

Investigating How High Perceived Economic Inequality Exacerbates Intergroup Competition, Zero-Sum Beliefs, and Perceived Intergroup Prejudice

Personality and Social
Psychology Bulletin
1–20

© 2024 by the Society for Personality
and Social Psychology, Inc
Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/01461672241234787
journals.sagepub.com/home/pspb



Jaclyn A. Lisnek¹, Nava Caluori¹, Jazmin L. Brown-Iannuzzi¹,
and Shigehiro Oishi²

Abstract

Rising economic inequality is associated with more prejudice. Little empirical data, however, investigate how inequality affects individuals' psychological processing and, in turn, exacerbates perceptions of prejudice in people's geographic area. We hypothesized that higher perceived economic inequality triggers beliefs that unequal economies are zero-sum and leads to beliefs that people are in competition for limited resources, which may ultimately exacerbate perceived prejudice. Through nine experiments (Studies 1-5 in the manuscript and three additional studies in the Supplement), we provide evidence that higher perceived inequality increases perceived prejudice against a wide range of outgroups. Furthermore, zero-sum beliefs and perceived competition serially mediate this relationship (Studies 2 and 3). In Study 4, we investigate nuance in this hypothesized model by testing whether higher perceived economic inequality exacerbates perceived racial/ethnic prejudice among a large, diverse sample and find a similar pattern of results. Finally (Study 5), we demonstrate that assuaging competition beliefs mitigates perceived prejudice.

Keywords

economic inequality, competition, zero-sum beliefs, prejudice, intergroup relations

Received July 21, 2023; revision accepted February 6, 2024

"An imbalance between rich and poor is the oldest and most fatal ailment of all republics."

- Plutarch

Introduction

Economic inequality in the United States is large and growing. When comparing across the seven advanced democratic nations (G7), the United States stands out as having the highest level of inequality (Schaeffer, 2020; data from OECD, 2022). As warned by Plutarch, high levels of inequality are fatal to republics. Inequality may lead to social disintegration (e.g., Wilkinson & Pickett, 2009). The current research investigates the impact of economic inequality on intergroup prejudice.

Karl Marx (Reich, 1983) and Alexis de Tocqueville (1835/2003) argued that material differences may divide social groups, exacerbating prejudice and making economic inequality self-perpetuating. That is, intergroup prejudice

and high economic inequality may be part of a mutually reinforcing cyclical pattern. A significant body of research has demonstrated, using both correlational and experimental approaches, that prejudice exacerbates economic inequality between several different social groups (e.g., Bertrand & Mullainathan, 2004; Esses & Dietz, 2007; Reuben et al., 2014; Wilson et al., 2020), lending strong evidence to half of this theory.

Relatively less work has investigated whether economic inequality may exacerbate intergroup prejudice. Some work has investigated the correlational relationship between inequality and White American's prejudice toward Black Americans (e.g., Connor et al., 2019; Gordils

¹University of Virginia, Charlottesville, USA

²The University of Chicago, IL, USA

Corresponding Author:

Jaclyn A. Lisnek, University of Virginia, 485 McCormick Rd,
Charlottesville, VA 22904, USA.

Email: jal4kh@virginia.edu

et al., 2020; Hovland & Sears, 1940). For example, research has found a small but significant within-state association between income inequality and Whites' explicit racial bias toward Black Americans, but this finding was contingent on model specification and dependent on which measure of income inequality was used (Connor et al., 2019). In addition, when participants were told that the income inequality between Black and White Americans was large (vs. small), participants reported greater perceived competition, mistrust, avoidance, and discrimination between Black and White Americans (Gordils et al., 2023). And, in highly economically unequal nations, globalization (and resultant exposure to diverse groups) was associated with greater outgroup prejudice (Caluori et al., 2021). These data begin to lend evidence to the other half of the theory—economic inequality can exacerbate prejudice.

However, there remain significant gaps in understanding the causality and mechanism of this relationship, and little work has extended beyond the relationship between economic inequality and White American's prejudice toward Black Americans (e.g., Bianchi, 2020). It is possible that economic inequality may exacerbate prejudice against *all* social outgroups. However, we anticipate that economic inequality may exacerbate prejudice toward a wide range of social groups perceived to be resource-relevant (i.e., competitors for economic resources) (e.g., Zou & Cheryan, 2017). The current research aims to fill critical methodological and theoretical gaps in our understanding of whether and how economic inequality may exacerbate prejudice.

Perceived Economic Inequality, Zero-Sum Beliefs, Perceived Competition, and Perceived Prejudice

Economic inequality is a broad term used to describe the range of differences in economic well-being among individuals or groups in a society. Colloquially, economic inequality is often thought of as the gap in wealth between the rich and the poor. Objective levels of inequality, however, may filter through imperfect knowledge and individual biases resulting in differences between objective and perceived economic inequality (e.g., Jachimowicz et al., 2023). For example, across a series of studies American participants dramatically underestimated the level of inequality in the United States; particularly by underestimating the amount of wealth the rich owned and overestimating the amount of wealth the poor owned (Norton & Ariely, 2011). Furthermore, perceptions of inequality, as opposed to objective inequality, are more effective at predicting a wide range of psychological outcomes, such as policy attitudes and well-being, and public health outcomes (e.g., Buttrick et al., 2017; Gimpelson & Treisman, 2018; Hauser & Norton, 2017; Niehues, 2014; Norton, 2014). Given the importance of perceived inequality (vs. objective inequality) for determining relevant outcomes,

we focus our research on investigating the causal impact of perceived inequality, particularly at the local level as these local perceptions may be more psychologically impactful (e.g., Anderson et al., 2012; Côté et al., 2015).

Previous research suggests that inequality, particularly when wealth is visible, may be self-perpetuating in part because cooperation decreases and greed increases. For example, a study by Nishi and colleagues (2015) demonstrated the self-perpetuation of inequality using a public goods game. In this game participants were randomly assigned to a higher (vs. lower) inequality distribution and were made aware (vs. did not know) of the level of inequality by learning about the level of initial endowment each participant had in the game. When inequality was higher and participants were aware of the level of inequality, they cooperated less, resulting in greater inequality over 10 rounds of the game. Related work suggests that environments of higher inequality may lead to conflict because they make salient to individuals that resources are shared unequally between individuals and groups in society (e.g., Kraus et al., 2017). Overall, this work suggests that when people are aware of high levels of inequality, they may react by sharing and cooperating less and trying to hold onto more resources for themselves (and their group). This may lead to both the perpetuation of inequality and the exacerbation of conflict.

Consistent with, and building from, this work, we suggest that when people perceive inequality is high, it may exacerbate perceived intergroup prejudice. We anticipate that this may occur, in part, because higher inequality may trigger beliefs that financial resources are zero-sum. Zero-sum beliefs are the idea that one person's success directly implies another's failure (e.g., Aumann, 1987). People often inappropriately apply zero-sum beliefs to the economy, especially when inequality is high (Davidai, 2022; Friedman & Friedman, 1990; see also Brown et al., 2022). Inequality and resulting zero-sum beliefs may in turn exacerbate intergroup competition concerns. Local contexts of economic inequality predict greater perceived competition (Sánchez-Rodríguez et al., 2019; Sommet et al., 2019, 2023), and zero-sum beliefs predict increased competition in the workplace (Chun et al., 2023). Thus, zero-sum beliefs and competition are related but distinct concepts. Competition refers to a situation in which multiple individuals or groups strive to achieve a particular goal or resource, but the outcome is not necessarily fixed or zero-sum.

Ultimately, increased zero-sum beliefs and resulting competition beliefs may exacerbate perceptions of intergroup prejudice. Realistic group conflict theory contends that competition for limited resources may, in part, explain prejudice and hostility between groups because people rely on social groups to optimally compete for resources for themselves and for their ingroup (Campbell, 1965; Sherif, 1956). Lending evidence to this theory, research finds that zero-sum beliefs and the belief that immigrants are competitors for

economic resources predict more prejudicial attitudes toward immigrants (Esses et al., 2001).

Social norms against expressing prejudice (e.g., Crandall & Eshleman, 2003) can make accurate measurement of prejudicial attitudes difficult. However, asking people about how prejudiced they perceive those around them to be—instead of asking them about their own prejudices—can produce more candid reports, as it allows people to distance themselves from their prejudice and respond in more socially desirable ways (e.g., Fiske et al., 2002). Other research has found that measures of other- (vs. personally) endorsed prejudice were more strongly associated with implicit bias and application of stereotypes in behavior (e.g., Correll et al., 2002; Devine, 1989), suggesting that these indirect measures of prejudice are indeed related to individual prejudice. Social desirability issues suggest that people's self-reported prejudice may not directly increase under circumstances of high inequality, but their perceptions of prejudice among those around them may, and this could reflect larger increases in actual prejudice.

Extending beyond previous research, we anticipate that perceived economic inequality may exacerbate perceived prejudice toward a wide range of social groups perceived to be resource-relevant. Even when inequality is not explicitly framed as existing between social groups, people may assume they are competing with outgroups for limited resources (for a similar argument see Buttrick & Oishi, 2017). Previous research suggests that groups based on race (e.g., Hovland & Sears, 1940), religion (Rios et al., 2022), nationality (Esses et al., 2006), and socioeconomic status (e.g., Horwitz et al., 2014) may coalesce to share resources among ingroup members and exclude resources from outgroup members. We would not expect economic inequality to exacerbate perceived prejudice toward *all* potential social groups. For example, we would not expect economic inequality to exacerbate perceived prejudice between groups that are not deemed economic competitors (e.g., Zou & Cheryan, 2017), or groups that do not coalesce for the purposes of gathering economic resources (e.g., exacerbating prejudice between those who are lefthanded vs. righthanded). Thus, consistent with previous theories, we anticipate there may be a nuanced relationship such that perceived economic inequality may exacerbate perceived prejudice toward groups deemed to be economic threats (e.g., Blumer, 1958; Bobo & Hutchings, 1996; Zou & Cheryan, 2017).

Does Racial/Ethnic Group Position Shape the Relationship Between Economic Inequality and Racial/Ethnic Prejudice?

In the current research, we test whether high perceived inequality exacerbates prejudice toward a wide range of social groups perceived to be competitors for resources (including racial/ethnic groups, but also religious groups, socioeconomic groups, etc.). However, in our multiracial and multicultural world, it is also important to understand more

nuanced racial/ethnic prejudices beyond White American's prejudice toward Black Americans—the focus of much past research. To this end, we explore whether the proposed theoretical model can be used to explain the relationship between economic inequality and racial/ethnic prejudice between a number of different racial groups.

