ability on earnings and the independent effect of race (net of class).
3. They make an additional set of inferences about race. They estimate the cumulative effect of race (i.e., the direct effect of race via discrimination in neighborhoods, schools, and the labor market plus its indirect effect through social class as well as the share of overall variance in earnings that is due to between-race inequality (i.e., between-race sum-of-squares divided by the total sum-of-squares). This captures the extent to which they believe that members of the same race share a linked fate.
4. They estimate how much luck matters. We take this to be the amount of variance in final earnings that they cannot explain by the combination of race, class, and ability.

Importantly, agents have perfect information about other agents' racial status, social class, and ability, and they understand the causal chain that links these characteristics to life outcomes. In other words, they know the equations that govern economic mobility and observe all its constituent variables, but they estimate its coefficients based on a sample of observations conditioned by their (segregated) social world. Again, in making these assumptions, our purpose is not realism. Individuals making inferences in the real world apply flawed models to imperfect information. Future work might consider how this might enrich the model we propose here. Our point, however, is to show that even perfect information and properly specified models are no defense against systematic (and inequality-reinforcing) errors as long as one's inferential universe is constituted by the very causes that are the object of those inferences.

Findings

Figure 2 reports estimates based on our simulation. Panel A reports agents' descriptive inferences about the extent of inequality in earnings in their society, expressed as the total variance in earnings that they see. Panel B reports agents' causal inferences regarding three determinants of earnings (ability, class, and race), expressed as standardized coefficients in a regression model predicting earnings. Panel C reports agents' inference about the role of luck, expressed as the unexplained variance in earnings (i.e., that part of inequality which cannot be explained by ability, class, and race). The results reported are based on hundred simulations for each parameterization we discuss. Confidence intervals denote uncertainty due to randomness across these hundred simulations and not uncertainty arising from agents' inferences, which we ignore on the grounds that we are interested in their best guess.⁴ To measure "ground truth," in each run of the simulation, we also make each of the causal and descriptive inferences on the entire sample of agents.

Extent of Inequality

The first point to emphasize is that agents with segregated social networks make biased descriptive inferences. Specifically, they underestimate the extent of earnings inequality (figure 2A). In sampling on their neighborhood, their school or on people close to them in earnings, they see only

