

# Personal Relative Deprivation and the Belief That Economic Success Is Zero-Sum

Martino Ongis<sup>1</sup> and Shai Davidai<sup>2</sup>

<sup>1</sup> Edmond J. Safra Center for Ethics, Harvard University

<sup>2</sup> Columbia Business School, Columbia University

Why do people view economic success as zero-sum? In seven studies (including a large, nationally representative sample of more than 90,000 respondents from 60 countries), we explore how personal relative deprivation influences zero-sum thinking—the belief that one person’s gains can only be obtained at other people’s expense. We find that personal relative deprivation fosters a belief that economic success is zero-sum, and that this is true regardless of participants’ household income, political ideology, or subjective social class. Moreover, in a large and preregistered study, we find that the effect of personal relative deprivation on zero-sum thinking is mediated by lay perceptions of society. The more people see themselves as having been unfairly disadvantaged relative to others, the more they view the world as unjust and economic success as determined by external forces beyond one’s control. In turn, these cynical views of society lead people to believe that economic success is zero-sum. We discuss the implications of these findings for research on social comparisons, the distribution of resources, and the psychological consequences of feeling personally deprived.

**Keywords:** personal relative deprivation, zero-sum beliefs, economic success, social comparison

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Although the heroic tales of Robin Hood and the Merry Men are more a matter of folklore than historical fact, their sentiment of economic vigilantism has, for centuries, sparked the imagination of millions. All around the world, people seem to relate to the idea that “the rich” gain at the expense of “the poor” and that one person’s economic success is inevitably balanced by others’ failure (Różycka-Tran et al., 2015). Indeed, this zero-sum view of economic success is found in many economic philosophies and political ideologies (Davidai & Ongis, 2019; Meegan, 2010; Siroła & Pitesa, 2017).

What explains this widespread belief that the wealthy gain at the expense of worse-off others? More generally, why do so many people view economic success as a zero-sum game, where people can only succeed at others’ expense?

We argue that personal relative deprivation—the feeling of having been unfairly disadvantaged relative to others (Smith et al., 2012)—fosters the belief that economic success is zero-sum.

Specifically, we suggest that both temporary and chronic experiences of relative deprivation garner the belief that wealthy people’s fortunes come at the expense of less fortunate others. In contrast, we argue that feeling relatively gratified with one’s economic standing reduces such zero-sum beliefs about economic success.

## The Belief That Life Is Zero-Sum

Viewing life as zero-sum is associated with many adverse consequences, including reduced trust, lower subjective wellbeing, diminished faith in democracy, and a general sense that the social system is illegitimate and unjust (Piotrowski et al., 2019; Różycka-Tran et al., 2015, 2018, 2019a, 2019b; Shin & Kim, 2018). Among other things, zero-sum thinking has been linked to various forms of prejudice, including a belief that immigrants benefit at the expense of a country’s citizens (Davidai & Ongis, 2019; Esses et al., 2001; Louis et al., 2013), that racial minorities benefit at the majority’s expense (Norton & Sommers, 2011; Wilkins et al., 2015), and that women advance at men’s expense (Kehn & Ruthig, 2013; Wilkins et al., 2015). More broadly, perceiving one’s interests as diametrically opposed to others’ interests contributes to intergroup conflict (Bar-Tal, 2000; Bobo & Hutchings, 1996; Esses et al., 2001; Ho et al., 2012), inhibits compromises (Maoz & McCauley, 2005, 2009), and impedes social and economic progress (Krugman, 2003; Rubin, 2003; Wright, 2001).

Although a lot is known about the consequences of zero-sum thinking, much less is known about its underlying causes. Past research has argued that zero-sum thinking is a cultural mindset or worldview (Różycka-Tran et al., 2015) that reflects a cognitive

Martino Ongis  <https://orcid.org/0000-0002-9410-1333>

Shai Davidai  <https://orcid.org/0000-0002-2603-2217>

Both authors contributed equally to the article.

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Correspondence concerning this article should be addressed to Martino Ongis, Edmond J. Safra Center for Ethics, Harvard University, 124 Mt. Auburn Street, Suite 502-North, Cambridge, MA 02138, United States, or Shai Davidai, Columbia Business School, Columbia University, 3022 Broadway Avenue, New York, NY 10027, United States. Email: [mongis@fas.harvard.edu](mailto:mongis@fas.harvard.edu) or [sd3311@columbia.edu](mailto:sd3311@columbia.edu)

adaptation to scarcity (Boyer & Petersen, 2018; Foster, 1965) and is a relic of erroneous mercantilist views of economic exchange (Johnson, 2018). Yet, recent research suggests that zero-sum beliefs are more malleable than previously thought and are influenced by such factors as people's perceptions of the economy (Sirola & Pitesa, 2017), their beliefs about the status-quo (Davidai & Ongis, 2019), the experience of personal threat (Smithson et al., 2015), and the way in which zero-sum statements are phrased and measured (Smithson et al., 2017). For instance, whereas depicting social and economic issues as a threat to the status-quo increases zero-sum thinking among conservatives, framing the very same issues as upholding existing social structures increases zero-sum thinking among liberals (Davidai & Ongis, 2019).

In this article, we examine an important yet previously overlooked factor that underlies the belief that economic success is zero-sum. Specifically, we examine whether *personal relative deprivation*—an aversive state brought about by feeling that one has been unfairly disadvantaged relative to others (Smith et al., 2012)—increases zero-sum thinking. We predicted that relative to people who feel gratified about their economic standing, those who feel personal relative deprivation would be substantially more prone to view economic success as zero-sum.

### Personal Relative Deprivation and Zero-Sum Thinking

Inspired by work on social comparison processes (Festinger, 1954; Wheeler & Miyake, 1992), personal relative deprivation has been conceptualized as a two-step process: an initial cognitive assessment that one has been personally disadvantaged relative to a comparison target, and a subsequent negative affective reaction that includes anger, resentment, and dissatisfaction with one's outcomes (Callan et al., 2008; Haisley et al., 2008; Smith et al., 2012). This experience of relative deprivation has been associated with various physical and psychological consequences, including heightened stress, poor mental health, and lower subjective well-being (Eibner & Evans, 2005; Ellaway et al., 2004; Luttmner, 2005; Pham-Kanter, 2009; Walker & Mann, 1987). And, although feeling relatively deprived can motivate personal development (Hafer & Olson, 1993; Olson et al., 1995), it can also lead people to discount their desired outcomes (Crosby, 1984; Tougas & Beaton, 2008) and to engage in delinquent and needlessly risky behaviors (Agnew, 2001; Callan et al., 2011; Greenberg, 1993).

Importantly, the experience of relative deprivation is independent from people's objective economic resources, and financially well-off people may still feel disadvantaged when comparing themselves to better-off others (Davidai & Deri, 2019; Frank, 1985; Houston et al., 1989; Sherman, 2019). Because better-off others are often more cognitively accessible than those who are worse-off than oneself (Davidai et al., 2021; Deri et al., 2017), it is not surprising that objectively well-off individuals can nonetheless feel as if they have been personally deprived of an otherwise better fortune. Thus, although relative deprivation is negatively correlated with objective markers of economic success (Callan, Kim, & Matthews, 2015; Callan et al., 2008), even objectively well-off individuals can nonetheless feel deprived when comparing themselves to financially better-off others.

We examine how personal relative deprivation influences the belief that economic success is zero-sum. Given that relative

deprivation fosters a competitive and antagonistic view of interpersonal relationships (Callan et al., 2017; Smith et al., 2012), we predicted that it would more generally lead people to view success as zero-sum, such that one person's gains are inevitably balanced by others' losses. Specifically, we argue that the sense of deprivation that arises from comparing oneself to better-off others promotes the belief that success is zero-sum. In contrast, we argue that a sense of relative *gratification* (which arises from comparisons to less fortunate others) reduces zero-sum beliefs about economic success.