Racial/ethnic prejudice represents a unique and important situation in which to test our model given the long history of racism in the United States, and that race/ethnicity is integrally linked with social status in the United States (e.g., Bobo & Hutchings, 1996; Moller et al., 2009). The Group Position Model (Blumer, 1958) suggests that White Americans' racial prejudice is exacerbated when they feel their group's superior position is being challenged (by Black Americans). Bobo and Hutchings (1996) extended this model to understand a multicultural space, and their findings suggest that intergroup prejudice may also emerge between minoritized groups (e.g., Black and Latinx Americans) to the extent that people of these groups feel they are competing against one another for resources. Research also suggests that White Americans may be particularly fearful of racial progress (e.g., Norton & Sommers, 2011). This would suggest that perceiving high economic inequality may lead White Americans to perceive more prejudice toward all racial/ethnic outgroups as they may be particularly motivated to maintain their economic status. Thus, racial/ethnic prejudice represents a unique and important situation in which to test our model to understand *for whom* and *toward whom* perceived economic inequality may exacerbate racial/ethnic prejudice.

Overview of the Current Research

To summarize, we hypothesize that higher perceived economic inequality in one's own geographic region may increase zero-sum beliefs and perceived competition which, in turn, may lead to increased perceptions of intergroup prejudice. In Study 1, we investigate the causal relationship between inequality, competition, and zero-sum beliefs across resource-relevant social groups (e.g., religious groups; socioeconomic status groups; racial groups) and non-resource-relevant social groups (e.g., groups based on handedness). In Study 2, we focus on resource-relevant social groups and investigate whether competition and zero-sum beliefs mediate the relationship between inequality and prejudice. In Study 3, we replicate and extend upon Study 2 by investigating this mediational pattern when predicting participants' personal prejudice. Study 4 investigates nuances in the proposed mechanism by focusing on race/ethnicity prejudice among a racially/ethnically diverse sample. Finally, in Study 5, we investigate whether we can mitigate the relationship between inequality and prejudice by assuaging economic competition concerns. In addition, the Supplemental Materials reports three more studies which yield a similar pattern of results as to the studies reported in the article.

Table 1. Demographics for Studies 1 Through 5.

Study	N	% White	% Black	% Asian	% Latinx	% Native American	% Middle Eastern	% Multiracial	% Other race	% Men	% Women	% Other gender	Age (SD)	MacArthur ladder (SD)
1	392	76.53	10.46	5.36	4.08	0.51	0	2.04	1.02	51.53	48.21	0.26	40.14 (11.35)	5.69 (2.09)
2	422	71.56	10.66	9.24	0	0.47	0	2.61	0.47	45.02	54.03	0.95	39.55 (12.45)	5.43 (1.90)
3	401	75.81	8.23	6.48	5.74	0.75	0.25	2.74	0	44.14	55.11	0.75	42.17 (12.53)	5.11 (1.76)
4	1,575	27.43	25.02	25.02	22.54	0	0	0	0	34.48	63.75	1.78	33.66 (12.91)	5.11 (1.70)
5	391	76	11	5.6	4.3	0.77	0	2.3	0	42.2	55.2	0.51	41.57 (13.04)	5.98 (2.16)

Note. Socioeconomic status (SES) was measured using the MacArthur Ladder on a scale from 1 to 10.

Statistical Power, Participants, and Preregistrations

For all studies, an *a priori* power analysis indicated that for a two-condition between-subjects design, we would need a total sample size of $N = 352$ to detect a small-to-medium effect size (Cohen's $d = .30$) with adequate power ($1 - \beta = .80$; G*Power; Faul et al., 2009). To account for attrition, we recruited between 400 and 450 participants from CloudResearch. In Study 4, because we were interested in race/ethnicity prejudice among a racially/ethnically diverse sample, we recruited 1,600 participants (we aimed to have approximately 400 participants representing each group: Asian, Black/African American, Hispanic/Latinx, and White). After removing data from individuals who failed a robot check and attention checks, our final samples ranged from 391 to 1,575 participants. See Table 1 for demographics of each study.

All studies used pre-registered protocols. Preregistrations, study materials, data, analytic code, and codebook can be found here: [https://osf.io/7hfpq/?view_only=a9866621756a47a996d27ec69bacab71]. All analyses were pre-registered unless specifically indicated otherwise.

Study 1

In Study 1, we investigate the causal relationship between inequality, competition, and zero-sum beliefs across social groups that may be seen as resource-relevant (e.g., religious groups; SES groups; racial groups) and non-resource-relevant social groups (e.g., groups based on handedness). We preregistered our prediction that when inequality is perceived to be high, participants will perceive greater competition and zero-sum beliefs toward groups perceived to be resource-relevant but not toward groups perceived to be non-resource-relevant.

Method

Procedure. After passing a robot CAPTCHA and attention check, consenting participants were asked several items about their geographic location, finances, and demographics. These

items included: “In which state do you currently reside?,” “How much do you spend on housing costs (including utilities)?,” “What is your highest level of education?” and a question asking for the name of the county and zip code in which the participant currently resided (for exact study materials see Open Science Framework). Participants were told that a sophisticated computer algorithm would use the responses they provided on these geographic, financial, and demographic items to calculate their “geographic economic inequality index.” Specifically, participants were told:

The following survey is part of an ongoing project examining trends in economic inequality—or the distribution of money across society. You'll be asked some questions about your geographic area and demographic questions. It is important that you be as accurate as you can.

At the end of this survey, using statistical analyses based on your responses and incorporating data from the US Census, we will provide you with feedback about the distribution of economic resources in your geographic area.

Unbeknownst to participants, after completing these items, they were randomly assigned to either the *High Economic Inequality* condition or the *Low Economic Inequality* condition. The exact feedback for the two conditions is presented in Table 2. This manipulation, adopted from Côté and colleagues (2015), can effectively shift perceptions of inequality as people are not often aware of the level of inequality in their area to begin with (Engelhardt & Wagener, 2014; Norton & Arieli, 2011).¹

Competition. Next, participants answered questions about intergroup competition or zero-sum beliefs, the order of which was counterbalanced to avoid order effects. The competition item was: “Thinking about your geographic area, to what extent do you perceive competition for financial resources between your social group and the following social groups?” We assessed perceived competition on a scale from 1 (*not at all*) to 5 (*all of the time*). The social groups included as potentially resource-relevant were people of a different

Table 2. Geographic Economic Resources Feedback.

Low inequality condition	High inequality condition
Your geographic area economic inequality index: 0.11 Interpreting your geographic area economic inequality index score: The distribution of economic resources for the geographic area you reside in is much more equal than most parts of the United States. A score of zero means this area in the United States has the most equal distribution of resources across its residents. That is, all residents in this area have very similar socioeconomic standings. A score of one means this area in the United States has the most unequal distribution of resources across its residents. That is, some residents are making millions of dollars and have a much higher socioeconomic standing whereas other residents are living below the poverty line and have a much lower socioeconomic standing.	Your geographic area economic inequality index: 0.89 Interpreting your geographic area economic inequality index score: The distribution of economic resources for the geographic area you reside in is much more unequal than most parts of the United States. A score of zero means this area in the United States has the most equal distribution of resources across its residents. That is, all residents in this area have very similar socioeconomic standings. A score of one means this area in the United States has the most unequal distribution of resources across its residents. That is, some residents are making millions of dollars and have a much higher socioeconomic standing whereas other residents are living below the poverty line and have a much lower socioeconomic standing.

Table 3. Correlations Between Variables, Study 1.

Variable	1	2	3	4	5	6	7	8	9	10	11
Competition											
1. Race											
2. Religion	.68**										
3. Immigrants	.70**	.62**									
4. SES	.62**	.48**	.56**								
5. Handedness	.54**	.68**	.50**	.32**							
6. Favorite color	.54**	.67**	.52**	.33**	.85**						
Zero-sum beliefs											
7. Race	.57**	.55**	.50**	.42**	.55**	.54**					
8. Religion	.56**	.61**	.52**	.42**	.63**	.61**	.81**				
9. Immigrants	.56**	.57**	.59**	.43**	.63**	.62**	.74**	.78**			
10. SES	.48**	.39**	.37**	.51**	.36**	.35**	.66**	.60**	.54**		
11. Handedness	.51**	.59**	.47**	.31**	.76**	.75**	.70**	.76**	.75**	.47**	
12. Favorite color	.51**	.59**	.48**	.33**	.75**	.75**	.68**	.74**	.73**	.46**	.87**

*Indicates $p < .05$.**Indicates $p < .01$.

race, religion, economic status, and immigrants/foreign workers ($\alpha = .86$). The social groups included as potentially non-resource-relevant were people who use a different hand to write than the participant uses, and people whose favorite color is different from the participant's ($\alpha = .92$).

Zero-Sum Beliefs. Zero-sum beliefs were measured by asking participants the extent to which they agreed with the idea that if one social group gets richer, it means that another social group gets poorer (1 = *strongly disagree*; 7 = *strongly agree*; Różycka-Tran et al., 2015). Again, social groups included as potentially resource-relevant were people of a different race, religion, economic status, and immigrants/foreign workers ($\alpha = .90$). The social groups included as potentially non-resource-relevant were people who use a different hand to write than the participant uses, and people whose favorite color is different from the participant's ($\alpha = .93$). See Table 3 for correlations between variables.

Participants concluded by reporting additional demographics, were debriefed, and were compensated for their time.

Results

We hypothesized that participants in the high (vs. low) inequality condition would report greater intergroup competition and zero-sum beliefs for groups that are potentially viewed as resource-relevant. To investigate this hypothesis, we first averaged responses for perceived competition between participants' own social group and each of the other groups into two indices: one index for potentially resource-relevant groups, and one index for non-resource-relevant groups. We did the same for our question measuring zero-sum beliefs between participants' own social group and all other social groups. Then, we conducted mixed ANOVAs and separate *t*-tests to investigate whether inequality condition affected ratings

Table 4. Descriptive Statistics for Participants in the Low Versus High Inequality Condition, Study 1.

Variable	Inequality condition			
	Low		High	
	M	SD	M	SD
Perceived competition toward. . .				
Social group resource-relevant	2.64	1.14	3.09	1.02
Social group non-resource-relevant	2.02	1.38	2.15	1.36
Zero-sum beliefs toward. . .				
Social group resource-relevant	3.22	1.83	3.82	1.71
Social group non-resource-relevant	2.53	1.99	2.88	2.03

Table 5. Inferential Statistics for Participants in the Low Versus High Inequality Condition, Study 1.

Variable	t-test	p-value	95% CI	Cohen's d
Perceived competition toward. . .				
Social group resource-relevant	-4.19	<.001	[-0.67, -0.24]	0.42
Social group non-resource-relevant	-1.03	.299	[-0.42, 0.13]	0.10
Zero-sum beliefs toward. . .				
Social group resource-relevant	-3.36	<.001	[-0.95, -0.25]	0.34
Social group non-resource-relevant	-1.77	.078	[-0.76, 0.04]	0.18

toward resource-relevant and non-resource-relevant groups. See Table 4 for descriptive statistics and Table 5 for inferential statistics.

Although not preregistered, we examined the omnibus interaction between inequality and the type of social group to capture whether there are significant differences between groups. Mixed ANOVAs reveal a significant interaction between condition and type of group on competition, $F(1, 390) = 8.53, p = .004$, and a marginal interaction on zero-sum beliefs, $F(1, 390) = 3.49, p = .063$. To further understand these findings, we tested the simple effects, which were preregistered. As anticipated, participants in the high (vs. low) inequality condition reported greater intergroup competition and zero-sum beliefs for groups hypothesized to be resource-relevant. And condition did not affect competition beliefs or zero-sum beliefs for groups hypothesized to be non-resource-relevant. Findings were similar when we tested perceived competition with each social group separately (see Supplement for disaggregated findings and additional analyses across all studies).