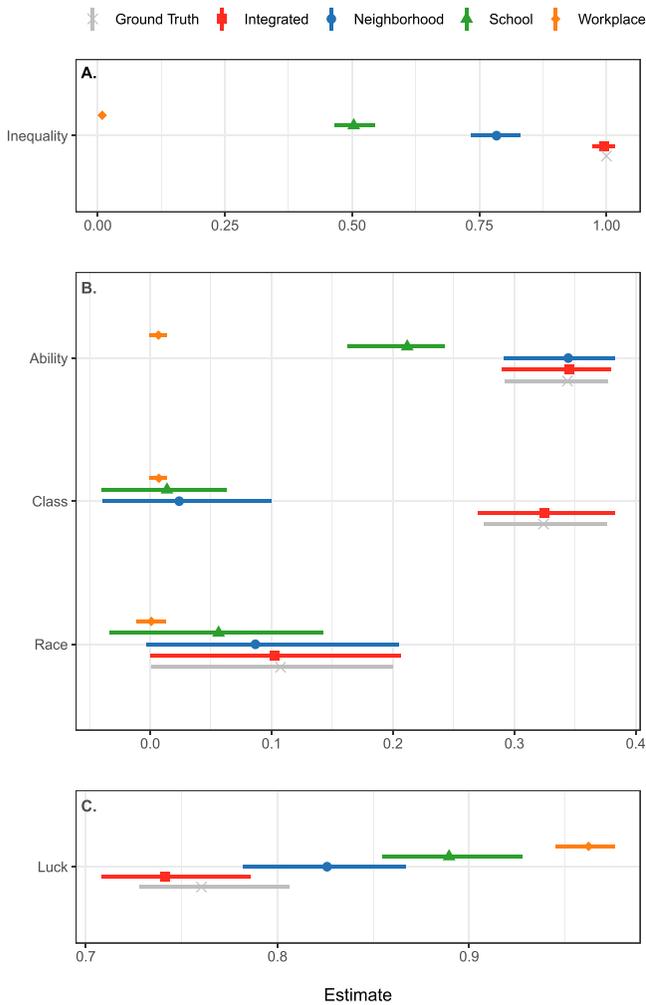


Figure 2. Causal and Descriptive Inferences. Note: This figure plots descriptive and causal inferences made by the median agent across hundred runs of our agent-based model. Panel A plots the median agent's estimate of inequality (measured as the variance of the income distribution they observe). Panel B plots the median agent's inferences about the causal effect of a standard deviation increase in ability and class on earnings as well as the direct effect (i.e., net of class) of being a member of the dominant race (in standard deviations of final earnings), while Panel C plots the median agent's inferences about how much luck governs final earnings (measured as the share of total variance in final earnings that they cannot explain by a model which includes class, ability, and race). The shapes of the points denote four simulations and contrasts them to ground truth: One in which agents' social worlds are drawn at random, a second in which they are based in neighborhoods, a third based in schools, and a fourth based in workplaces. The confidence intervals span the 2.5th and 97.5th percentile values across hundred simulations.

a fraction of the true earnings distribution. This point may not be surprising, but it bears repeating in light of the fact that Americans of all incomes massively underestimate earnings inequality (Kiatpongsan and Norton 2014). In our simulation, the rich have minimal information about the lives of the poor and the poor are similarly clueless about the lives of the rich (cf., Osberg and Smeeding 2006).

Further, our simulation suggests that the size of this bias varies with the stage at which this segregation occurs. Agents with integrated networks estimate inequality accurately, but those

who form their social world in neighborhoods underestimate it by about 22%, those whose worlds form in schools underestimate it by about 50%, and those whose world reflect their earnings group see very little inequality at all. As we will argue in our conclusion, this suggests that the earlier at which societies compel integration of people's social networks, the better will be their descriptive inferences about inequality.

Causes of Inequality

The importance of privilege, ability, and luck

An individual's earnings in our simulation are governed by inherited privilege (race and class), inherited endowments (ability), and randomness (luck). But, the key insight of our model is that not everyone reaches the same conclusions about what matters and how. Those whose networks form later in the life course are systematically misled.

First, people underestimate the importance of inherited privileges for a person's earnings. All agents with segregated social worlds underestimate the effect of race and social class on earnings (figure 2B).

Second, some but not all forms of network segregation lead individuals to underestimate the effect of ability. Those whose social worlds form in schools or are based on their earnings group underestimate the effect of ability. This is not true of those who make their inferences in neighborhoods since (by design, in our simulation) ability matters only later in the life course.⁵

Finally, network segregation leads agents to overestimate the role of luck (figure 2C). The later networks form, the less agents are able to explain of the inequality they observe in their networks. Why is this? Recall that we define luck as the proportion of variance in final earnings that agents are unable to explain. It is thus a function of both the total variance in earnings they observe and the sum of squares of explanatory variables in their model. Even though total observed variance declines the later the stage of network formation (i.e., these agents estimate less inequality), the variance they *are* able to explain with their model declines at a faster rate.⁶

What lies behind these three kinds of mistakes? Figure 1B shows what is happening. It illustrates what the world looks like to those who rely on neighborhood-based networks, specifically. The point is that *social sampling leads whole causal pathways to disappear*. For people whose networks are drawn exclusively from their neighborhood, as shown in figure 1, the direct effects of race on school and earnings remain visible, but the effects of class and discrimination in neighborhood access are both invisible. The effects of ability, by contrast, are not obscured at all. One can see how analogous but more extreme problems surface when networks formed instead in school or by earnings group.

As we discuss again below, the result is that on commonsense conceptions of morality, social sampling will incline people to believe that their society is a meritocracy and thus give them principled reasons to oppose redistribution.

Race and racial inequality

Our contribution to this point has been to simulate how people make incorrect inferences about their unequal societies. This work has been informed by prior scholarship on the distorting effects of network segregation on people's perceptions of inequality and mobility (Dawtry et al. 2015; Schulz et al. 2022; Windsteiger 2022). But, existing work has not yet considered the impact of these same forces on agent's inferences about race. After all, modern societies like the United States are not just stratified by class; they are also characterized by substantial racial inequality and racial discrimination. That is, on average, racial minorities inherit inferior class positions (what we have been calling the indirect effect of race). Further, conditional on class, racial minorities are disadvantaged in their interactions with individuals and institutions (what we have been calling the direct effect of race).

People in modern societies regularly make inferences about these facts. How much racial inequality is there in our society? How prevalent is discrimination? How much of racial inequality is due to discrimination rather than inherited inequality? Previous research has not said very

much about how network segregation might affect people's answers to these questions. In this section, we set out to examine just this. How do people living in segregated social worlds understand the magnitude, consequences, and causes of racial inequality?