Why would relative deprivation foster zero-sum beliefs about economic success? First, the inconsistency between seeing others as better-off yet seeing oneself as more intelligent, competent, and hardworking (Alicke & Govorun, 2005; Dunning et al., 2004) can create a cognitive dissonance that people seek to resolve. To do so, people may focus on difficulties that have held them back (i.e., resolving the dissonance by seeing themselves as having faced more hardships than others; e.g., Davidai & Gilovich, 2016; Hansson et al., 2021) as well as on how the social system is rigged against them (i.e., resolving the dissonance by seeing the entire system as unjust). Consequently, by focusing people on the difficulties they face and the lack of justice in society, relative deprivation may foster the belief that success is zero-sum, giving people an explanation for how seemingly intelligent and hardworking individuals like them can still be deprived of better outcomes. Second, even in the absence of dissonance, motivated reasoning processes may lead people who feel deprived to view success as zero-sum. Specifically, people may be motivated to absolve themselves from blame about their circumstances by attributing their dire outcomes to *others'* actions, therefore justifying their desire to "take back" what they believe others have gained at their expense (Kimmel, 2013) as well as their desire to reject any policy that might make others better-off (McGhee, 2021). Thus, rather than blaming themselves for their perceived deprivation, people may be motivated to view others' economic success as zero-sum.

Of course, although zero-sum thinking may sometimes be justified (e.g., when resources are indeed distributed in a zero-sum manner), it can be misplaced when applied to broader economic outcomes (e.g., Schelling, 1958). Because voluntary transactions of goods and labor create opportunities for mutual gains, they typically make all parties better-off (or not worse-off) than before. And, whereas certain policies and outcomes may be zero-sum (such as when special-interest groups lobby for policies that benefit them at the expense of the "silent majority"; Stiglitz, 1998), economic success on the whole is not zero-sum in the narrow sense of the term (i.e., the success of some and the failure of others is typically accompanied by *overall* economic growth). Yet, regardless of the accuracy of such beliefs, their negative consequences make it important to understand when and why people exhibit them. Thus, rather than examining the accuracy of people's beliefs (and far from making a normative claim regarding whether success is or isn't zero-sum), we investigate the psychological forces that encourage or inhibit such zero-sum beliefs in the first place.

### Research Overview

In seven studies, we examine the influence of personal relative deprivation on zero-sum thinking. Using a large and nationally

representative sample from sixty countries, Study 1 examines the relationship between people's satisfaction with their financial resources and their belief that wealth is zero-sum. Studies 2A–2C establish a causal relationship between temporary experiences of relative deprivation and zero-sum thinking by asking participants to compare themselves with better-off or worse-off others before assessing their beliefs about economic success. Studies 3A and 3B replicate this effect in the context of the COVID-19 pandemic. Finally, in a large, preregistered study, Study 4 examines several potential mediators of the relationship between chronically feeling relative deprivation and zero-sum thinking. In all studies, we predicted that personal relative deprivation would foster a belief that economic success is zero-sum, such that people can only gain at others' expense. Importantly, we predicted that this effect would be independent from objective indicators of socioeconomic status, such as income and education (Kraus & Keltner, 2009), as well as other demographic variables known to affect the belief that life is zero-sum.

For all studies, we report all conditions run and measures collected. Sample sizes were determined in advance (with the intention of achieving 80% power for detecting small-to-medium effects, using a  $\sim 100$  participants/condition heuristic in Studies 2–3 and based on the effect of a pilot study in Study 4), and analyses were conducted after data collection was complete. For each study, we report any exclusion criteria and a sensitivity power analysis, determining the smallest observable effect given the achieved sample. The research reported follows APA's ethical standards and was approved by the Institutional Review Boards of the authors' institutions. All the materials and data can be accessed through the Open Science Framework: [https://osf.io/58rme/?view\\_only=b5c3dac1d803490bb4397a9240aa0550](https://osf.io/58rme/?view_only=b5c3dac1d803490bb4397a9240aa0550).

## Study 1

We begin by examining the relationship between personal relative deprivation and the belief that wealth is zero-sum. To do so, we analyzed individual-level data from the World Value Survey, a project that, for the past 4 decades, has collected representative samples of respondents in almost 100 countries (Inglehart et al., 2014). We examined how the affective component of personal relative deprivation, as indicated by people's satisfaction with their household income (Smith et al., 2012), relates to the belief that economic success is zero-sum. We predicted that participants who feel unsatisfied with their personal finances would be more prone to view wealth as zero-sum and less prone to view it as potentially growing for everyone.

In addition, we examined whether the relationship between relative deprivation and zero-sum thinking is exhibited beyond the effects of income and socioeconomic status (Różycka-Tran et al., 2015). Although we expected to find a negative relationship between indicators of status and zero-sum thinking, we predicted that, regardless of their socioeconomic status, personal relative deprivation would lead people to view economic success as zero-sum.

## Method

### Participants

Ninety thousand three hundred fifty participants from 60 different countries (43,391 males, 46,868 females, 91 other/did not

respond;  $M_{\text{age}} = 42.05$ ) took part in the sixth wave (2010–2014) of the World Values Survey. Of these, two thousand, one hundred seventy were American participants (1,053 males, 1,117 females;  $M_{\text{age}} = 49.09$ ). Detailed information about the survey, including the method of recruitment, can be found at <http://www.worldvaluessurvey.org/WVSDocumentationWV6.jsp>.

### Materials and Procedure

We focused on two key variables in the World Values Survey: participants' affective experience of relative deprivation, as measured by their level of dissatisfaction with their personal finances, and the belief that wealth is zero-sum. Financial satisfaction/dissatisfaction was measured with the following question: "How satisfied are you with the financial situation of your household?" (1 = *Completely dissatisfied*; 10 = *Completely satisfied*). Zero-sum thinking was measured on a 10-point scale asking respondents to indicate how much they believe that *People can only get rich at the expense of others* (1) versus *Wealth can grow so there's enough for everyone* (10). We reverse-scored both scales so that higher values indicate higher relative deprivation and a greater tendency for zero-sum thinking.

To account for the influence of various individual-level factors on zero-sum thinking, we included in the analyses participants' age, gender, ethnicity, level of education, household income ("On this card is an income scale on which 1 indicates the lowest income group and 10 the highest income group in the country. We would like to know in what group your household is. Please, specify the appropriate number, counting all wages, salaries, pensions, and other incomes that come in"; 1 = *Lowest group*; 10 = *Highest group*), subjective social class ("People sometimes describe themselves as belonging to the working class, the middle class, or the upper or lower class. Would you describe yourself as belonging to the:" 1 = *Upper class*; 5 = *Lower class*), and political orientation ("In political matters, people talk of 'the left' and 'the right.' How would you place your views on this scale, generally speaking?" 1 = *Left*; 10 = *Right*).

## Results

We predicted that personal relative deprivation (i.e., feeling dissatisfied with one's finances regardless of one's actual income level) would predict the belief that wealth is zero-sum, such that the rich accrue their wealth at the expense of less fortunate others. As predicted, we found a significant positive relationship between personal relative deprivation and zero-sum thinking in both the American sample,  $\beta = .18$ ,  $t(2170) = 8.92$ ,  $p < .001$ , as well as in the entire global sample,  $\beta = .12$ ,  $t(90350) = 37.06$ ,  $p < .001$ . The more participants felt deprived about their financial situation, the more they viewed wealth as zero-sum. Moreover, this relationship remained significant even when controlling for household income and social class,  $\beta_{\text{U.S. sample}} = .14$ ,  $t(2121) = 5.75$ ,  $p < .001$ ;  $\beta_{\text{Entire sample}} = .12$ ,  $t(90349) = 29.02$ ,  $p < .001$ , as well as when controlling for participants' age, gender, education, and political orientation (see Table 1).