Overall, this suggests that perceived inequality may exacerbate perceptions of intergroup competition and zero-sum beliefs toward a wide range of social groups perceived to be resource-relevant, but not toward groups that are less likely to be perceived to be non-resource-relevant. In the next study, we investigate whether perceived inequality may exacerbate perceived prejudice toward social groups per-

ceived to be resource-relevant, and whether perceived competition and zero-sum beliefs mediate this relationship.

Study 2

In Study 2, we investigated whether perceived economic inequality caused changes in: (a) zero-sum beliefs, (b) perceived competition, and (c) perceptions of prejudice. As stated in our preregistration, we predicted that participants in the high (vs. low) economic inequality condition would report more zero-sum beliefs and more perceived competition, which would in turn predict increased perceived prejudice of individuals in their geographic region.

Method

Procedure. The manipulation of economic inequality was the same as Study 1.

Zero-Sum Beliefs. After participants received feedback about the level of economic inequality in their geographic area, they then were asked to report their own opinions on a 6-item zero-sum beliefs measure (e.g., “Successes of some social groups are usually failures of other social groups”) on a scale from 1 (*strongly disagree*) to 7 (*strongly agree*), ($\alpha = .95$; Różycka-Tran et al., 2015).

Competition. Participants were asked three items that assessed perceived intergroup competition using a scale from 1 (*not at all*) to 5 (*all the time*). These items were: “To what extent do you think different social groups in your geographic area. . .” 1) “. . . will compete with each other for financial resources?,” 2) “. . . will try to keep financial resources for their social group?,” and 3) “. . . will view each other as threats to their own financial resources?” ($\alpha = .86$)

Perceived Prejudice. Then, participants completed measures of perceived prejudice toward social groups that could potentially be viewed as competitors for resources. Specifically, we asked participants how willing they thought others in their geographic area would be to have social outgroups as neighbors (adopted from the World Values Survey), their perceived competence and warmth of social outgroups, and how positive people in their geographic area would feel toward these social outgroups (adopted from Fiske et al., 2002). Based on Study 1 and past research, the social groups were: people in their social group, people of a different race, people of a different religion, people who speak a different language, immigrants/foreign workers, people of a different socioeconomic status. We also had a general item that asked about “people who are NOT in their social group.” All ratings were made on slider scales from 0 (not at all) to 100 (extremely). See Table 6 for correlations between dependent measures.

We adopted our measure of social distance (i.e., willingness to have outgroups as neighbors) from the World Values

Table 6. Correlations Between Dependent Variables, Study 2.

Variable	1	2	3	4	5	6	7	8	9
1. Competition									
2. Zero-sum	.62**								
Outgroup									
3. Positivity	-.24**	-.20**							
4. Competence	-.24**	-.15**	.85**						
5. Warmth	-.27**	-.20**	.85**	.87**					
6. Social distance	-.24**	-.18**	.80**	.83**	.85**				
Ingroup-outgroup									
7. Positivity	.11*	.12*	-.65**	-.62**	-.57**	-.58**			
8. Competence	.16**	.13*	-.60**	-.72**	-.61**	-.63**	.79**		
9. Warmth	.15**	.12*	-.58**	-.64**	-.69**	-.62**	.76**	.80**	
10. Social Distance	.15**	.08	-.62**	-.69**	-.65**	-.78**	.78**	.79**	.79**

*Indicates $p < .05$.**Indicates $p < .01$.

Survey and include it as a measure of prejudice. Prior work has shown that the strongest predictor of not wanting to have other groups as neighbors is prejudice toward these groups, as opposed to other factors such as concerns about property value (Schuman & Bobo, 1988). Furthermore, prejudice was the primary predictor of how White Americans' formed opinions about their desire for residential segregation (Bobo & Zubrinsky, 1996). Together, this work suggests that while desired social distance may indicate other concerns (such as concerns about property values), it is also an indicator of prejudice.

Finally, participants reported additional demographic information, were debriefed, and compensated for their time.

Results

See Table 7 for means and standard deviations and Table 8 for inferential statistical test values. First, we conducted t -tests to examine whether condition influenced perceived competition and zero-sum beliefs. As anticipated, participants in the high (vs. low) inequality condition reported more zero-sum beliefs. In addition, participants in the high (vs. low) inequality condition perceived more competition between groups.

We measured perceptions of prejudice in one's area using several different items: perceived competence, warmth, positivity, and desired social closeness toward their own social group and several outgroups (people of a different race, people of a different religion, people who speak a different language, immigrants/foreign workers, people of a different socioeconomic status). We created two prejudice indexes by: (a) combining the ratings of all social outgroups ($\alpha_{\text{competent}} = .94$; $\alpha_{\text{warm}} = .95$; $\alpha_{\text{positive}} = .92$; $\alpha_{\text{social closeness}} = .94$) and (b) creating a difference score between ingroup and outgroups (see Supplemental Materials for additional ways to analyze these data, including analyses for each social group separately²). When combining ratings toward all the social outgroups, the

Table 7. Means and Standard Deviations for Dependent Variables of Interest by Condition, Study 2.

Variable	Inequality condition			
	Low		High	
	M	SD	M	SD
Competition	2.86	0.92	3.57	1.01
Zero-sum	3.22	1.50	4.17	1.68
Difference Score (ingroup—outgroup)				
Competence	19.27	23.24	24.89	27.67
Warmth	15.87	22.68	21.23	26.76
Positivity	19.39	23.82	23.87	27.18
Social closeness	23.29	27.03	30.84	28.53
Average of all outgroups				
Competence	60.01	23.95	52.27	23.63
Warmth	62.95	23.46	54.01	22.79
Positivity	60.47	21.73	53.67	22.21
Social closeness	61.56	25.72	52.69	25.83

Table 8. Inferential Statistics for Dependent Variables of Interest by Condition, Study 2.

Variable	t -test	p -value	95% CI	Cohen's d
Competition	-7.41	< .001	[-0.90, -0.52]	0.74
Zero-sum	-5.97	< .001	[-1.27, -0.64]	0.60
Difference score (ingroup—outgroup)				
Competence	-2.18	.030	[-10.67, -0.55]	0.22
Warmth	-2.14	.033	[-10.27, -0.44]	0.22
Positivity	-1.74	.082	[-9.53, 0.57]	0.18
Social closeness	-2.70	.007	[-13.06, -2.05]	0.27
Average of all outgroups				
Competence	3.23	.001	[3.03, 12.45]	0.33
Warmth	3.84	< .001	[4.36, 13.52]	0.39
Positivity	3.08	.002	[2.46, 11.14]	0.31
Social closeness	3.41	< .001	[3.76, 13.97]	0.34

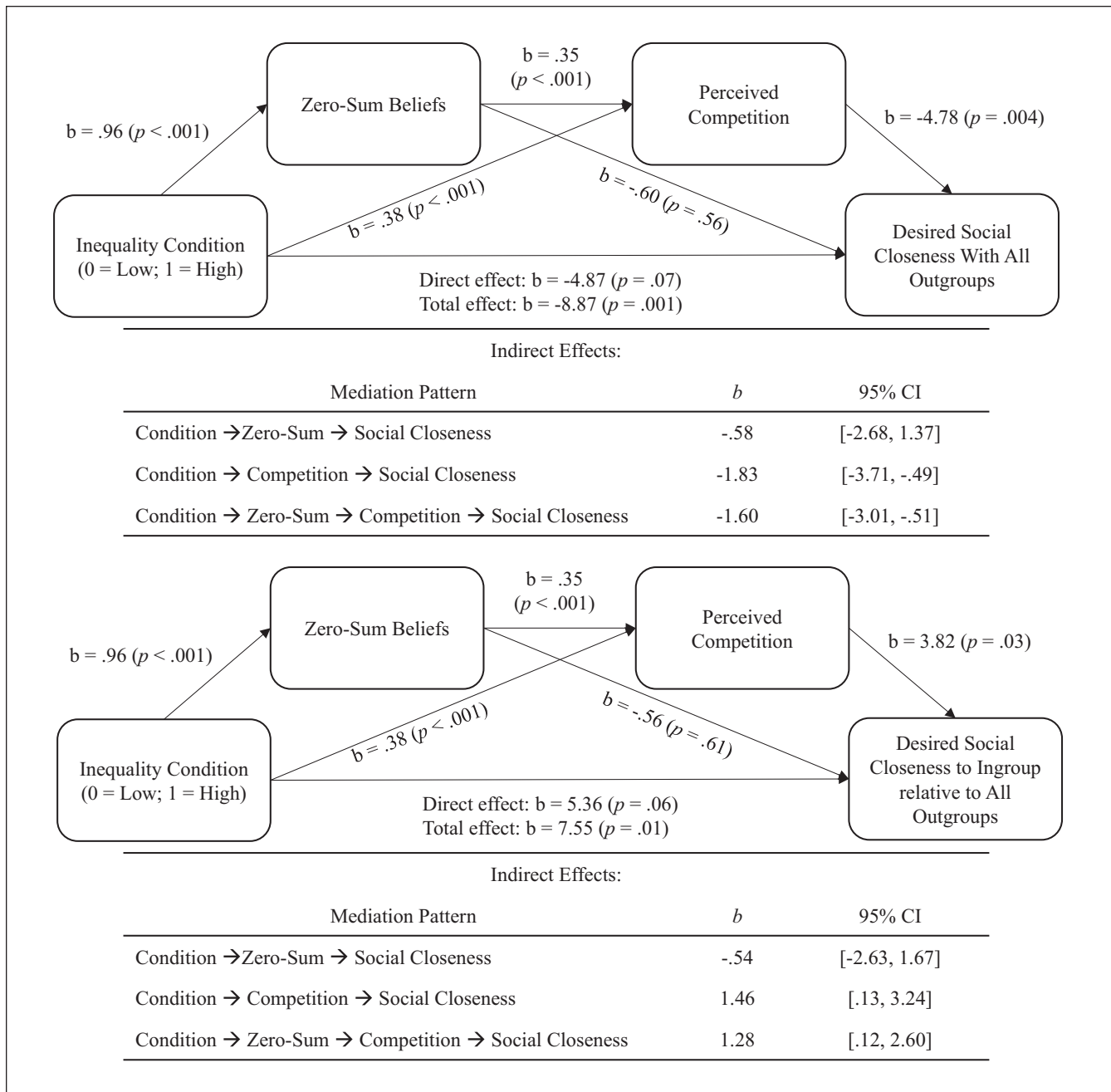


Figure 1. Serial Mediation Figures Predicting Perceived Desired Social Closeness Toward All Social Groups (Top) and the Difference Score Between Ingroup and Outgroups (Bottom), Study 2.

results revealed that participants in the high (vs. low) economic inequality condition said those in their region would perceive outgroups as less competent, warm, positive, and would want less social closeness with outgroups. The effects were similar when using the difference score measure of prejudice. Participants in the high (vs. low) economic inequality condition perceived that people in their area would view their ingroup relative to outgroups as more competent, warmer, marginally more positive, and perceived those in their region to want more social closeness with their ingroup relative to outgroups.