Figure 3 presents four types of inferences that people might make about racial inequality. Panel A shows agents' estimate of the total earnings gap between the racial majority and minority group. Panel B plots the percentage of the variance in total earnings that is accounted for by variance between races. Panel C shows agents' inferences about the effect of present-day discrimination, specifically, on people's earnings (i.e., their estimate of the effect of race, conditional on class). And, panel D reports the percentage of the total racial earnings gap that agents attribute to present-day discrimination ($100 \times \frac{\beta_{\text{RED},i}}{\beta_{\text{RET},i}}$). Our simulation suggests two kinds of errors. First, segregated social worlds lead agents to systematically underestimate the effect of race in shaping one's fortunes. Consider their different estimates of the **total** effect of race (equivalently, the mean gap in earnings between the majority and minority group). As figure 3A shows, the true average gap between majority and minority groups in our simulations is around 0.34 standard deviations. Those whose worlds form in neighborhoods estimate this at around 0.10 [−0.02, 0.22], those whose form in schools estimate it at around 0.05 [−0.03, 0.15], and those whose form at the workplace estimate no gap at all [−0.01, 0.01].

In part, this is no surprise, given that constrained agents see far less inequality overall. Yet, the muted estimates of the racial gap cannot be explained by this fact alone. As figure 3B shows, of the total earnings inequality they do observe, agents also attribute a slightly smaller share to race. That is to say, when decomposing total earnings variance into its between-race and within-race components, agents basing inferences on segregated social worlds **underestimate** the share that is due to between-race variation in average earnings. A segregated social world is thus less likely to furnish a sense of linked economic fate.

Second, it is not just the case that agents underestimate the total racial gap. Importantly, they also misunderstand its **causes**. Figure 3D plots agents' estimation of the role of present-day discrimination. By construction, discrimination explains about 31% of the total racial gap, which is roughly the share of the gap attributed to discrimination by those with integrated networks. Yet, agents who form segregated networks all dramatically overstate its relative importance.

Note, however, that while agents overstate the relative importance of race-based discrimination, they in fact **understate** its absolute importance. As shown in figure 3D, and discussed above, agents underestimate the extent of race-based discrimination as well as the total level of racial inequality. In other words, network segregation yields people who are both less alive to the facts of racial discrimination and more likely to use discrimination to explain the little racial inequality that they do observe.

To see why agents' inferences about racial inequality are warped, consider again figure 1B. As the DAG shows, agents who unwittingly condition on neighborhoods will see only a certain kind of race effect. The effects of past discrimination are invisible. Agents see only race-based discrimination in the process of sorting into schools and earnings.

We think these twin facts capture something important about contemporary discussions of race in societies like the United States. There is by now considerable evidence to suggest that people tend to underestimate just how much inequality and discrimination exists. In fact, the American public seems to think that racial inequality has all but disappeared (Davidai and Walker 2022; Kraus et al. 2019; Onyeodor et al. 2021). Yet, when people are confronted with the fact of racial inequality, discrimination is often their only explanation. One example of this might be discussions of racial inequality inside the American criminal justice system, for instance, which has recently been front and center in public consciousness. Most of the racial disparities in American prisons are explained by disparities in crime commission (Beck and Blumstein 2018; Tonry and Melewski 2008), which are, in turn, simply the result of racial inequality in life circumstances (Sampson and Wilson 1995). Yet, the most cited work on American mass incarceration of the last decade, and unarguably the work with most public resonance, explains these racial disparities by reference to institutional and interpersonal racism inside the criminal