Finally, a mixed-model analysis treating country as a random-effect variable revealed a significant effect of deprivation on zero-sum thinking above and beyond the effects of income, social class, age, gender, education, political orientation, and two related country-level macroeconomic variables (GDP per capita and the Gini

**Table 1**

*Zero-Sum Thinking in the United States (Right) and All 60 Countries (Left) in the World Values Survey as the Product of Personal Relative Deprivation, Household Income, Subjective Social Class, Age, Gender, Education, and Political Orientation (Study 1)*

Source	Full Sample of 60 Countries ( $n = 90,349$ )				U.S. Sample ( $n = 2,081$ )			
	$\beta$	$SE$	$t$ Value	$Pr >  t $	$\beta$	$SE$	$t$ Value	$Pr >  t $
Intercept	3.96	0.06	59.25	<0.005	7.47	0.56	13.28	<.0001
Personal relative deprivation	0.11	0.004	27.77	<.0001	0.07	0.02	3.21	0.001
Household income	-0.08	0.004	-19.17	<.0001	-0.07	0.03	-2.09	0.036
Subjective social class	-0.07	0.008	-8.26	<.0001	0.07	0.06	1.11	0.265
Age	-0.002	0.00	4.19	<0.005	-0.009	0.00	-3.32	<0.005
Gender	-0.09	0.10	0.93	0.354	-0.10	0.09	-1.06	0.289
Education	-0.05	0.004	-12.35	<.0001	-0.009	0.04	-0.23	0.816
Political orientation	-0.07	0.002	-28.79	<.0001	-0.28	0.02	-11.84	<.0001

index of income inequality),  $\beta_{deprivation} = .047$ ,  $F(1, 59) = 47.47$ ,  $p < .001$  (Table S5 in the online supplemental materials). In line with past research, income, social class, and political conservatism negatively predicted (Bobo & Hutchings, 1996; Davidai & Ongis, 2019; Rózycka-Tran et al., 2015), and GDP per capita did not predict (Rózycka-Tran et al., 2019b; but see Rózycka-Tran et al., 2015), zero-sum beliefs about economic success. In addition, although past research did not find a direct relationship between income inequality and zero-sum thinking (Rózycka-Tran et al., 2015) we found a negative association between the two. However, these minor differences may be attributable to the large-scale correlational nature of these studies and to limitations involved in matching data from multiple sources (see the online supplemental materials for details). Thus, although more research is needed to determine how these and other macroeconomic variables affect zero-sum thinking, our findings reveal that both when focusing on U.S. respondents and when examining data from around the world, a robust relationship emerges between relative deprivation and the belief that economic success is zero-sum.

### Studies 2A–2C

Analyzing a large and publicly available dataset, we found initial evidence for the relationship between personal relative deprivation and zero-sum thinking. The more participants felt dissatisfied with their finances, the more they viewed wealth as zero-sum. Of course, correlation does not imply causation, and zero-sum thinking may have been the cause (rather than the consequence) of participants' sense of deprivation. Moreover, since respondents in the World Values Survey indicated their dissatisfaction with their household finances (i.e., the *affective* component of deprivation), it could unfortunately only serve as a proxy for our key variable. Thus, in Studies 2A–2C we examine the *causal* link between participants' sense of personal relative deprivation and their zero-sum belief about success. Because unfavorable comparisons with more economically fortunate others can lead to personal relative deprivation (e.g., Callan et al., 2015; Kim, Callan, Gheorghiu, Matthews, 2017; Olson, Herman, & Zanna, 2014; Smith et al., 2012), we examined whether comparing oneself with better-off others increases the belief that success is zero-sum. Specifically, we manipulated relative deprivation by having participants compare their finances with people who are much better-off (*relative deprivation condition*) or much worse-off (*relative*

*gratification condition*) than themselves. We then measured the extent to which participants viewed a zero-sum relationship between their own economic standing and the standing of the people to whom they compared themselves. We predicted that, regardless of their own economic standing, participants in the *relative deprivation condition* (i.e., who engage in unfavorable upward economic comparisons) would be more prone to see success as zero-sum than participants in the *relative gratification condition* (i.e., who engage in relatively favorable downward comparisons).

## Study 2A

### Method

#### Participants

Two hundred two U.S. residents who were recruited from Amazon's Mechanical Turk completed the study (105 males, 97 females,  $M_{age} = 34.82$ ; 78% White, 8% Black, 7% Hispanic, 4% Asian, 1% Native American, 1% Other), allowing us to detect significant effects ( $p < .05$ ) as small as  $f = .20$  with 80% power.

#### Materials and Procedure

Participants were randomly assigned to one of two conditions in which they viewed an image of a 10-rung ladder representing the U.S. population in terms of income, education, and occupational prestige. In the *relative deprivation condition*, participants were asked to engage in unfavorable economic comparison by evaluating their socioeconomic standing vis-à-vis "people at the very top of the ladder—the people with the highest socioeconomic status." In the *relative gratification condition*, participants engaged in relatively favorable comparisons by evaluating their standing vis-à-vis "people at the very bottom of the ladder—the people with the lowest socioeconomic status." In both conditions, participants then indicated how much they agree or disagree with five items relating to the belief that success is zero-sum (e.g., "The profits people at the top of the ladder [my rung of the ladder] make often leave people from my rung of the ladder [the bottom of the ladder] in a worse position than they previously were";  $\alpha = .91$ ). Finally, participants indicated their subjective socioeconomic status, and reported their age, gender, education, ethnicity, income, and political orientation.

## Results

We predicted that participants in the *relative deprivation condition* (who compared their socioeconomic standing with much better-off individuals) would exhibit more zero-sum thinking than participants in the *relative gratification condition* (who compared their standing with others who are substantially worse-off). Indeed, participants who compared themselves to economically better-off others were significantly more prone to view economic success as zero-sum ( $M = 4.73$ ,  $SD = 1.54$ ) than participants in the *relative gratification condition*, ( $M = 3.08$ ,  $SD = 1.43$ ),  $F(1, 201) = 62.02$ ,  $p < .001$ ,  $\eta^2 = .232$ , Cohen's  $d = 1.11$ . This effect remained significant even when controlling for participants' demographics, including political ideology, subjective socioeconomic status, income, education, gender, age, and ethnicity,  $\beta_{deprivation} = .55$ ,  $F(1, 200) = 82.12$ ,  $p < .001$ ,  $\eta^2 = .279$ . Regardless of their socioeconomic standing, engaging in unfavorable economic comparisons increased participants' tendency to view economic success as zero-sum. Whereas participants in the relative deprivation condition viewed a zero-sum relationship between their and others' success, participants in the relative gratification condition were significantly less prone to exhibit such zero-sum thinking.

### Study 2B

Participants who compared themselves to financially better-off others exhibited more zero-sum thinking about economic success. Study 2B extends this finding in two ways. First, participants in the *relative gratification condition* in Study 2A may have felt uncomfortable admitting that they have gained at others' expense, leading them to deny a zero-sum relationship between their economic standing and the standing of worse-off others. To assuage this concern, we rephrased the statements in the relative gratification condition in Study 2B, framing the gains of less-fortunate others as coming at participants' expense rather than the other way around. Second, because zero-sum thinking involves an assumption about interest incompatibility in addition to resource scarcity (Bazerman, 1983), we included a new measure that directly asks participants how much their economic interests are compatible or incompatible with the interests of people who are much better-off or worse-off than themselves. We predicted that participants in the *relative deprivation condition* (who compare themselves with substantially better-off others) would be more prone to view economic success as zero-sum than participants in the relative gratification condition (who compare themselves with financially worse-off others).

## Method

### Participants

Two hundred one U.S. residents, recruited from Amazon's Mechanical Turk, completed the study (105 males, 92 females, 2 other/unspecified;  $M_{age} = 35.11$ ; 75% White, 9% Black, 5% Hispanic, 8% Asian, 4% Other). Two participants who failed an attention check were excluded from analyses, resulting in a final sample of 199 participants which allowed us to detect significant effects ( $p < .05$ ) as small as  $f = .20$  with 80% power.