Serial Mediation. Finally, we investigated a serial mediation pattern whereby economic inequality condition predicted zero-sum beliefs (M1), perceived competition (M2), and, in turn, perceived prejudice (Y). Given that desired social closeness is the closest to a behavioral measure, we used desired social closeness as the primary measure of prejudice in these analyses. To test this pattern, we used lavaan with 5,000 bootstrapped resamples (Rosseel, 2012). Continuous variables were standardized prior to analyses. Because there are two ways to calculate prejudice, we conducted these

analyses twice: (a) desired social closeness toward all social outgroups and (b) the difference score of desired social closeness between one's ingroup and all outgroups. See Figure 1 for indirect and specific pathway findings. Overall, the pattern of results is consistent with mediation (i.e., that greater levels of economic inequality in one's geographic region leads to perceptions of greater prejudice by way of increased zero-sum beliefs and perceived competition). However, given that the mediators were not manipulated in this study, we advise caution in interpreting these results.

Overall, we found that greater perceived inequality in one's own region resulted in greater zero-sum beliefs, this predicted greater competition, and competition in turn predicted greater perceptions of prejudice toward outgroups in one's area. All the analyses above were preregistered, except that we did not specify how we would create our prejudice measure in the preregistration. Next, we replicate and extend upon Study 2 by investigating this mediational pattern when predicting participants' personal prejudice.

Study 3

In the previous study, we assessed perceived prejudice of people in one's geographic area (instead of participants' own prejudice) because previous research has shown that people regulate their expression of personally endorsed prejudice, whereas prejudice framed in terms of cultural knowledge produces more candid reports (e.g., Fiske et al., 2002). Furthermore, past research has found that measures framed as group- (vs. personal-) endorsement were more strongly associated with implicit bias and application of stereotypes in behavior (e.g., Correll et al., 2002; Devine, 1989). In the current study, however, we investigate participants' personal prejudice to test whether the pattern of results extends to predicting participants' personal prejudices. As stated in the preregistration, we predicted that participants in the high (vs. low) economic inequality condition would report more zero-sum beliefs and more perceived competition, which would in turn predict higher levels of prejudice indirectly via zero-sum beliefs and competition. We did not have clear predictions regarding a direct effect of condition on prejudice.

Method

Procedure. The procedure was the same as Study 2, except for some changes to the prejudice-dependent variables. Specifically, we measured participants' positivity toward outgroups (0 = extremely negatively, 100 = extremely positively), and their willingness to have outgroups as neighbors (0 = not at all, 100 = extremely). Similar to the previous studies, the outgroups were: people of a different race, people of a different religion, immigrants or foreign workers, people of a different socioeconomic status, and people who are in your social group. For correlations between measures, see Table 9.

Finally, participants reported additional demographic information, were debriefed, and compensated for their time.

Table 9. Correlations Between Dependent Variables, Study 3.

Variable	1	2	3	4	5
1. Competition					
2. Zero-sum	.62**				
Outgroup					
3. Positivity	-.22**	-.12*			
4. Social distance	-.12*	-.02	.68**		
Ingroup-outgroup					
5. Positivity	.01	.03	-.48**	-.41**	
6. Social distance	.05	.10*	-.36**	-.61**	.71**

*Indicates $p < .05$.

**Indicates $p < .01$.

Table 10. Mean and Standard Deviations for Dependent Variables of Interest by Condition, Study 3.

Variable	Inequality condition			
	Low		High	
	M	SD	M	SD
Competition	2.57	0.96	3.44	1.01
Zero-sum	3.11	1.46	4.09	1.63
Difference score (ingroup-outgroup)				
Positivity	7.19	14.28	7.47	21.11
Social closeness	8.69	16.61	7.91	22.30
Average of all outgroups				
Positivity	72.28	19.75	68.05	23.42
Social closeness	78.55	21.84	77.58	23.67

Results

See Table 5 for means, standard deviations, and inferential statistic test values. As expected, participants in the high (vs. low) inequality condition reported more zero-sum beliefs. In addition, participants in the high (vs. low) inequality condition perceived more competition between groups.

We measured prejudice in two different ways: positivity toward outgroups and desired social closeness toward outgroups (people of a different race, people of a different religion, people who speak a different language, immigrants/foreign workers, people of a different socioeconomic status). For each of these prejudice measures, we again created two indices of prejudice: one that averaged responses across all outgroups, and one that subtracted this averaged response across all outgroups from responses for the ingroup. Condition did not have a significant effect on any of these prejudice measures (see Table 10 for means and standard deviations and Table 11 for full results), but average positivity toward outgroups was marginally lower in the high inequality condition compared with the low inequality condition ($p = .053$).

We also examined each social group separately to see if inequality influenced a particular group. We aggregated the prejudice measures (i.e., positivity and social distance) and ran t-tests for each group separately. We found no effect of

Table 11. Inferential Statistics, Study 3.

Variable	<i>t</i> -test	<i>p</i> -value	95% <i>CI</i>	Cohen's <i>d</i>
Competition	-8.86	<.001	[-1.07, -0.68]	0.89
Zero-sum	-6.31	<.001	[-1.28, -0.67]	0.63
Difference score (ingroup-outgroup)				
Positivity	-0.15	.881	[-3.85, 3.30]	0.02
Social closeness	0.39	.695	[-3.12, 4.68]	0.04
Average of all outgroups				
Positivity	1.94	.053	[-0.05, 8.51]	0.20
Social closeness	0.42	.672	[-3.53, 5.47]	0.04

perceived inequality on prejudice toward people of a different race ($p = .222$), religion ($p = .565$), or immigrants ($p = .430$). However, higher inequality did lead to significantly more prejudice toward those who are of a different SES, $t(389.26) = 2.02$, $p = .044$, 95% $CI = [0.12, 8.48]$. One interpretation of these results is that prejudice resulting from higher economic inequality does not extend to all competitive social groups but is instead specific to SES. However, given the results of Study 2 and the mediations below, it could also be that the lack of effects toward the other social groups is a result of social desirability concerns.

We again tested a serial mediation pattern with economic inequality condition predicting zero-sum beliefs (M1), zero-sum beliefs predicting perceived competition (M2), and perceived competition, in turn, predicting prejudice (Y) using the same approach as in Study 2. Continuous variables were standardized prior to analyses. We found significant indirect effects (using 5,000 bootstrapped resamples) of inequality on prejudice via zero-sum beliefs and competition for two of our prejudice outcomes: average positivity toward outgroups and average desired social closeness to outgroups (see Figure 2 for full model results). Indirect effects for our other two prejudice outcomes were nonsignificant, $ps > .09$. This pattern of results is consistent with a mediation pattern in which economic inequality predicts higher zero-sum beliefs which in turn predicts greater perceived competition, which in turn predicts more negative outgroup attitudes overall (but not relative to the ingroup). However, given that the mediator was not manipulated in this study, we advise caution in interpreting these results.

These findings differ from Study 2 as there is no significant difference by condition for the prejudice measures. Most likely this is due to social desirability bias—or wanting to appear unprejudiced—as we asked participants about their *own* prejudices rather than about those living in their area. Because of this, we would expect similar but weaker effects, which is what we find. Notably, there is a significant indirect effect through zero-sum beliefs and competition for positivity and social distance measures.

Study 4

Study 4 sought to extend the previous studies to understand whether higher perceived economic inequality exacerbates perceived racial/ethnic prejudice between a number of specific

racial groups. Racial/ethnic prejudice represents a unique and important context in which to test our model as race/ethnicity is integrally linked with social status in the United States (e.g., Bobo & Hutchings, 1996; Moller et al., 2009). Furthermore, past research suggests that White Americans may be particularly likely to express prejudice toward minoritized groups to maintain their own power and the status quo (e.g., Sidanius & Pratto, 2001). In addition, intergroup prejudice may emerge between minoritized groups (e.g., Black and Latinx Americans) to the extent that people in these groups feel they are competing against one another for resources (Bobo & Hutchings, 1996). Together, this would suggest that high perceived economic inequality may lead to greater perceptions of intergroup prejudice in one's area for all racial/ethnic groups, but this may be particularly true for White Americans. However, hypotheses regarding specific racial groups were not preregistered.

Method

Participants. As we were interested in effects separately based on the racial/ethnic identity of the participant, we aimed to recruit 1,600 participants from Prolific to have sufficient power to investigate subgroup analyses with 400 participants in each of the following racial/ethnic groups: Asian, Black/African American, Latinx/Hispanic, and White.

Procedure. The manipulation for Study 4 was the same as the previous studies.

Zero-Sum Beliefs. After participants received feedback about the level of economic inequality in their geographic area, they then completed a 3-item zero-sum beliefs measure ($\alpha = .86$; Różycka-Tran et al., 2015).

Perceived Prejudice. Next, participants were asked two items that assessed perceived intergroup competition ($\alpha = .84$). We assessed prejudice by assessing desired social closeness with different racial/ethnic groups. Specifically, for each racial/ethnic group, we asked the following two questions: “How comfortable do you think most [insert participants' racial group] people would be in these situations?” (1) “In a social setting (such as a club or bar) where most people are [Asian/Black/Latinx/White] and (2) “Marrying an [Asian/Black/Latinx/White] person.” Participants responded on a scale from 1 (*not at all comfortable*) to 10 (*extremely comfortable*) and answered these items about all racial groups except their own ($\alpha_{\text{Asian}} = .83$, $\alpha_{\text{Black}} = .84$, $\alpha_{\text{Latinx}} = .82$, $\alpha_{\text{White}} = .78$). For correlations between variables, see Table 12. For consistency across studies, we report other measures in the supplementary materials.

Finally, participants reported additional demographic information, were debriefed, and compensated for their participation.

Results

See Table 13 for means, standard deviations, and inferential statistics. As expected, participants in the high (vs.