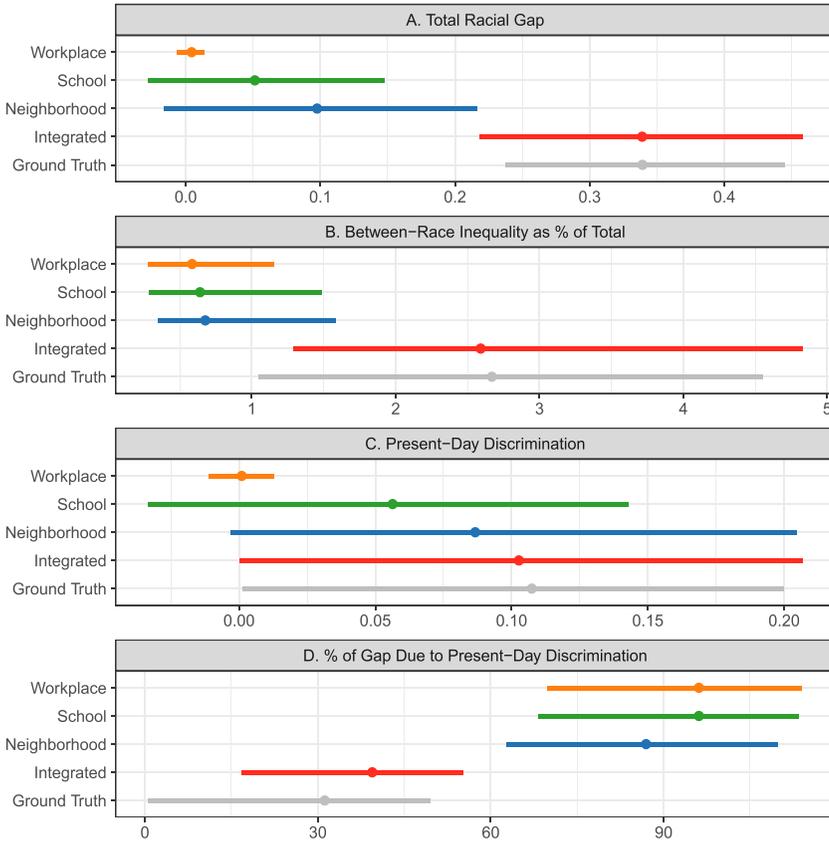


Figure 3. Inferences about racial inequality. Note: This figure plots race-related inferences made by the median agent across hundred runs of our agent-based model. The “Total Racial Gap” refers to the median agent’s estimate of the total (i.e., unconditional) effect of race on final earnings, measured in standard deviations of final earnings (Panel A). “Between-Race Inequality as % of Total” refers to the median agent’s estimate of the share of total variance that can be attributed to the difference between the dominant and majority race (Panel B). “Present-day Discrimination” refers to the median agent’s estimate of the direct effect of race on final earnings (i.e., net of class) (Panel C). “% of Gap Due to Present-Day Discrimination” refers to the median agent’s estimate of the share of the total gap that can be explained by the direct effect they estimate (Panel D). The y-axis denotes how individuals form networks. Confidence intervals span the 2.5th and 97.5th percentile values across hundred simulations.

justice system (Alexander 2012). Our simulation suggests one possible explanation for the public focus on present-day discrimination: Discrimination dominates discussions of racial inequality because it makes sense of the worlds that individuals inhabit.

To be clear, we are not at all suggesting that racial discrimination is unimportant to the fate of racial minorities in modern societies. In fact, as our simulation suggests, people living in segregated social worlds will underestimate the *absolute* importance of racial discrimination in shaping final earnings. Our point here is just that they will also overestimate the *relative* importance of discrimination vis-à-vis the indirect effects of race via class. Naturally, people who misunderstand racial inequality in this way will also misunderstand what will be necessary to address it.

Robustness tests

Our simulation requires that we fix the values of several parameters (e.g., the number of agents, the share of agents of the minority race, the shape of the income distribution, the size of their

networks, and the share of variance explained by nonrandom factors). It is not computationally feasible to explore the entire parameter space, but robustness checks show that our main conclusions are not substantively affected by changing these choices one at a time. Here, we discuss the robustness of our results to our two most contestable assumptions.

First, we set the total causal effect of race and the effect of a standard deviation in class position to be roughly equal. We make this assumption because of the absence of any reason to think one was more important than the other, but this does not amount to an affirmative reason to believe they are equal. Second, we set the cumulative effects of discrimination (in neighborhood sorting, educational access, and workplace hiring) to be smaller than the indirect effect of inherited racial inequality on outcome. This represented our educated guess about the nature of racial inequality in today's United States.

It is not straightforward to empirically identify the independent contribution of present-day discrimination to the racial gap in earnings, but some evidence does suggest that most of the racial gap is explained by inherited inequality. For instance, Chetty et al. found that, conditional on parental income, the gap in adult earnings between black and white females disappears and the gap among males reduces substantially (to 10.0 percentiles, or roughly 60% of the raw gap of 17.2 percentiles (Chetty et al. 2020)). In earlier work, Neal and Johnson found that including a measure of early childhood educational attainment closed the gap between black and white women and about 75% of the wage gap between black and white men (Neal and Johnson 1996). But, parsing these different effects is not easy. There are several tricky methodological and empirical questions to consider (Lundberg 2022), and we do not want to be mistaken for thinking that we have resolved them.