## Materials and Procedure

To begin, participants indicated their socioeconomic standing on a 10-rung ladder, with the top of the ladder representing "the people who are the best off—those with the most money, the most education and the most respected jobs" and the bottom representing "the people who are worst off—those with the least money, the least education, and the least respected jobs or no job at all" (Adler, Epel, Castellazzo, & Ickovics, 2000). Following, we randomly assigned participants to one of two conditions in which they either compared themselves to people at the very top (*relative deprivation condition*) or the very bottom (*relative gratification condition*) of the ladder. We used two measures to examine zero-sum thinking. First, participants indicated their agreement with five zero-sum statements about economic success (e.g., "The profits people from the top [bottom] of the ladder make often leave people from my rung of the ladder in a worse position than they previously were";  $\alpha_{relative-deprivation} = .93$ ,  $\alpha_{relative-gratification} = .85$ ). Second, participants indicated how much their economic interests are compatible or incompatible with the interests of people from the very top (*relative deprivation condition*) or bottom (*relative gratification condition*) of the ladder. Specifically, participants saw seven pairs of increasingly overlapping circles—one labeled "Economic interests of people from my rung of the ladder" and the other labeled "Economic interests of people from the top [bottom] of the ladder"—and selected the pair that most closely reflects their and their comparison group's interests. Finally, participants reported their household income, age, gender, education, ethnicity, and political orientation.

## Results

We predicted that participants in the relative deprivation condition would be more prone to view economic success as zero-sum than participants in the relative gratification condition. As predicted, the effect of condition on zero-sum thinking was significant,  $F(1, 198) = 103.27$ ,  $p < .001$ ,  $\eta^2 = .343$ , Cohen's  $d = 1.44$ . Participants who thought about how they compare to substantially better-off others were significantly more inclined to view success as zero-sum ( $M = 4.82$ ,  $SD = 1.59$ ) than participants who compared themselves with economically worse-off others ( $M = 2.74$ ,  $SD = 1.26$ ), and this effect remained significant even when controlling for political ideology, subjective socioeconomic status, income, education, age, gender, and ethnicity,  $\beta_{deprivation} = .58$ ,  $F(1, 198) = 103.98$ ,  $p < .001$ ,  $\eta^2 = .331$ . Regardless of their own standing on the socioeconomic ladder, comparing oneself to better-off others increased participants' zero-sum thinking.

We next examined participants' views regarding the compatibility of their and others' interests. As predicted, participants in the *relative deprivation condition* viewed their economic interests as less compatible with others' interests ( $M = 5.00$ ,  $SD = 1.55$ ) than participants in the *relative gratification condition* ( $M = 3.64$ ,  $SD = 1.58$ ),  $F(1, 198) = 37.37$ ,  $p < .001$ ,  $\eta^2 = .140$ , Cohen's  $d = .86$ . Thus, relative deprivation increased participants' belief that economic success and the relationship between their and others' interests are zero-sum.

## Study 2C

Comparing oneself with financially better-off others fostered the belief that economic success is zero-sum. However, because participants in Studies 2A and 2B compared themselves with others who are extremely better-off or worse-off than themselves (i.e., people at the top or the bottom of the socioeconomic ladder), it is unclear how more modest comparisons influence zero-sum views of success. To examine this, we asked participants in Study 2C to consider how their financial situation compares to people who are *just above them* or *just below them* on the socioeconomic ladder. Because comparisons with similar others who are even slightly better-off can elicit relative deprivation (e.g., Kim, Callan, Gheorghiu, & Skylark, 2018), we predicted that such modest unfavorable comparisons would increase the tendency to view success as zero-sum.

## Method

### Participants

Two hundred one U.S. residents who were recruited from Amazon's Mechanical Turk completed the study (101 males, 99 females, 1 other/unspecified;  $M_{\text{age}} = 36.10$ ; 73% White, 7% Black, 9% Hispanic, 8% Asian, 1% Other), which allowed us to detect significant effects ( $p < .05$ ) as small as  $f = .20$  with 80% power.

### Materials and Procedure

As in Study 2B, participants indicated their standing on a 10-rung ladder that represents socioeconomic status in society. Next, participants were assigned to one of two conditions in which they compared themselves to others who are slightly better-off (*relative deprivation* condition) or worse-off (*relative gratification* condition) than themselves. Participants viewed an image that highlighted where they stand on the socioeconomic ladder and the number of rungs above or below them. This image was accompanied by a text specifying how these slightly higher/lower rungs represent "People above (below) you on the ladder (who have more [less] money, more [less] education, more [less] status, etc.)." Participants were then asked to indicate their agreement with five zero-sum statements about economic success (for example, "The profits people above (below) me on the ladder make often leave people from my rung of the ladder in a worse position than they previously were;"  $\alpha_{\text{relative deprivation}} = .87$ ;  $\alpha_{\text{relative gratification}} = .85$ ). Finally, participants reported their political orientation, household income, age, gender, education, and ethnicity.

## Results

Replicating Studies 2A and 2B, we found a significant effect of condition on zero-sum thinking,  $F(1, 199) = 89.15$ ,  $p < .001$ ,  $\eta^2 = .310$ , Cohen's  $d = 1.33$ . Participants in the relative deprivation condition (who compared themselves to slightly better-off others) were significantly more prone to view economic success as zero-sum ( $M = 4.78$ ,  $SD = 1.39$ ) than participants in the relative gratification condition ( $M = 2.89$ ,  $SD = 1.44$ ). This effect of condition on zero-sum thinking remained significant even when controlling for political ideology, subjective socioeconomic status, income, education, age, gender, and ethnicity,  $\beta_{\text{deprivation}} = .54$ ,  $F(1, 199) = 90.54$ ,  $p < .001$ ,  $\eta^2 = .284$ . Regardless of where they placed themselves on the socioeconomic

ladder, comparing oneself with financially better-off others increased participants' belief that success is zero-sum. Thus, even when participants explicitly stated that they rank high on the ladder, feeling relatively deprived bolstered their belief that success is zero-sum.

## Studies 3A and 3B

People exhibit more zero-sum thinking when comparing themselves to economically better-off others than worse-off others. Studies 3A and 3B expand these results in four important ways. First, because the experimental manipulation in Studies 2A–2C was embedded within the dependent variables, it is unclear whether the effect of deprivation on zero-sum thinking was due to the manipulation itself or to the different framings of the DVs. Specifically, embedding the manipulation within slightly different dependent variables may have inadvertently primed participants to think about different manifestations of zero-sum dynamics, leading them to consider whether they gain at others' expense or whether others' gain at their expense. And, since people are more likely to view others' gains as zero-sum than their own gains as such (Roberts & Davidai, in press), Studies 2A–2C may reflect this inherent asymmetry rather than a sense of deprivation.

Therefore, in studies 3A and 3B, we examine this hypothesis with a new manipulation of relative deprivation that does not rely on how the dependent variables are framed. Specifically, we asked participants how their finances have been affected by the COVID-19 pandemic relative to better-off or worse-off others before indicating their zero-sum beliefs about economic success. Given its vast economic effects, we predicted that participants would feel more deprivation when comparing themselves to people who benefited from the pandemic (e.g., due to the soaring stock market) than to people who were hurt by it (e.g., due to lost wages). Second, Studies 3A and 3B included a measure of relative deprivation as a manipulation check. Third, we examined zero-sum thinking in a concrete and personally relevant manner, asking participants whether they view the gains and losses accrued during the COVID-19 pandemic as zero-sum. In addition, we added an exploratory measure of indirect zero-sum thinking to further examine how relative deprivation affects the belief that success is zero-sum. Finally, Study 3B included a control condition unrelated to economic comparison. In both studies, we predicted that comparing oneself to better-off others would lead to personal relative deprivation and, consequently, to the belief that people who benefited from the pandemic have done so at the expense of those who were hurt by it.