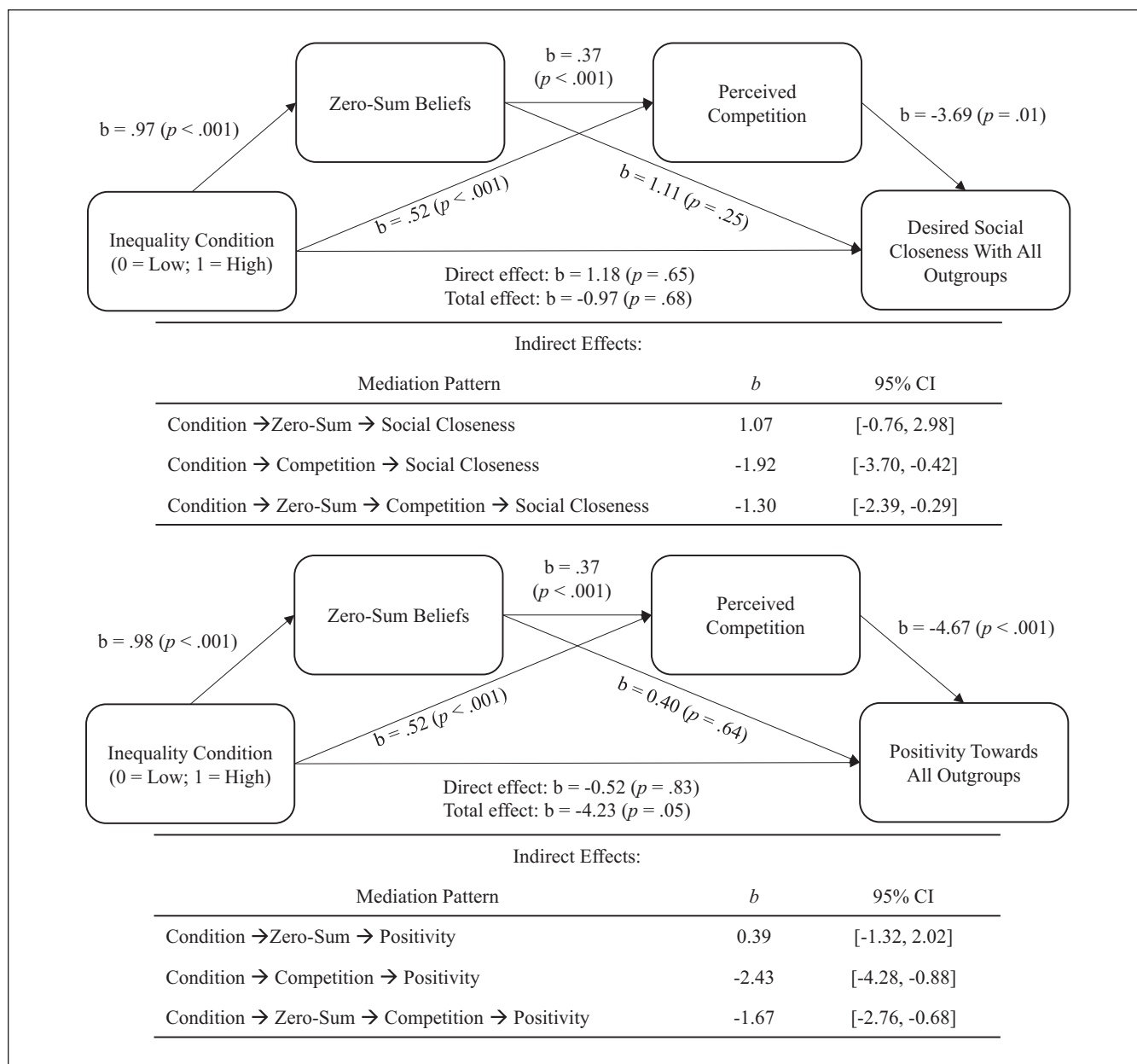


Figure 2. Serial Mediation Figures Predicting Positivity Toward All Social Groups (Top) and Desired Social Closeness to All Social Groups (Bottom), Study 3.

Table 12. Correlations Between Variables, Study 4.

Variable	1	2	3	4	5
1. Zero-sum					
2. Compete	.36**				
Social closeness with. . .					
3. Asian people	-.10**	-.09**			
4. Black people	-.09**	-.07*	.63**		
5. Latinx people	-.09**	-.04	.59**	.77**	
6. White people	-.16**	-.08**	.47**	.23**	.19**

*Indicates $p < .05$.

**Indicates $p < .01$.

low) inequality condition reported more zero-sum beliefs and perceived more competition. We also investigated these findings separately based on participants' racial/ethnic self-identification. We found a similar pattern of results for White participants, Asian participants, and Black participants—participants in the high (vs. low) inequality condition reported more zero-sum beliefs and perceived more competition. However, Latinx participants perceived greater competition in the high (vs. low) inequality condition but showed no difference in zero-sum beliefs.

Next, we examined the relationship between condition and perceived desired closeness to specific outgroup members (see

Table 13. Means, Standard Deviations, and Inferential Statistics for Dependent Variables of Interest by Condition, Study 4.

Participants	DV	Low inequality		High inequality		<i>t</i> -test	<i>df</i>	<i>p</i> -value	95% CI		Cohen's <i>d</i>
		Mean	<i>SD</i>	Mean	<i>SD</i>						
All	Zero-sum	3.96	1.33	4.24	1.26	-4.29	1,569.6	<.001	-0.41	-0.15	0.22
	Compete	3.36	1.29	4.16	1.24	-12.48	1,570.1	<.001	-0.92	-0.67	0.63
Asian	Zero-sum	3.99	1.27	4.34	1.09	-2.93	385.07	0.004	-0.58	-0.12	0.30
	Compete	3.31	1.20	4.24	1.12	-7.90	391.21	<.001	-1.15	-0.69	0.80
Black	Zero-sum	4.00	1.33	4.28	1.28	-2.12	392.99	0.034	-0.54	-0.02	0.21
	Compete	3.42	1.35	4.10	1.32	-5.04	391.69	<.001	-0.94	-0.41	0.51
Latinx	Zero-sum	4.15	1.41	4.32	1.25	-1.22	334.86	0.224	-0.45	0.11	0.13
	Compete	3.31	1.25	4.26	1.24	-7.14	347.4	<.001	-1.21	-0.69	0.76
White	Zero-sum	3.74	1.31	4.03	1.39	-2.20	424.27	0.028	-0.54	-0.03	0.21
	Compete	3.38	1.33	4.04	1.28	-5.25	428.91	<.001	-0.91	-0.41	0.51

*Bolded *p*-values indicate $p < .05$.

Table 14. Means, Standard Deviations, and Inferential Statistics for Dependent Variables of Interest by Condition, Study 4.

Participant group	Desired closeness to . . .	Low inequality		High inequality		<i>t</i> -test	<i>df</i>	<i>p</i> -value	95% CI		Cohen's <i>d</i>
		Mean	<i>SD</i>	Mean	<i>SD</i>						
All	Asian	6.13	2.22	5.88	2.14	2.04	1,173.7	0.042	0.01	0.51	0.12
	Black	5.08	2.45	4.85	2.14	1.69	1,152.7	0.091	-0.04	0.49	0.10
	Latinx	6.23	2.13	5.93	2.06	2.54	1,215.8	0.011	0.07	0.54	0.15
	White	5.93	2.20	5.97	2.06	-0.36	1,132.2	0.722	-0.29	0.20	0.02
Asian	Black	3.87	1.95	4.30	1.91	-2.20	391	0.029	-0.81	-0.04	0.22
	Latinx	5.24	1.82	5.29	1.89	-0.27	389.59	0.790	-0.42	0.32	0.03
	White	6.54	1.90	6.57	1.75	-0.17	389.8	0.862	-0.39	0.33	0.02
Black	Asian	5.54	2.32	5.36	2.29	0.74	390.58	0.457	-0.28	0.63	0.08
	Latinx	7.20	1.94	6.80	2.08	1.99	386.63	0.047	0.005	0.80	0.20
	White	5.06	2.20	5.13	2.04	-0.34	390.65	0.732	-0.49	0.35	0.03
Latinx	Asian	6.29	2.21	6.10	2.05	0.82	340.88	0.413	-0.26	0.63	0.09
	Black	6.08	2.51	5.54	2.25	2.10	337.35	0.037	0.03	1.04	0.22
	White	6.24	2.23	6.22	2.12	0.11	344.3	0.910	-0.43	0.48	0.01
White	Asian	6.56	2.01	6.14	2.01	2.17	427	0.031	0.04	0.80	0.21
	Black	5.40	2.36	4.75	2.07	3.07	425.09	0.002	0.24	1.08	0.30
	Latinx	6.25	2.14	5.73	1.93	2.64	427.96	0.009	0.13	0.90	0.25

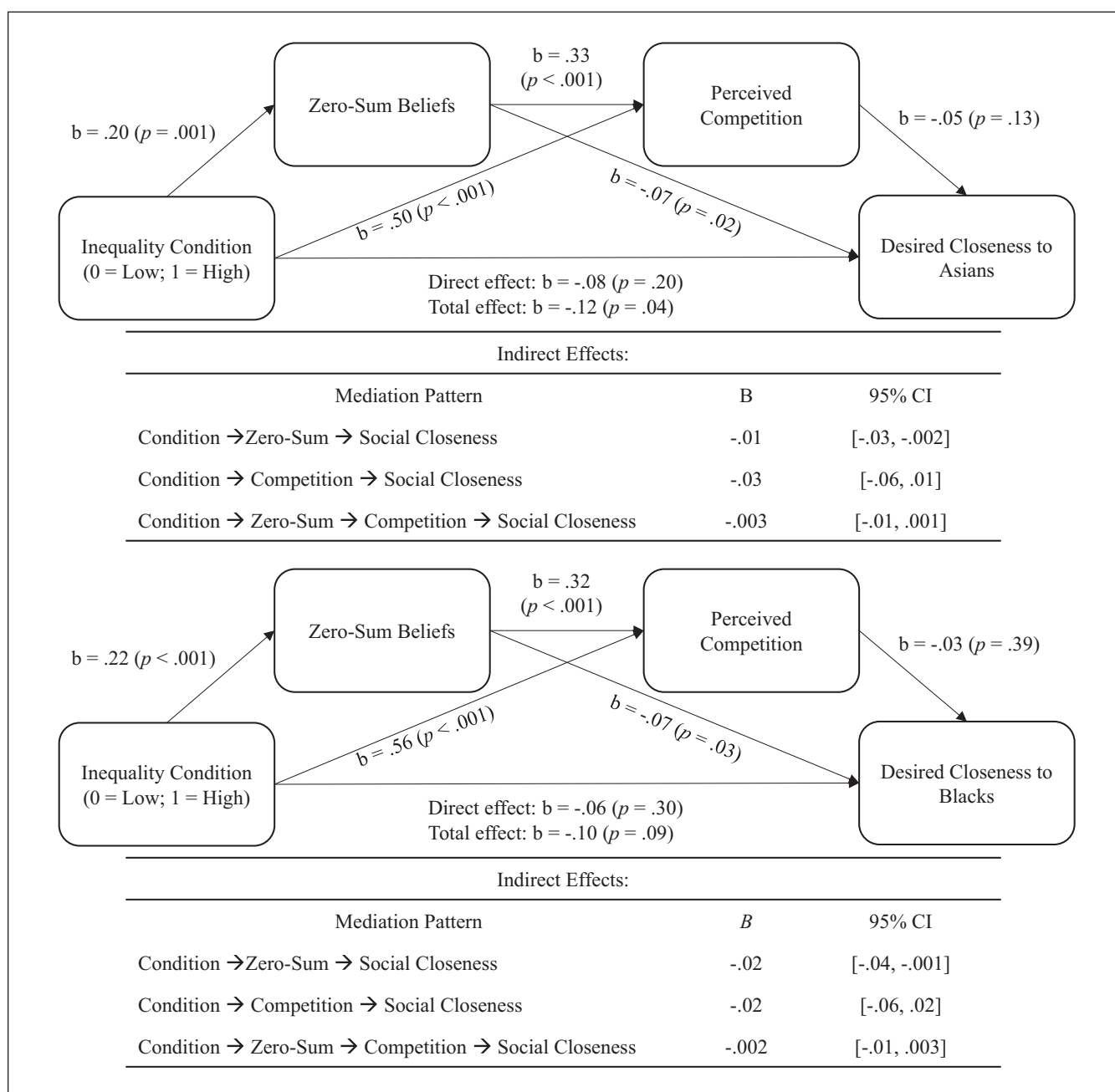
Table 14 for means, *SD*s, and inferential statistics). Overall, participants perceived that those in their geographic area would desire less closeness to Asian and Latinx Americans when inequality was high (vs. low). No other statistically significant findings emerged. To get a more nuanced understanding, we also investigated these findings separately based on participants' racial/ethnic self-identification. When inequality was high (vs.

low), Black participants perceived less desired closeness with Latinx people. Latinx participants also perceived less desired closeness with Black people when inequality was high (vs. low). Despite the possible advantages of Latinx and Black individuals working together, these results suggest a mutually competitive relationship. White participants perceived less desired closeness to all other racial/ethnic groups when inequality was high (vs.

low). This suggests a more generalized desire for social distance to maintain status in periods of high inequality. Contrary to expectations, Asians desired more closeness with Black people when inequality was high (vs. low) suggesting that Asians may feel a need to identify with another marginalized group (i.e., Black individuals) in times of high inequality. However, this finding seems to be driven by Asian participants feeling exceptionally low closeness toward Black people when inequality is low.