For this reason, we show that the conclusions of this section are robust to the universe of reasonable alternative assumptions. As figure 4 shows, whether we assume that the direct effect is in fact greater than the indirect (rather than the indirect being greater than the direct, as in our default parameterization), or whether we assume that class is in fact more important than race or race more important than class (rather than equal, as in our default parameterization), the main conclusions of this section are no different. Agents who make inferences in segregated social networks underestimate the total racial gap, underestimate the absolute amount of racial discrimination, and overestimate the share of the total racial gap that can be explained by that discrimination. Again, figure 1 explains why. No matter the magnitude of the relevant causal arrows, people who condition on nodes of a causal chain lose the ability to estimate the effect of variables prior to that node. No matter the specific parameters that govern the world, there is no safeguard against the deforming effects of segregated social worlds on people's inferences.

Demands for Redistribution

Last, we explore the consequences for agents' redistributive preferences. After all, agents' inferences furnish principled reasons to favor or oppose redistribution. Following Piketty (1995), we ignore the fact of ideological dissensus and instead assume that people plug their observations into commonsense principles of distributive justice.

Suppose then that agents form beliefs about redistribution in one of the following ways.

First, the more someone believes race and class matter and the less they think ability matters, the more likely they may be to favor redistribution (Alesina et al. 2018; Van Hootegem 2022). Second, the more someone believes that luck matters (i.e., the more they find it difficult to explain variance in final earnings), the more they may favor redistribution (Cappelen et al. 2022).

Third, the larger the earnings inequality they perceive, the more they may favor redistribution (McCall et al. 2017).

Fourth, we consider redistributive preferences as a function of agents' position in the final earnings distribution. Those with more money may for reasons of self-interest favor less redistribution, and those with less money favor more (Suhay, Klačnja, and Rivero 2021).

Finally, we combine all of the above into a single "moral model," giving equal weight to each.

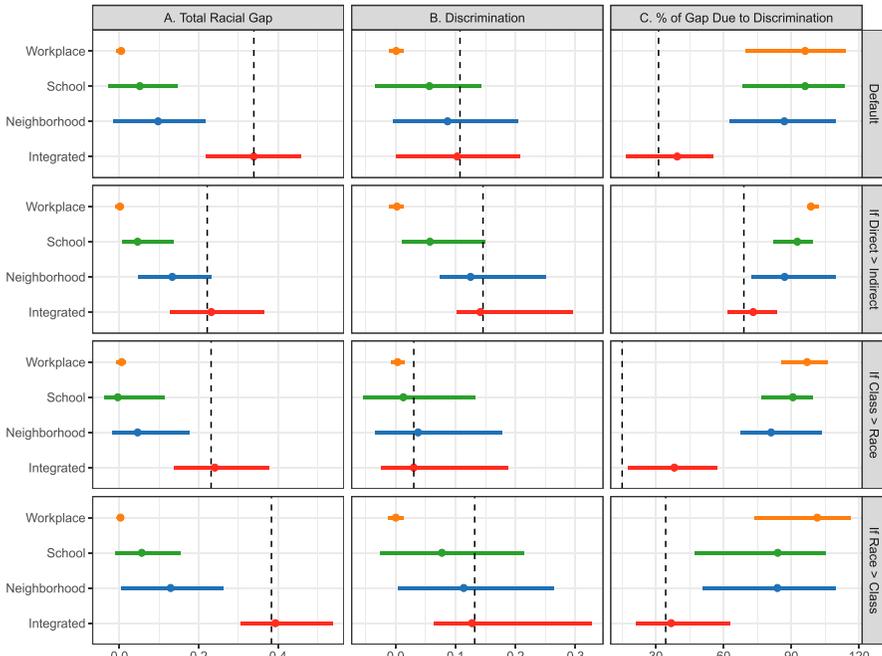


Figure 4. Inferences about Racial Inequality Robust to Other Assumptions. Note: This figure illustrates that our main conclusions about the way in which segregation deforms inferences about the effect of race (first row) are robust to other ways of specifying the parameters of our simulation. Whether we specify that the direct effect of race be greater than the indirect (second row), or the effect of class be larger than the direct effect of race (third row), or the opposite (fourth row), social world segregation leads agents to underestimate the size of the total racial gap, underestimate the effect of race, and attribute more of the gap to the direct effect of race than is true in reality. Confidence intervals span the 2.5th and 97.5th percentile values across hundred simulations. For further explanation, see [figure 3](#) and the discussion in the Race and racial inequality section of the paper.