## Study 3A

## Method

### Participants

Two hundred one U.S. residents were recruited from Amazon's Mechanical Turk to participate in the study (108 males, 91 females, two unspecified;  $M_{\text{age}} = 38.64$ ; 79.6% White, 3.5% Black, 4.5% Hispanic, 10.5% Asian, <1% Native American, 1.5% Other), which allowed us to detect significant effects ( $p < .05$ ) as small as  $d = .46$  with 80% power.

## Materials and Procedure

Participants were randomly assigned to one of two conditions in which they reflected about how the COVID-19 pandemic affected their finances. In the relative deprivation condition, participants engaged in unfavorable economic comparison by writing about how the pandemic has affected their household finances relative to those who have benefited the most from it. In the relative gratification condition, participants engaged in a relatively favorable comparison by writing about how the pandemic has affected their finances relative to those who have been hit the hardest by it.

In both conditions, participants were then asked to complete a five-item measure of personal relative deprivation (e.g., “When I think about what I have compared with others, I feel deprived”; Callan et al., 2008;  $\alpha = .90$ ) and a six-item measure of whether they viewed economic gains during the Covid-19 pandemic as zero-sum (e.g., “People who have had an easier time financially during Covid-19 have achieved this at the expense of those who have had a more difficult time”  $\alpha = .95$ ). In addition, we added an exploratory indirect measure of zero-sum thinking by asking participants to indicate how people like them have been affected by the pandemic, how people from a lower economic standing have been affected, and how people from a higher economic standing have been affected ( $-2 = \text{Financially much worse-off}$ ;  $0 = \text{Neither worse-off nor better-off}$ ;  $+2 = \text{Financially much better off}$ ). We examined whether participants exhibit indirect zero-sum beliefs by simultaneously believing that richer people have become better-off and that poorer people have become worse-off (for a similar operationalization of zero-sum thinking, see Johnson et al., 2021). Finally, participants reported their subjective socioeconomic status, age, gender, education, ethnicity, income, and political orientation.

## Results

### Manipulation Check

As predicted, participants in the relative deprivation condition felt significantly more deprived ( $M = 3.68$ ,  $SD = 1.30$ ) than participants in the relative gratification condition ( $M = 2.91$ ,  $SD = 1.33$ ),  $F(1, 200) = 17.15$ ,  $p < .0001$ ;  $\eta^2 = .079$ , suggesting that the manipulation successfully fostered personal relative deprivation.

### Zero-Sum Thinking

We predicted that comparing one’s finances to those who have benefited from the pandemic would bolster the belief that success during the pandemic was zero-sum. As predicted, participants in the relative deprivation condition exhibited significantly more zero-sum thinking ( $M = 4.07$ ,  $SD = 1.39$ ) than participants in the relative gratification condition ( $M = 3.23$ ,  $SD = 1.47$ ),  $F(1, 200) = 17.13$ ,  $p < .0001$ ;  $\eta^2 = .079$ , and this was true even when controlling for participants’ demographics, including political ideology, subjective socioeconomic status, income, education, gender, age, and ethnicity,  $\beta_{\text{deprivation}} = .29$ ,  $F(1, 200) = 18.61$ ,  $p < .0001$ ;  $\eta^2 = .81$ . Whereas comparing oneself with better-off others increased the belief that economic success during the pandemic was zero-sum, participants who compared themselves with worse-off others were significantly less prone to such zero-sum thinking.

## Indirect Zero-Sum Thinking

We next examined the exploratory measure of indirect zero-sum thinking. First, we examined the percentage of participants in each condition who simultaneously believed that people from a higher economic standing have benefited from the pandemic and that people from a lower economic standing have been hurt by it. Further supporting our hypothesis, relative deprivation significantly increased the likelihood of simultaneously believing that the rich have gotten richer and that the poor have gotten poorer. Whereas almost 75% of participants in the relative deprivation condition exhibited such indirect zero-sum thinking, less than 57% of participants in the relative gratification condition did so,  $\chi^2(1, 201) = 7.36$ ,  $p = .007$ . Next, we created a composite measure of how much participants believed the pandemic affected people from higher- and lower-economic standing and compared this measure to 0 (i.e., the belief that the losses of some people have been entirely offset by the gains of better-off others). Whereas participants in the relative deprivation condition believed that the losses of people from lower economic standing were offset by the gains of people from higher economic standing ( $M = -.16$ ,  $SD = .91$ ),  $t(94) = 1.68$ ,  $p = .096$ , participants in the relative gratification condition believed that the sum change was negative ( $M = -.43$ ,  $SD = 1.20$ ),  $t(105) = 3.74$ ,  $p = .0003$ . Thus, this exploratory measure of indirect zero-sum thinking suggests that personal relative deprivation increased the belief that people from a higher economic standing succeeded at the expense of people from a lower standing.<sup>1</sup>

## Study 3B

Study 3B is a direct replication of Study 3A with the addition of a control condition, in which participants were not explicitly instructed to compare their finances to better-off or worse-off others. We predicted that participants would exhibit more zero-sum thinking in the relative deprivation condition than the relative gratification condition. Although we did not have specific hypotheses about the control condition, we expected participants to be at least somewhat prone to spontaneously compare themselves to better-off others (e.g., Davidai et al., 2020; Putnam-Farr & Morewedge, 2020) and therefore exhibit some level of zero-sum thinking.

## Method

### Participants

Four hundred fifty-four U.S. residents were recruited from Amazon’s Mechanical Turk to participate in the study (223 males, 224 females, seven unspecified;  $M_{\text{age}} = 40.78$ ; 80.6% White, 6% Black, 3.5% Hispanic, 7.1% Asian, <1% Native American, 2.4% Other). One participant was excluded from analyses for failing an

<sup>1</sup> Importantly, the correlation between responses to the six-item zero-sum measure and responses to this indirect measure of zero-sum thinking was significant. The more participants explicitly believed that economic success during the pandemic was zero-sum, the more likely they were to simultaneously believe that better-off people have gained from the pandemic and that worse-off people have lost from it,  $\chi^2(1, 201) = 12.73$ ,  $p = .0004$ .

attention check. The final sample allowed us to detect significant effects ( $p < .05$ ) as small as  $f^2 = .02$  with 80% power.

### Materials and Procedure

Participants were randomly assigned to one of three conditions. In the experimental conditions, participants wrote about how the COVID-19 pandemic has affected their finances relative to better-off (relative deprivation condition) or worse-off (relative gratification condition) others. In the control condition, participants wrote about the pandemic's effect on their health, a noneconomic domain. Participants then completed a five-item measure of personal relative deprivation ( $\alpha = .86$ ), a six-item measure of whether economic gains during the pandemic were zero-sum ( $\alpha = .95$ ), and reported their subjective socioeconomic status, age, gender, education, ethnicity, income, and political orientation.

## Results

### Manipulation Check

The manipulation significantly affected relative deprivation,  $F(2, 452) = 16.17, p < .0001; \eta^2 = .067$ . A series of post hoc comparisons found that participants in the relative deprivation condition felt significantly more deprived ( $M = 3.77$ ) than participants in the relative gratification condition ( $M = 2.90$ ),  $F(1, 450) = 30.69, p < .0001$ . Participants in the control condition ( $M = 3.18$ ) felt more deprived than participants in the relative gratification condition,  $F(1, 450) = 15.19, p < .0001$ , but marginally less than participants in the relative deprivation condition,  $F(1, 450) = 3.14, p = .077$ . Thus, relative deprivation was highest when comparing oneself to better-off others and lowest when comparing oneself to worse-off others.