Serial Mediation. For exploratory purposes, we investigated a serial mediation pattern whereby economic inequality condition

predicted zero-sum beliefs (M1), perceived competition (M2), and, in turn, perceived desired closeness to Asians/ Blacks/ Latinx/ and Whites (Y). To test this pattern, we used lavaan with 5,000 bootstrapped resamples (Rosseel, 2012). Continuous variables were standardized prior to analyses. Although the pattern of effects was similar to Studies 2 and 3, the serial indirect pathway was not significant when predicting desired closeness toward Asian, Black, Latinx, or White Americans (see Figure 3). However, this serial mediation pattern also simultaneously investigates simple mediation via zero-sum beliefs and perceived competition, and these results reveal significant simple



(continued)

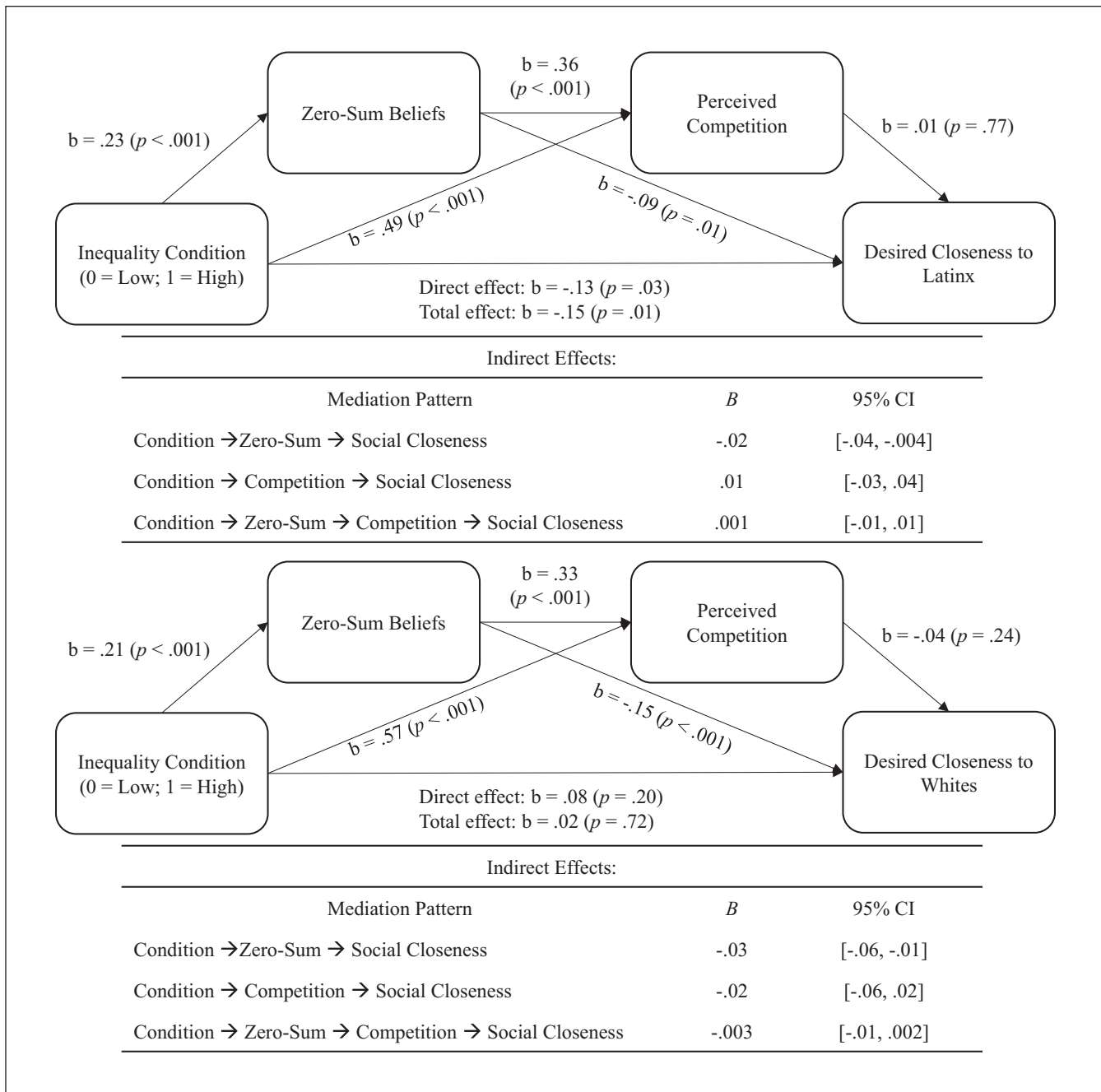


Figure 3. Serial Mediation Figures Predicting Desired Social Closeness by Social Group, Study 4.

mediation via perceived zero-sum beliefs. This suggests that high (vs. low) economic inequality increased perceived zero-sum beliefs which, in turn, increased participants' perception that their racial/ethnic group would be less willing to be close to Asian, Black, Latinx, or White Americans. Again, because the mediators were not manipulated in this study, we advise caution in interpreting all mediation results.

We also investigated this serial mediation pattern separately based on participants' racial/ethnic self-identification

(for detailed findings, see Supplemental Materials). Again, we did not find evidence for a serial indirect effect. However, this serial mediation pattern also simultaneously investigates simple mediation via zero-sum beliefs and perceived competition. For Black participants, there was a significant simple mediation of inequality's effect on perceived desired closeness with White people via perceived zero-sum beliefs, suggesting that high (vs. low) inequality increased zero-sum beliefs and, in turn, led to less perceived desired closeness

with White people, indirect effect $b = -0.04$, 95% CI = $[-.09, -.002]$. Therefore, this relationship is driven by Black participants' perceptions that Whites' higher economic status results in their own groups lower economic status. Consistent with the findings above, there was also a significant direct effect of inequality on Black participants desired closeness to Latinx people such that greater inequality predicted less desired closeness to Latinx people ($b = -0.20$, $p = .049$). This suggests that in contrast to the relationship between Black and White individuals, the relationship between Black and Latinx individuals may not be driven by zero-sum beliefs or competition.

For White participants, there was also significant simple mediation between inequality's effect on perceived desired closeness with Black people via perceived zero-sum beliefs. This pattern suggests that high (vs. low) inequality increased zero-sum beliefs and, in turn, led to less desired closeness with Black people, indirect effect $b = -0.04$, 95% CI = $[-.08, -.002]$. Therefore, there is a mutual relationship between Black and White individuals in that, for both groups, zero-sum beliefs are driving the relationship between high inequality and less desired closeness among the two groups. Perhaps this is due to the long and complicated history between White and Black individuals in the U.S. Consistent with the findings above, there are also significant direct effects of inequality on desired closeness for Asian ($b = -0.19$, $p = .038$), Black ($b = -0.26$, $p = .007$), and Latinx ($b = -0.23$, $p = .021$) groups. In all cases, this direct effect suggests that participants in the high inequality condition report less desired closeness with these groups.

For Latinx participants, there was a significant simple mediation of inequality's effect on closeness with Asians and Blacks via perceived competition. In both cases, this pattern suggests that high (vs. low) inequality increased perceived competition and, in turn, led to less desired closeness with Asian and Black people, indirect effect $b_{Asian} = -0.08$, 95% CI = $[-.17, -.01]$, indirect effect $b_{Black} = -0.09$, 95% CI = $[-.19, -.002]$. Therefore, Latinx people seem to perceive they are in competition with both Black and Asian people in times of higher inequality. There are no significant direct effects for Latinx participants.

Finally, for Asian participants, there are no significant simple mediations of inequality on desired closeness with each racial group via zero-sum beliefs or competition. However, consistent with the findings above, there is a direct effect of inequality on desired closeness to Black people such that when inequality is perceived to be high, Asian participants desire closeness with Black people ($b = 0.20$, $p = .026$).

Overall, these findings suggest that high inequality exacerbates White participants' perceptions of prejudice toward minoritized groups and may exacerbate perceived prejudice between some minoritized groups (i.e., Latinx and Black individuals). Furthermore, zero-sum beliefs may be a particularly potent mechanism to consider when trying to understand the relationship between perceived economic inequality

and perceived racial/ethnic prejudice. However, when looking within racial group, the mechanism may vary. That is, for White and Black participants, zero-sum beliefs seem to drive the relationship whereas for Latinx participants, competition seems to drive the relationship.

Study 5

We have shown that perceived inequality in one's region predicts perceived prejudice via competition and zero-sum beliefs. However, as mediation models do not imply causation, we manipulate competition in Study 5 to establish a causal relationship between competition and perceived prejudice. In this study, we do not manipulate perceived inequality, but instead tell all participants that inequality is high because this is the critical situation with respect to our theorizing. As preregistered, we expect that greater levels of competition (vs. lower) will predict greater levels of perceived prejudice.

Method

Procedure. In a final study, we sought to mitigate perceived prejudice by reducing intergroup competition. Participants went through a similar procedure as the economic inequality manipulation in Studies 1 through 5. However, this time they were told the computer was calculating their "geographic economic competitiveness index" instead of an inequality score. Unbeknownst to participants, they all read that inequality in their region was high but were randomly assigned to either the high or low *competition* condition. In the high competition condition, participants read that

Economists agree that the level of competition in an area has a direct impact on people's economic outcomes. Based on the economic competitiveness index, you live in a VERY economically competitive place. Because of your area's specific economic profile, people are fiercely competing against each other for economic resources.

In the low competition condition, participants read

Economists agree that the level of competition in an area has a direct impact on people's economic outcomes. Based on the economic competitiveness index, you DO NOT live in a very economically competitive place. Because of your area's specific economic profile, people are not competing against each other for economic resources.