[Figure 5](#) presents estimates of median redistributive preferences across social worlds for each of the ways a person's inequality beliefs may inform their politics. We show the factors behind agents' support for redistribution in varying combination to illustrate how preferences are affected by each. Note that because the earnings distribution in our simulation is normally distributed and thus symmetric, when redistributive preferences are based entirely on a person's earnings, the median redistributive preference is around 0.5, reflecting the fact that half of the population would stand to gain from redistribution. Of course, income distributions in capitalist societies are in fact right-skewed, which on its own gives median voters reasons to favor redistribution ([Meltzer and Richard 1981](#)). But, our point here is not to conclude anything about the actual preferences of the median voter but rather to illustrate the reasons that segregation will encourage all voters to look less favorably on redistribution than they otherwise would. Thus, the numbers on the x-axis have only relative and not absolute meaning. (For more details on how we map inferences to preferences, see the Supplementary Appendix.)

The rest of [figure 5](#) illustrates the consequences of segregated social worlds. First, if agents' preferences are based on their causal inferences about earnings inequality, those in constrained social worlds (especially, those whose worlds form in neighborhoods) are much less likely to favor redistribution. Since the effects of race and class are mostly invisible, the world appears meritocratic (but for those in neighborhoods and to a lesser extent, schools, ability is visible). Second, if redistributive preferences are based on descriptive inferences about inequality, the effect of segregation is similar: Those with segregated social worlds see less inequality and thus

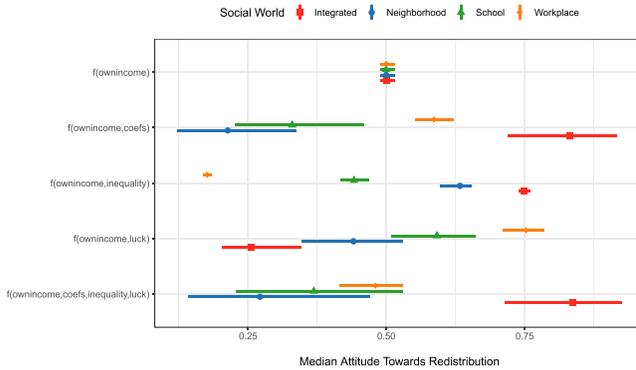


Figure 5. Attitudes toward redistribution. Note: This figure illustrates how these inferences might affect agents' redistributive preferences. The y-axis denotes different ways of mapping inferences to preferences, while the x-axis denotes the median agent's attitude toward redistribution (where 0 indicates total opposition and 1 indicates full support). The shapes again denote the nature of segregation. For more details, see the Demands for Redistribution section.

are less likely to favor redistribution. Again, in this case, it is those whose social worlds form later in the life course whose inferences suffer most, and so it is these agents who are least likely to favor redistribution.

The exception to the patterns above is a scenario in which agents' preferences rely on their perceptions of the importance of luck alone. If redistributive preferences solely reflected perceptions of luck, those who struggle to explain life outcomes by reference to ability, class, and race would favor redistribution the most (Cappelen et al. 2022). Of course, one might think that "luck" would have the opposite implication. Perhaps, confronted with unexplained variance, a typical person would in fact turn to merit-based explanations (i.e., unobserved individual qualities). This is not how a liberal egalitarian ought to reason, but it may better match the typical person's intuitions. If this is right, the ordering of worlds would flip, which would only strengthen the overall conclusion of this section.

The combined result of the various factors motivating agents' redistributive preferences are shown in the bottom row of figure 5. This shows that agents evaluating inequality by inference from their segregated social worlds have principled and, in one sense, empirically well-founded reasons to favor less redistribution than they would in an integrated world. Our simulation implies that agents would be twice as supportive of redistribution if their social worlds were not segregated. As we proposed in our introduction, this may be an important part of why inequality persists in modern societies.

Conclusion

Why do the institutions at which social worlds are formed deform agents' inferences about the extent and nature of inequality? This is because, as figure 1 illustrates, inferences depend on what you see, what you see depends on whom you know, and whom you know is shaped by the processes about which you aim to make inferences. If agents make their inferences based on networks formed within a given institution, they are, in effect, conditioning on membership in that institution when making inferences about inequality. This renders invisible the causal processes that operate to determine access to that institution. They cannot see what lies behind the causal chain. This is a restatement of a simple but powerful insight well-known to quantitative practitioners: Conditioning on post-treatment variables biases estimates of a treatment because it effectively controls away its consequences (Morgan and Winship 2007).