### Zero-Sum Thinking

We predicted that unfavorable economic comparisons would increase the belief that economic success during the pandemic was zero-sum. Indeed, the experimental conditions significantly affected zero-sum thinking,  $F(2, 452) = 5.25, p = .006, \eta^2 = .023$ , and this was true even when controlling for ideology, subjective socioeconomic status, income, education, gender, age, and ethnicity,  $\beta_{\text{deprivation}} = .021, F(1, 438) = 3.63, p = .027, \eta^2 = .14$  (Figure 1). Replicating Study 3A, a series of post hoc comparisons revealed that participants in the relative deprivation condition exhibited significantly more zero-sum thinking ( $M = 3.89$ ) than participants in the relative gratification condition ( $M = 3.30$ ),  $F(1, 450) = 10.28, p = .0014$ . In addition, zero-sum thinking in the control condition ( $M = 3.67$ ) was higher than the relative gratification condition,  $F(1, 450) = 4.23, p = .04$ , but not significantly different from the relative deprivation condition,  $F(1, 450) = 1.48, p = .22$ , suggesting that participants may have spontaneously compared themselves to better-off others and, consequently, viewed economic success as zero-sum. Thus, personal relative deprivation fostered the belief that people who benefited from the pandemic did so at the expense of those who were made worse-off by it.

## Study 4

Regardless of how rich they personally are, people believe that the gains of even richer individuals come at their expense.

In Study 4, we examine several potential mediators for the effect of relative deprivation on zero-sum thinking. First, we examine whether this relationship can be explained by people's lay perceptions of how society functions. Specifically, we examine whether this relationship is mediated by how much people believe that the world is just (Lipkus, 1991) and by how much they believe that economic success results from hard work and competence (Shariff et al., 2016). Because relative deprivation weakens the belief that the world is just (Callan et al., 2017), and because cynicism about society is strongly associated with zero-sum thinking (e.g., Różycka-Tran et al., 2015), we expected these beliefs to mediate the effect of relative deprivation on zero-sum thinking by allowing people to "explain away" their sense of undeserved deprivation. Second, we examine whether this relationship can be explained by people's perceptions of the hardships that they had to endure in life. Specifically, we examine whether this relationship is mediated by how much people feel that they lack control over their lives (Lachman & Weaver, 1998) and by how much they are focused on preventing negative events from happening to them (Lockwood et al., 2002). Because both relative deprivation and socioeconomic status reduce people's sense of power (Kim et al., 2017) and control (Kraus et al., 2009), they may lead people to attribute their deprivation to others' success, effectively blaming others for having gained at their expense. Thus, we predicted that each of these four factors—the belief in a just world, internal attributions of economic success, perceived lack of control over one's life, and the desire to prevent negative outcomes—would mediate the relationship between personal relative deprivation and zero-sum thinking. In addition, we examined whether the effect of personal relative deprivation on zero-sum thinking is driven more by lay perceptions about society or more by specific perceptions about one's hardships in life.<sup>2</sup> Study 4 was preregistered: <https://aspredicted.org/blind.php?x=ef87fa>.

## Method

### Participants

Four hundred three U.S. residents who were recruited from Amazon's Mechanical Turk completed the preregistered study (192 males, 204 females, one other/unspecified;  $M_{\text{age}} = 36.28$ ; 70% White, 14% Black, 7% Hispanic, 7% Asians, 1% Native Americans, 5% Other). Six participants who failed a simple attention check were excluded from analyses, leaving a final sample of 397. This sample size allowed us to detect significant effects ( $p < .05$ ) as small as  $r = .14$  with 80% power.

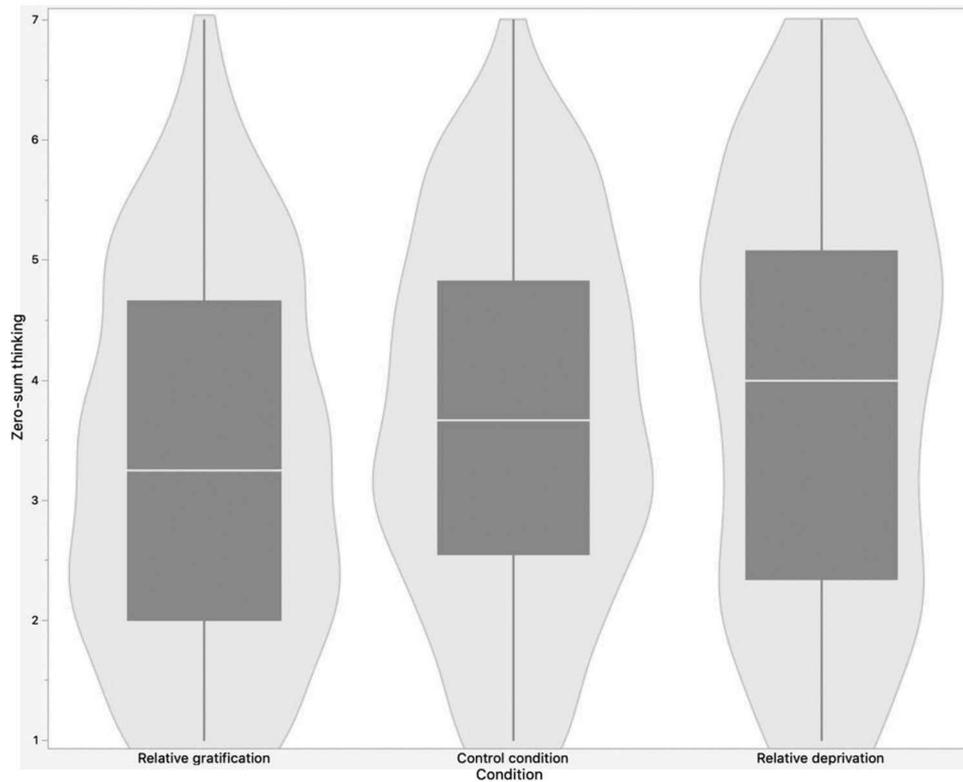
### Materials and Procedure

#### Key Variables.

**Zero-Sum Thinking.** Three different measures examined

<sup>2</sup> Although we examine these mediators both separately and simultaneously, it is important to note that they might be conceptually related to each other. For instance, the belief in a just world—a view about how society works—is related to beliefs about agency and locus of control (Furnham, 2003). Similarly, a personal sense of control is associated with the tendency to make dispositional (vs. contextual) attributions of economic success and failure (Kraus, Piff, & Keltner, 2009).

**Figure 1**  
Violin Plots, Medians, and Quantile Boxplots for Zero-Sum Thinking by Condition (Study 3B)



perceptions of economic success as zero-sum: four items from the Belief in Zero-sum Game scale (e.g., “The wealth of a few is acquired at the expense of many”; Różycka-Tran et al., 2015;  $\alpha = .74$ ), five items assessing zero-sum thinking about very rich people (e.g., “The profits that very rich people make often leave people who don't have a lot of money in a worse position than they previously were”;  $\alpha = .92$ ), and a measure of perceived interest compatibility (“Please select the circle below that, in your opinion, best describes the relationship between the interests of people with your socioeconomic status and the interests of people with a socioeconomic status higher than yours”; Davidai & Ongis, 2019). Following the preregistered plan, we created a composite measure of zero-sum thinking by standardizing and averaging participants' scores on the three measures (see Table S1 in the online supplemental materials for correlations between individual items).

**Personal Relative Deprivation.** A five-item measure assessed the extent to which people feel personal relative deprivation in their lives (e.g., “When I think about what I have compared with others, I feel deprived”; Callan et al., 2008;  $\alpha = .74$ ).

#### Potential Mediators.

**Belief in a Just World.** Participants' perceptions of the world as a fair place were measured with the seven-item belief in a just world scale (Lipkus, 1991; e.g., “I feel that people get what they deserve”;  $\alpha = .93$ ).

**Internal/External Attributions of Economic Success.** Attributions of economic success were measured with a single item that asked participants how much they believed that, in the United

States, a person's economic status is a result of their own efforts or of external circumstances (Black & Davidai, 2020; Shariff et al., 2016). Participants indicated their responses on a slider ranging from 1 (*Completely due to external circumstances*) to 100 (*Completely due to own efforts*).