As a manipulation check, we asked participants one item to assess perceived competition ("To what extent do you think different social groups in your geographic area will compete with each other for financial resources?" on a scale from 1 (*not at all*) to 5 (*all of the time*)).

Participants completed the same prejudice measures as in Study 2. See Table 15 for correlations between measures.

Table 15. Correlations Between Variables, Study 5.

Variable	1	2	3
Average of all outgroups			
1. Positivity			
2. Social distance	.82**		
Difference score (ingroup—outgroup)			
3. Positivity	-.67**	-.54**	
4. Social distance	-.55**	-.68**	.69**

*Indicates $p < .05$.

**Indicates $p < .01$.

Finally, participants reported demographic information, were debriefed, and compensated for their participation.

Results

Manipulation Check. To examine whether our manipulation was effective, we examined participants' perception of intergroup competition. Participants in the high competition condition ($M = 3.93$, $SD = 0.90$) perceived more competition between groups than participants in the low competition condition ($M = 2.84$, $SD = 1.22$), $t(353.8) = -10.09$, $p < .001$, $95\% \text{ CI} = [-1.31, -0.88]$, $d = 1.02$. This suggests the manipulation was successful.

Prejudice. Next, we investigated whether reducing perceived competition mitigated perceptions of prejudice. Again, for analyses we created two social closeness indexes by: (a) combining the ratings of all specific social outgroups ($\alpha_{\text{positive}} = .90$; $\alpha_{\text{social closeness}} = .91$) and (b) creating a difference score between people in one's social group and people who are not in one's social group. We also examined each social group separately and found the same pattern of results (see supplement).

See Table 16 for means, standard deviations, and inferential statistical test values. When combining ratings toward all specific social outgroups, the results revealed that participants in the low (vs. high) competition condition perceived people in their geographic area to be more positive toward outgroups and to want to be socially closer to outgroups. The effects were similar when using the difference score. Participants in the low competition condition (relative to high competition) perceived people in their geographic area to view their ingroup relative to outgroups as more positive and to have a greater desire to be socially close to outgroups. Overall, these findings suggest that mitigating perceptions of competition in one's geographic region in turn reduced perceptions of prejudice toward outgroups in one's geographic area. With the exception of how the prejudice measure was created, all analyses were preregistered.

General Discussion

The current work investigated whether higher perceived economic inequality in one's geographic region may increase

zero-sum beliefs and perceived competition which, in turn, may lead to increased perceptions of intergroup prejudice in one's geographic region. Study 1 found that high (vs. low) perceived inequality increased perceived competition and zero-sum beliefs across social groups perceived to be resource-relevant (e.g., religious groups; SES groups; racial groups), but not for non-resource-relevant social groups (e.g., groups based on handedness). Focusing on these relevant social groups, Study 2 found that higher perceived inequality caused more zero-sum beliefs, perceived competition, and perceived prejudice. Furthermore, the pattern of results suggested that perceived economic inequality exacerbated perceptions of prejudice via zero-sum beliefs and perceived competition. Study 3 replicated and extended this pattern of mediation to *personal* prejudice and found that perceived inequality indirectly influences personal prejudice. Study 4 investigated nuances in the proposed mechanism by focusing on perceived racial/ethnic prejudice among a racially/ethnically diverse sample and found that zero-sum beliefs may be particularly important when considering racial/ethnic prejudice. Finally, Study 5 provided evidence that assuaging economic competition concerns mitigated intergroup prejudice.

Contributions and Implications

The current work extends beyond previous research in several ways. First, it adds to the relatively limited work demonstrating that economic inequality may exacerbate prejudice by examining the causal relationship and by examining why this may occur. Specifically, we examined the role of zero-sum beliefs and perceived competition and found that these beliefs may, in part, explain why perceiving higher economic inequality may exacerbate personal and perceived prejudice.

Second, past research and theory has focused heavily on White American's prejudice toward Black Americans. Although we do examine race/ethnicity to understand the nuanced relationship between perceptions of economic inequality, zero-sum beliefs, perceived competition, and perceived prejudice, the current work extends beyond White Americans' prejudice toward Black Americans to examine perceived racial/ethnic prejudice toward numerous racial-ethnic groups and from a racially/ethnically diverse sample. We also investigate attitudes toward groups based on religion, language spoken, immigrant status, and SES. Together, these studies allow us to examine specific patterns as well zoom out and look at the broader patterns.

Finally, these studies not only assess the causal relationship between perceived inequality and perceived and personal prejudice; Study 5 also investigated a way to mitigate this relationship. We find that mitigating perceived intergroup competition reduces perceived intergroup prejudice. Overall, these findings coupled with previous research underscore the mutually reinforcing nature of economic inequality and prejudice, potentially creating a cyclical pattern. To break this cycle effectively, it is imperative not only

Table 16. Means, Standard Deviations, and Inferential Statistics for Dependent Variables of Interest by Condition, Study 5.

Variable	Perceived competition condition				<i>t</i> -test	<i>p</i> -value	95% CI	<i>Cohen's d</i>
	Low		High					
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
Average of all outgroups								
Positivity	60.28	22.84	54.38	21.92	2.61	.009	[1.45, 10.36]	0.26
Social Closeness	63.47	24.27	56.36	24.09	2.90	.004	[2.30, 11.93]	0.29
Difference score (ingroup—outgroup)								
Positivity	17.27	23.66	22.50	26.27	−2.07	.039	[−10.20, −0.26]	0.21
Social Closeness	19.71	24.64	25.33	28.19	−2.10	.036	[−10.89, −0.36]	0.21

to focus on mitigating prejudice but also to address policies and structures influencing inequality.

Limitations and Future Directions

It is important to consider the limitations of this work. First, this work investigates perceptions of others' desired social closeness/distance toward an outgroup as a measure of perceived prejudice. Previous work finds that not wanting outgroups as neighbors is predicted by prejudice to a much greater degree than other factors (such as the perceived wealth of outgroup members and concerns about property values dropping as a result of outgroup members moving in; Schuman & Bobo, 1988). Furthermore, we find that the measure of desired social closeness is strongly correlated with perceive warmth ($r = .85, p < .001$), competence ($r = .83, p < .001$), and positivity toward outgroup members ($r = .80, p < .001$). This suggests that, at least in our samples, perceived social closeness may be an indicator of perceived prejudice. However, it is possible that some participants felt social distance may allow different communities autonomy and self-determination. Future research should investigate whether desired social distance, in some conditions, may reflect prejudice while in other conditions may reflect the desire to allow different groups autonomy and self-determination.

Second, we found inconsistent evidence for the sequential mediation via zero-sum beliefs and perceived competition when investigating the indirect pathway from inequality condition to prejudice. Specifically, when we investigated perceived racial/ethnic prejudice among a sample of diverse participants, the mediational pattern was primarily via zero-sum beliefs. For exploratory purposes, we investigated several other mediation patterns in the Supplemental Materials. That said, it may be that our hypothesized sequential model does not best capture the process when considering racial/ethnic prejudice—suggesting important nuance in our model.

One possible explanation for these inconsistent findings may be important differences between racial/ethnic groups. Previous theory and research suggest that prejudice toward an outgroup may depend on the degree to which that

outgroup may pose a threat to the ingroup's resources (e.g., Blumer, 1958; Bobo & Hutchings, 1996; Cottrell & Neuberg, 2005; Zou & Cheryan, 2017). Our findings suggest that zero-sum beliefs may be particularly important for Black and White Americans when considering the relationship between economic inequality and prejudice, but perceived competition may be particularly important for Latinx Americans. Although we are unsure why these differences emerge between racial/ethnic groups of participants, it may be important to consider models of racial position and historical context (e.g., Lei et al., 2023; Trawalter et al., 2022). That is, models of racial position are integrally linked with the socio-cultural history such that stereotypes, perceived threat, and prejudice between groups are shaped by the dominant cultural perspective within a given society *and* the history of the subordinated group's exploitation. Thus, both history and current cultural contexts may give rise to intergroup prejudice and reinforce existing social hierarchies. Future research should take a sociohistorical and racial position theory lens to investigate when and why economic inequality may exacerbate intergroup prejudice by specific racial/ethnic groups and toward specific racial/ethnic groups.

Third, Study 5 aims to understand the causal mechanism between perceived inequality and perceived prejudice by manipulating the mediator—competition. In this study, high inequality is held constant across conditions of high and low perceived competition because we were critically interested in perceived prejudice when inequality was high, yet competition was low. However, a different test would have been to manipulate both perceived inequality and competition simultaneously. We could imagine a situation where low perceived inequality and high perceived competition led to an increased willingness to work across group boundaries because there is little economic risk and the potential for reward. That said, we did not test this possibility as it was beyond the scope of this research, and we could not find a real-world corollary for this situation. Future research could explore this question.

Fourth, previous research showed that reminding White participants of a demographic shift in the United States in the near future (i.e., Whites no longer being a majority group)

exacerbated their implicit and explicit racism toward Black, Latinx, and Asian groups (Craig & Richeson, 2014). It is not yet known why this was the case. Our current findings suggest that an unfavorable demographic shift might evoke more intergroup competition and/or a more intense zero-sum beliefs among White participants. These mechanisms need to be explicitly tested in the future.

Conclusion

Inequality continues to rise in the United States, underscoring the urgency to investigate the varied consequences of this inequality. The present work finds that high perceived inequality leads to heightened zero-sum beliefs and competition, which in turn led to increased perceptions of prejudice among a variety of social groups. Inequality and prejudice are part of a mutually reinforcing cyclical process. This would suggest that structural changes that reduce economic inequality may naturally lead to reduced prejudice, which may further serve the goal of reducing inequality.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This work was funded by the Russell Sage Foundation (G-2011-29113).

Preregistrations

Preregistrations, study materials, data, analytic code, and codebook can be found here: https://osf.io/7hfpq/?view_only=2538cb735d9945beb937c827bec53a3d

ORCID iDs

Jaclyn A. Lisnek  <https://orcid.org/0000-0001-8291-8832>

Nava Caluori  <https://orcid.org/0000-0003-1632-4512>

Jazmin L. Brown-Iannuzzi  <https://orcid.org/0000-0002-2247-8385>

Shigehiro Oishi  <https://orcid.org/0000-0002-4185-960X>

Supplemental Material

Supplemental material is available online with this article.

Notes

1. We find that in all five studies, 83 out of 3,181 participants (2.6%) report some form of skepticism about the manipulation. Given this relatively low number, we anticipate that the findings were relatively believable.
2. Note, when analyzing the groups separately, a similar pattern of results emerges as when aggregating the social groups.