Thus, when social worlds are based in neighborhoods, agents lose sight of the importance of race and social class in determining neighborhood access. In the case of schools, they lose sight of these *and* the importance of ability in determining school selection. In the case of segregated social worlds formed within agents' earnings group, persons lose sight of *all* prior causal processes (i.e., everything prior to the direct determinants of earnings). Agents are sampling on the dependent variable, which can be thought of as an extreme kind of post-treatment bias. When agents' social worlds are restricted in this way, all reliable inferences are elusive. Importantly, because people who sample on earnings do not see ability as important, they do not necessarily conclude (wrongly) that society is a meritocracy. More likely, they will conclude that society is a random draw in which luck matters more than anything. Their inferences are not a likely source of legitimacy for the social order.

What this suggests is that we should not attribute the problem of unmerited legitimacy solely to the fact that formative institutions force people to see only those like them in the earnings distribution (Dawtry et al. 2015; Schulz et al. 2022; Windsteiger 2022). Our simulation shows that this is not the only way in which these institutions matter. In addition to obscuring a part of the earnings distribution, they also render invisible everything that determines access to those institutions. The latter may be as consequential a way in which segregated social worlds confer legitimacy on the inequality regime that characterizes advanced capitalist countries (Mijs 2018, 2021).

The stratification process described in this paper has important implications for the politics of inequality. While our findings are based on a simulation exercise, empirical research suggests that levels of neighborhood segregation, school segregation, and wage segregation in the United States are in fact high, in international perspective, and growing (Jerrim and Macmillan 2015; Mare 2016; Mijs and Roe 2021; Reardon and Bischoff 2011; Smith et al. 2014; Tomaskovic-Devey et al. 2020; Workman 2022). Increasing levels of segregation are likely to further limit people's ability to make accurate inferences about economic and racial inequality and suppress the calls for redistribution we might hear in a more integrated society.

There is an important racial dimension to this process. As we have shown, segregation inhibits agents from identifying the structural causes behind present-day racial disparities. Americans believe racial inequalities have decreased in recent decades (Kraus et al. 2019) despite the fact that black-white inequality has been virtually unchanged since the 1960s (Bayer and Charles 2018). Our paper suggests one way of making sense of Americans' unwarranted optimism. In a highly stratified and segregated society, citizens find it intuitive to attribute inequality to discrimination. Because norms supporting blatant racial discrimination have eroded (Bobo et al. 2012), people may reasonably conclude that racial inequalities must have decreased as well. And, they will be inclined to address whatever little racial inequality they do see by combating the little discrimination they think remains. In this way, by distorting people's understanding of racial inequality, network segregation impedes attempts to redress it.

Finally, our model suggests an alternative mechanism to explain the lack of popular mobilization to growing economic inequality. By socially situating perceptions of inequality and preferences for redistribution, we offer an alternative explanation of the persistence of high levels of racial and class inequality. Even if people draw principled and not simply selfish conclusions from their inferences, their social worlds warp the information that is available to them. They cannot see the structural processes driving unequal outcomes. As a result, they correctly make incorrect inferences. In this sense, their views are ideological: beliefs which are false but make sense of the world they inhabit (Fields 1990).

Granted, to have shown these results in a simulation is different from having demonstrated that they obtain empirically. While our sociological simulation is informed by findings from social science scholarship, our hope is to stimulate and guide further empirical research. There are at least three kinds of observable implications of our model, each of which generates testable hypotheses:

- 1) Unequal societies produce segregated social worlds.
 - (a) The larger the role of social class and race in conditioning access to formative institutions (neighborhoods, schools, workplaces), the more segregated social networks will be.
 - (b) Networks formed later in life (e.g., workplaces) will be more socioeconomically and racially segregated than those formed early in life (e.g., neighborhoods).
- 2) Segregated social worlds distort perceptions and inferences about inequality.
 - (a) Segregated networks lead people to underestimate the extent of economic inequality between individuals and between racial and ethnic groups.
 - (b) Segregated networks lead people to underestimate the importance of social class and race in shaping life outcomes while leaving estimates of the importance of ability unaffected. They thus lead people to overestimate the relative importance of ability.
 - (c) Segregated networks lead people to underestimate the causal importance of race-based discrimination and especially the weight of inherited racial disadvantage. They thus lead people to overestimate the extent to which racial disparities are explained by discrimination.
- 3) Societies so characterized perpetuate social inequality.
 - (a) Because people in these kinds of societies underestimate the extent of economic inequality and the importance of social class and race, they will be less likely to support redistribution from rich to poor. This locks in inequality (and, thus, segregated social networks).