**Perceived Lack of Control.** Participants' experience of lacking control over their lives was measured with eight items from the constraints subscale of the perceived control scale (Lachman & Weaver, 1998; e.g., “What happens in my life is often beyond my control”;  $\alpha = .94$ ).

**Prevention Focus.** Participants' focus on avoiding negative life outcomes was measured with seven items from the prevention subscale of the regulatory focus scale (Lockwood et al., 2002; e.g., “I frequently think about how I can prevent failures in my life”;  $\alpha = .82$ ). We omitted two items that were specifically related to academic performance from the original scale (i.e., “I often worry that I will fail to accomplish my academic goals”; “My major goal in school right now is to avoid becoming an academic failure”).

#### Secondary Analyses

**Social Comparison Orientation.** In line with the preregistration, we measured the chronic tendency to engage in upward comparisons with six items adapted from the social comparison orientation scale (Gibbons & Buunk, 1999; e.g., “I always pay a lot of attention to how I do things compared with people who are richer than me”;  $\alpha = .85$ ). Because this measure was not related to zero-sum thinking

in a pilot study, we included it for secondary analyses purposes (see preregistration). As our data revealed no relationship between social comparison orientation and zero-sum thinking, we report these results in Table S2 in the online supplemental materials.

**Demographics.** Finally, participants reported their subjective socioeconomic status, political orientation, household income, age, gender, education, and ethnicity.

## Results

First, we examined the relationship between the two key variables—personal relative deprivation and the belief that economic success is zero-sum. Replicating Studies 1–3, we found a significant positive relationship between relative deprivation and zero-sum thinking,  $\beta = .19$ ,  $t(397) = 5.73$ ,  $p < .001$ , and this was true even when controlling for participants' ideology, subjective socioeconomic status, income, education, age, gender, and ethnicity,  $\beta = .12$ ,  $t(397) = 3.67$ ,  $p < .001$ . Regardless of their income, socioeconomic standing, and political ideology, participants who felt more deprived exhibited more zero-sum thinking about success.

We next examined the relationship between personal relative deprivation and the four potential mediators (the belief in a just world, attributions of economic success, perceived lack of control, and prevention focus). As hypothesized, relative deprivation negatively predicted the belief in a just world,  $r(397) = -.10$ ,  $p = .051$ , and internal attributions of economic success,  $r(397) = -.12$ ,  $p = .015$ , but positively predicted participants' lack of control over their lives,  $r(397) = .56$ ,  $p < .001$ , and their focus on avoiding negative outcomes,  $r(397) = .434$ ,  $p < .001$ . Thus, personal relative deprivation significantly predicted each of the four potential mediators.

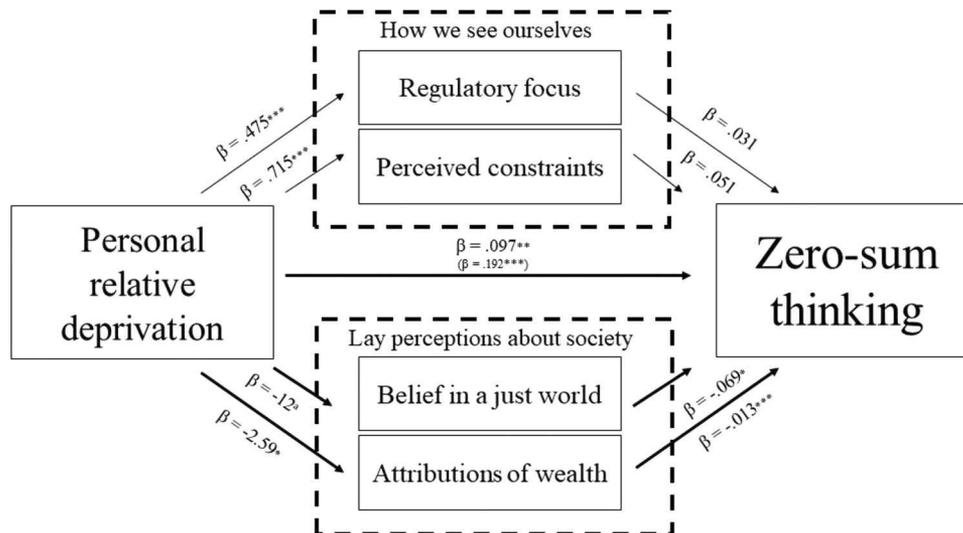
Similarly, each of the four potential mediators was significantly correlated with the belief that economic success is zero-sum. Zero-sum

thinking was negatively predicted by the belief in a just world,  $r(397) = -.38$ ,  $p < .001$ , and internal attributions of economic success,  $r(397) = -.50$ ,  $p < .001$ , but positively predicted by participants' lack of control over their lives,  $r(397) = .21$ ,  $p < .001$ , and their desire to prevent negative outcomes,  $r(397) = .15$ ,  $p < .005$ . The more participants believed that the world is just and made internal attributions for economic success, the less they believed that success is zero-sum. In contrast, the more participants felt that they lacked control over their lives and focused on preventing negative outcomes from occurring, the more they believed that success is zero-sum.

Finally, a series of analyses examined how much each of these four potential mediators explains the relationship between personal relative deprivation and zero-sum thinking. First, we ran four analyses testing each individual mediator separately. These analyses revealed a significant indirect effect of relative deprivation on zero-sum thinking through the belief in a just world and through internal attributions of wealth, but not through perceived lack of control or prevention focus (see the online supplemental materials). Second, we ran a mediation analysis examining the simultaneous and unique contribution of each mediator. Specifically, we ran a bootstrap analysis using the SAS PROCESS with the four variables—the belief in a just world, attributions of economic success, perceived lack of control, and prevention focus—as potential mediators. This analysis revealed an indirect effect of relative deprivation on zero-sum thinking through the belief in a just world ( $\beta = .0084$ ; 95% CI [.0001, .0262]) and through internal attributions of economic status ( $\beta = .0347$ ; 95% CI [.0048, .0714]). In contrast, the indirect effects through perceived lack of control ( $\beta = .0369$ ; 95% CI [-.0149, .0887]) and prevention focus ( $\beta = .0151$ ; 95% CI [-.0149, .0457]) were not significant (Figure 2). Thus, the relationship between relative deprivation and zero-sum thinking was mediated by lay perceptions about society (as measured by the belief in a just world and attributions of economic success) but not by

**Figure 2**

*The Mediating Role of Lay Perception About Society (the Belief in a Just World and Attribution of Wealth) and Perceived Personal Difficulties (Prevention Regulatory Focus and Perceived Constraints Over One's Life) on the Relationship Between Personal Relative Deprivation and Zero-Sum Thinking (Study 4)*



Note. <sup>a</sup>  $p < .06$ . \*  $p < .05$ . \*\*  $p < .005$ . \*\*\*  $p < .001$ .

perceptions of participants' own hardships. The more participants felt disadvantaged relative to others, the more they viewed society as unfair and success as externally determined, and these cynical views of society mediated the relationship between deprivation and zero-sum thinking.

### General Discussion

Why do people view economic success as zero-sum? In seven studies, including a large, nationally representative sample of more than 90,000 respondents from 60 countries, we found that personal relative deprivation underlies zero-sum beliefs about economic success. Regardless of their own income, feelings of relative deprivation led participants to view success as a limited resource which can only be obtained at others' expense. In contrast, feeling relatively gratified about one's resources reduced such zero-sum beliefs, leading participants to view wealth as something that could potentially grow for everyone. Moreover, as shown in Study 4, the effect of chronically feeling deprived on zero-sum thinking was mediated by lay perceptions about how the world works. The more participants felt they have been unfairly disadvantaged, the more they believed that the world is unjust and that success is attributable to forces beyond one's control—beliefs which mediated the effect of deprivation on zero-sum views of success.