References

- Anderson, C., Willer, R., Kilduff, G. J., & Brown, C. E. (2012). The origins of deference: When do people prefer lower status? *Journal of Personality and Social Psychology*, 102(5), 1077–1088.
- Aumann, R. J. (1987). Correlated equilibrium as an expression of Bayesian rationality. *Econometrica: Journal of the Econometric Society*, 55, 1–18.
- Bertrand, M., & Mullainathan, S. (2004). Are Emily and Greg more employable than Lakisha and Jamal? A field experiment on labor market discrimination. *American Economic Review*, 94(4), 991–1013.
- Bianchi, E. C. (2020). How the economy shapes the way we think about ourselves and others. *Current Opinion in Psychology*, 32, 120–123.
- Blumer, H. (1958). Race prejudice as a sense of group position. *Pacific Sociological Review*, 1(1), 3–7.
- Bobo, L., & Hutchings, V. L. (1996). Perceptions of racial group competition: Extending Blumer's theory of group position to a multiracial social context. *American Sociological Review*, 61, 951–972.
- Bobo, L., & Zubrinsky, C. L. (1996). Attitudes on residential integration: Perceived status differences, mere in-group preference, or racial prejudice? *Social Forces*, 74(3), 883–909.
- Brown, N. D., Jacoby-Senghor, D. S., & Raymundo, I. (2022). If you rise, I fall: Equality is prevented by the misperception that it harms advantaged groups. *Science Advances*, 8(18), Article eabm2385.
- Buttrick, N. R., Heintzelman, S. J., & Oishi, S. (2017). Inequality and well-being. *Current Opinion in Psychology*, 18, 15–20.
- Buttrick, N. R., & Oishi, S. (2017). The psychological consequences of income inequality. *Social and Personality Psychology Compass*, 11(3), Article e12304.
- Caluori, N., Brown-Iannuzzi, J. L., & Cipolli, W., III. (2021). Economic inequality shapes the relationship between globalization and prejudice. *Social Psychological and Personality Science*, 12(6), 1082–1091.
- Campbell, D. T. (1965). Ethnocentric and other altruistic motives. In D. Levine (Ed.), *Nebraska symposium on motivation* (Vol. 13, pp. 283–311). University of Nebraska Press.
- Chun, J. S., Sherf, E. N., & Slepian, M. L. (2023). In it to win it? Comparative evaluation increases zero-sum beliefs. *Motivation Science*, 9(1), 31–41.
- Connor, P., Sarafidis, V., Zyphur, M. J., Keltner, D., & Chen, S. (2019). Income inequality and White-on-Black racial bias in the United States: Evidence from project implicit and Google Trends. *Psychological Science*, 30(2), 205–222.
- Correll, J., Park, B., Judd, C. M., & Wittenbrink, B. (2002). The police officer's dilemma: Using ethnicity to disambiguate potentially threatening individuals. *Journal of Personality and Social Psychology*, 83(6), 1314–1329.
- Côté, S., House, J., & Willer, R. (2015). High economic inequality leads higher-income individuals to be less generous. *Proceedings of the National Academy of Sciences*, 112(52), 15838–15843.
- Cottrell, C. A., & Neuberg, S. L. (2005). Different emotional reactions to different groups: A sociofunctional threat-based approach to "prejudice." *Journal of Personality and Social Psychology*, 88(5), 770–789.

- Craig, M. A., & Richeson, J. A. (2014). More diverse yet less tolerant? How the increasingly diverse racial landscape affects white Americans' racial attitudes. *Personality and Social Psychology Bulletin*, 40(6), 750–761.
- Crandall, C. S., & Eshleman, A. (2003). A justification-suppression model of the expression and experience of prejudice. *Psychological Bulletin*, 129(3), 414–446.
- Davidai, S. (2022). How do people make sense of wealth and poverty? *Current Opinion in Psychology*, 43, 42–47.
- De Tocqueville, A. (2003). *Democracy in America*. Penguin. (Original work published 1835)
- Devine, P. G. (1989). Stereotypes and prejudice: Their automatic and controlled components. *Journal of Personality and Social Psychology*, 56(1), 5–18.
- Engelhardt, C., & Wagener, A. (2014). *Biased perceptions of income inequality and redistribution*.
- Esses, V. M., & Dietz, J. (2007). *Prejudice in the workplace: The role of bias against visible minorities in the devaluation of immigrants' foreign-acquired qualifications and credentials*. Canadian Issues/Themes Canadiens.
- Esses, V. M., Dietz, J., & Bhardwaj, A. (2006). The role of prejudice in the discounting of immigrant skills. In *19th Annual Conference of the Society of Industrial and Organizational Psychology*, Chicago, IL.
- Esses, V. M., Dovidio, J. F., Jackson, L. M., & Armstrong, T. L. (2001). The immigration dilemma: The role of perceived group competition, ethnic prejudice, and national identity. *Journal of Social Issues*, 57(3), 389–412.
- Faul, F., Erdfelder, E., Buchner, A., & Lang, A. G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, 41(4), 1149–1160.
- Fiske, S. T., Cuddy, A. J. C., Glick, P., & Xu, J. (2002). A model of (often mixed) stereotype content: Competence and warmth respectively follow from perceived status and competition. *Journal of Personality and Social Psychology*, 82(6), 878–902. <https://doi.org/10.1037/0022-3514.82.6.878>
- Friedman, M., & Friedman, R. D. (1990). *Free to choose*. Free to Choose Enterprise.
- Gimpelson, V., & Treisman, D. (2018). Misperceiving inequality. *Economics & Politics*, 30(1), 27–54.
- Gordils, J., Jamieson, J. P., & Elliot, A. J. (2023). The effect of Black–White income inequality on perceived interracial psychological outcomes via perceived interracial competition. *Journal of Experimental Psychology: General*, 152(9), 2479–2503. <https://doi.org/10.1037/xge0001418>
- Gordils, J., Sommet, N., Elliot, A. J., & Jamieson, J. P. (2020). Racial income inequality, perceptions of competition, and negative interracial outcomes. *Social Psychological and Personality Science*, 11(1), 74–87.
- Hauser, O. P., & Norton, M. I. (2017). (Mis) perceptions of inequality. *Current Opinion in Psychology*, 18, 21–25.
- Horwitz, S. R., Shutts, K., & Olson, K. R. (2014). Social class differences produce social group preferences. *Developmental Science*, 17(6), 991–1002.
- Hovland, C. I., & Sears, R. R. (1940). Minor studies of aggression: VI. Correlation of lynchings with economic indices. *Journal of Psychology*, 10, 301–310.
- Jachimowicz, J. M., Davidai, S., Goya-Tocchetto, D., Szaszi, B., Day, M. V., Tepper, S. J., Phillips, T. L., Mirza, U. M., Ordabayeva, N., & Hauser, O. P. (2023). Inequality in researchers' minds: Four guiding questions for studying subjective perceptions of economic inequality. *Journal of Economic Surveys*, 37(5), 1534–1561.
- Kraus, M. W., Park, J. W., & Tan, J. J. (2017). Signs of social class: The experience of economic inequality in everyday life. *Perspectives on Psychological Science*, 12(3), 422–435.
- Lei, R. F., Foster-Hanson, E., & Hoh, J. X. (2023). A sociohistorical model of intersectional social category prototypes. *Nature Reviews Psychology*, 2, 297–308.
- Moller, S., Alderson, A. S., & Nielsen, F. (2009). Changing patterns of income inequality in U.S. counties, 1970–2000. *American Journal of Sociology*, 114, 1037–1101. <https://doi.org/10.1086/595943>
- Niehuys, J. (2014). *Subjective perceptions of inequality and redistributive preferences: An international comparison* [IW-TRENDS Discussion Paper]. Cologne Institute for Economic Research.
- Nishi, A., Shirado, H., Rand, D. G., & Christakis, N. A. (2015). Inequality and visibility of wealth in experimental social networks. *Nature*, 526(7573), 426–429.
- Norton, M. I. (2014). Unequality: Who gets what and why it matters. *Policy Insights from the Behavioral and Brain Sciences*, 1(1), 151–155.
- Norton, M. I., & Ariely, D. (2011). Building a better America—One wealth quintile at a time. *Perspectives on Psychological Science*, 6(1), 9–12.
- Norton, M. I., & Sommers, S. R. (2011). Whites see racism as a zero-sum game that they are now losing. *Perspectives on Psychological Science*, 6(3), 215–218.
- Organisation for Economic Co-operation and Development. (2022). *Income inequality (indicator)*. <https://doi.org/10.1787/459aa7f1-en>
- Reich, M. (1983). *Racial inequality: A political-economic analysis*. Princeton University Press.
- Reuben, E., Sapienza, P., & Zingales, L. (2014). How stereotypes impair women's careers in science. *Proceedings of the National Academy of Sciences*, 111(12), 4403–4408.
- Rios, K., Halper, L. R., & Scheitle, C. P. (2022). Explaining anti-atheist discrimination in the workplace: The role of intergroup threat. *Psychology of Religion and Spirituality*, 14(3), 371–380. <https://doi.org/10.1037/rel0000326>
- Rosseel, Y. (2012). Lavaan: An R package for structural equation modeling. *Journal of Statistical Software*, 48(2), 1–36. <https://doi.org/10.18637/jss.v048.i02>
- Rózycka-Tran, J., Boski, P., & Wojciszke, B. (2015). Belief in a zero-sum game as a social axiom: A 37-nation study. *Journal of Cross-Cultural Psychology*, 46(4), 525–548.
- Sánchez-Rodríguez, Á., Willis, G. B., Jetten, J., & Rodríguez-Bailón, R. (2019). Economic inequality enhances inferences that the normative climate is individualistic and competitive. *European Journal of Social Psychology*, 49(6), 1114–1127.
- Schaeffer, K. (2020, February 7). *6 facts about economic inequality in the U.S.* Pew Research Center. <https://www.pewresearch.org/fact-tank/2020/02/07/6-facts-about-economic-inequality-in-the-u-s/>
- Schuman, H., & Bobo, L. (1988). Survey-based experiments on white racial attitudes toward residential integration. *American Journal of Sociology*, 94(2), 273–299.
- Sherif, M. (1956). Experiments in group conflict. *Scientific American*, 195(5), 54–59.

- Sidanius, J., & Pratto, F. (2001). *Social dominance: An inter-group theory of social hierarchy and oppression*. Cambridge University Press.
- Sommet, N., Elliot, A. J., Jamieson, J. P., & Butera, F. (2019). Income inequality, perceived competitiveness, and approach-avoidance motivation. *Journal of Personality*, 87(4), 767–784.
- Sommet, N., Weissman, D. L., & Elliot, A. J. (2023). Income inequality predicts competitiveness and cooperativeness at school. *Journal of Educational Psychology*, 115(1), 173–191.
- Trawalter, S., Higginbotham, G. D., & Henderson, K. (2022). Social psychological research on racism and the importance of historical context: Implications for policy. *Current Directions in Psychological Science*, 31(6), 493–499.
- Wilkinson, R. G., & Pickett, K. E. (2009). *The spirit level: Why equality is better for everyone*. Penguin UK.
- Wilson, B. D., Gomez, A. G., Sadat, M., Choi, S. K., & Badgett, M. V. (2020). Pathways into poverty: Lived experiences among LGBTQ people. *UCLA: The Williams Institute*. Retrieved from <https://escholarship.org/uc/item/3bp6b7dp>
- Zou, L. X., & Cheryan, S. (2017). Two axes of subordination: A new model of racial position. *Journal of Personality and Social Psychology*, 112(5), 696–717.