This last hypothesis suggests that inequality in these kinds of societies proves self-perpetuating (Mijs 2021). But, our simulation also suggests interventions that might disrupt this high-inequality, low-redistribution equilibrium. We demonstrated that individuals' errors are the result of three features of their unequal society: racial and class inequality in access to key institutions, the patterning of social worlds by these formative institutions, and the pivotal role of these institutions in future success. The third feature is probably a permanent feature of societies with competitive markets, and to address the first feature would be to solve the problem of people's perceptions of reality by transforming it. Yet, the second feature can furnish some feasible prescriptions.

As we showed, people who experience and reason about the world through integrated networks are much more likely to understand the extent and causes of inequality. This might inform policies which help create networks across privileged and less-privileged neighborhoods, schools, and workplaces—perhaps by expanding public spaces (Mijs and Roe 2021) and private places (Massenkoff and Wilmers 2023) which gather people together.

Indeed, empirical research suggests that “network interventions” can heighten the awareness of inequality and yield better understanding of the causes of poverty as well as racial and gender disparities. Such is the finding of research on racial desegregation in US education, following landmark Supreme Court rulings in the 1950s, 60s, and 70s (Sachdeva 1973; Scott and McPartland 1982), and of experiments with gender integration in the American and Norwegian armed forces (Dahl, Kotsadam, and Rooth 2018; Miller 2022). Similarly suggestive are findings from longitudinal research on the downstream consequences of social interactions across ethnic, racial, and class divides, such as in a person's residential neighborhood in childhood (Brown et al. 2021), in daycare (Gaias et al. 2018) and in school (Cech 2017), through college roommates in adolescence (Mijs 2023; Sidanius et al. 2010) and through the workplace in early adulthood (Mo and Conn 2018).

A particularly insightful natural experiment shows that when the process stratifying rich and poor children into different schools in Delhi, India, was disrupted, rich students now confronted with poor classmates were more egalitarian, generous, and charitable and displayed less discriminatory attitudes and behaviors against the poor (Rao 2019). Optimistically, then, interventions of this kind might forge a new equilibrium, characterized by *stronger* support for redistribution and *greater* levels of it. In fact, recent evidence suggests that, in the abstract, this is the kind of world in which most Americans would prefer to live (Norton and Ariely 2011).

Endnotes

1. Recent works by Cheng and Wen (2019) and Eriksson and Simpson (2012) suggest that these stylized facts may not survive better methodological choices. It is beyond the scope of this paper to rule on whether they are correct. But, whether or not we are right to assume that Americans overestimate mobility and underestimate inequality, the main contribution of this paper will be to suggest that inequality itself will make people more optimistic about inequality than they would be otherwise. We thank a reviewer for asking us to clarify this point.
2. Code to replicate the simulation and all results discussed in this paper is available at <https://github.com/ausmani23/inferentialspaces>.
3. Some readers of this paper have suggested that we use the term “simulation” to better distinguish what we are doing from typical approaches in agent-based modeling. The reader is invited to substitute whichever term they prefer.
4. Computational constraints limit us to a simulation based on 1000 agents each connected to 80 others, but the confidence intervals could be made arbitrarily smaller by increasing either of these numbers. Thus, in what follows, we will draw conclusions about the consequences of network segregation even in cases where confidence intervals for the median agent's estimates overlap across different types of social worlds. The confidence intervals illustrate uncertainty about the median agent's estimates under these artificial parameters, while our conclusions reflect the theory these estimates help us develop about the consequences of network segregation in the real world.
5. The important point is not whether this accurately reflects neighborhood selection in the real world but rather that this difference illustrates one of our important conclusions: When “social sampling” happens inside a given institution, it necessarily distorts inferences about the effects of the causes that shape access to that same institution.
6. When confronted with unexplained variance, a person might turn not to luck but to merit-based explanations (i.e., imputing the residual to unobserved individual differences). We return to this possibility in the Demands for Redistribution section, where we discuss how the relative weight of this unexplained variance figures in people's redistributive attitudes. As we show there, making the opposite assumption about luck (or dropping it from our model) would only strengthen our conclusions.

About the Authors

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Supplementary Material

[Supplementary material](#) is available at *Social Forces* online.

Data Availability

Code to replicate the simulation and all results discussed in this paper is available through the Github data repository at <https://github.com/ausmani23/inferentialspaces>.

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