The effect of relative deprivation on zero-sum thinking may indicate the impact of both cognitive and motivational psychological forces. First, the inconsistency between people's positive self-perceptions (Alicke & Govorun, 2005; Dunning et al., 2004) and their feelings of deprivation might create a cognitive dissonance that is resolved by changing one's beliefs about the economic system as unmeritocratic. Thus, by viewing economic outcomes as attributable to external forces beyond one's control (rather than internal dispositions, skills, and determination), people can reconcile their otherwise positive self-perceptions with the fact that they themselves have not been rewarded for their self-perceived deservingness. Similarly, relative deprivation highlights an inconsistency between people's beliefs that "good things happen to good people" (Lipkus, 1991), that they themselves are good people worthy of good things, and that they nonetheless seem to miss out on favorable economic outcomes. This dissonance can be resolved by either changing one's belief about how the world works or by changing one's beliefs about oneself. Since people are unlikely to question their own self-worth, they resolve this dissonance by focusing on structural societal issues that make the world seem unjust. At the same time, because downward economic comparisons do not create dissonance between self-perceptions and people's perceived success, relative *gratification* fosters internal attributions of economic outcomes, leading to the belief that good fortunes are due to one's own traits and abilities and are therefore non-zero-sum.

Yet, even in the absence of cognitive dissonance and inconsistent self-perceptions, and beyond objective structural issues that create economic disparities in society, relative deprivation may also increase people's *motivation* to view success as zero-sum. Indeed, the motivation to view wealthy individuals as gaining at the expense of worse-off others can help explain why just world beliefs and attributions of economic outcomes only partially mediated the effect of deprivation on zero-sum thinking. For instance, attributing one's perceived

disadvantage to wealthier others' success can absolve people from blame about their own circumstances and justify their anger toward better-off others (and, more generally, the prevailing socioeconomic system). Thus, rather than blaming themselves, people may be motivated to view others' success as zero-sum, seeing their relative deprivation as due to others' (unjustified) gains.

### Theoretical Implications and Future Directions

The effect of relative deprivation on zero-sum thinking highlights how social comparison processes can shape lay beliefs about why some people are more successful than others. When comparing themselves to better-off others, people believe that economic success is achieved through competition over limited resources. In contrast, engaging in downward comparisons fosters a more charitable view of success as potentially achievable by anyone. Thus, in addition to helping people form accurate self-perceptions (Festinger, 1954; Gerber et al., 2018), upward and downward comparisons may also influence their perceptions of the underlying reasons for economic success and failure.

Importantly, comparisons to better-off and worse-off others may also affect beliefs about who gains and who loses from zero-sum relationships (i.e., who makes up the different parties in a zero-sum relationship). On the one hand, when comparing themselves to better-off others, people may not distinguish between their subjective disadvantage and the objectively much harsher disadvantages of those who are even worse-off than themselves. Consequently, upward comparisons may lead people to identify with anyone who is not well-off and interpret a zero-sum relationship between "the rich" and "the poor" as reflecting a relationship between "the rich" and "everyone else" (including oneself). Since people typically view others' gains as coming at their own expense (but not vice-versa; Roberts & Davidai, in press), such broad identification with "the poor" may foster a belief that the rich gain at both one's own and everyone else's expense. On the other hand, people often view "the poor" unfavorably (Fiske et al., 2002), attribute their outcomes to internal failings (Davidai, 2021), and draw clear distinctions between themselves and worse-off others (Kuziemko et al., 2014). Thus, even when engaging in upward comparisons, people may be reluctant to identify with worse-off others, and therefore interpret zero-sum relationships as relating to how "the rich" gain at the expense of "the poor" rather than how "the rich" gain at their own, personal expense.

Of course, the belief that success is zero-sum is not unique to economic resources, and future research could examine how social comparison processes affect zero-sum thinking about noneconomic resources. For instance, because comparing oneself with better-performing peers fosters a sense of deprivation, it may explain why students view academic success as zero-sum, even when that is objectively not the case (Meegan, 2010). More generally, feeling that others possess more of any desired resource may lead people to view it as scarce. Employees who compare themselves to higher-status peers may view status as zero-sum, children who compare how much parental attention each sibling receives may view love and affection as limited, scientists who compare themselves to better-published colleagues may view recognition and prestige as zero-sum, and so forth. Regardless of the evaluated resource, feeling personal relative deprivation may foster a belief that outcomes are zero-sum.

This suggests that any factor which prompts people to compare themselves to better-off others may increase zero-sum beliefs about success. For instance, because economic inequality is associated with stronger comparison effects (Cheung & Lucas, 2016) and dissatisfaction with one's resources (Hastings, 2019), it may increase zero-sum views of success. Consequently, seeing success as zero-sum may reduce tolerance for inequality and increase people's support of redistribution. And, since economic scarcity and the feeling of 'not having enough' focus people on the immediate, short-term causes and consequences of their hardships (Mullainathan & Shafir, 2013), they may make it difficult to adopt the broader, long-term view that is needed for non-zero-sum thinking (Wright, 2001). In contrast, believing that one can be economically successful may curb such zero-sum beliefs. Thus, just as economic growth weakens the belief that success is zero-sum (Sirola & Pitesa, 2017), believing in one's own and others' future chances of economic success (Alesina et al., 2018; Davidai, 2018; Davidai & Gilovich, 2015; Davidai & Walker, 2021; Day & Fiske, 2017) may similarly reduce zero-sum beliefs about it.

Zero-sum beliefs can also cultivate pessimistic perceptions that public policies inevitably cause some people harm. Yet, even though political lobbying sometimes favors policies that benefit special-interest groups at the expense of the 'silent majority,' many policies offer "near-Pareto improvements" which greatly benefit one party without significantly harming others (Stiglitz, 1998). Nevertheless, viewing success as zero-sum may lead people to (wrongly) view policies as coming at their expense, even when that is not the case (Baron et al., 2006; Brown & Jacoby-Senghor, 2021). Similarly, people may view the success of businesses and corporations as coming at the expense of the social good, and thus causing more harm than good (Bhattacharjee et al., 2017). Devoting attention to assumptions about the zero-sum nature of success may be critical for garnering support for important and beneficial policy and legislation.

Similarly, the fact that comparing oneself with worse-off others reduces zero-sum thinking sheds light on why those who are most economically advantaged by the system often oppose redistribution policies that benefit the greater good. By viewing success as nonzero-sum, well-off individuals may conclude that their outcomes have *not* come at others' expense and are, therefore, deserved. Consequently, seeing one's success as one's own doing (rather than an exploitation of others' lack of success) can lead people to view the system as legitimate and just, to view the status quo as worth maintaining, and to oppose policies that challenge it. Thus, although various cognitive and motivational processes make it extremely difficult to convince economically advantaged people that (some of) their gains may have come at others' expense, doing so may help reduce opposition to important legislation. Just as admitting one's racial privilege fosters willingness to challenge the status quo (e.g., Knowles et al., 2014), acknowledging how economic advantages can negatively affect worse-off others may foster support for policies that reduce economic disparities.

Although we focused on *personal* relative deprivation, future research could benefit from examining how *group* relative deprivation affects zero-sum beliefs about success. People experience *group* deprivation when comparing their ingroup to other higher-ranked groups (Smith & Ortiz, 2002; Walker, 1999), and feelings of unfair group disadvantages may lead them to view the distribution of resources among groups as zero-sum. Since members of historically

privileged groups (e.g., European Americans, men) sometimes feel that they have been unfairly disadvantaged (Kimmel, 2013), this may help explain why they often see other groups' gains as coming at their own group's expense (Kehn & Ruthig, 2013; Wilkins et al., 2015). Thus, just as zero-sum beliefs can stem from how rich or poor people feel (rather than how rich or poor they actually are), feeling that one's group has been disadvantaged may lead people to view life as zero-sum regardless of the group's actual standing in society.

Future research could also examine how different sources of deprivation affect zero-sum thinking. By manipulating *who* people compare themselves with, we created a sense of deprivation in an ecologically valid manner that affects how participants feel rather than how much money they believe they have. Consequently, relative deprivation affected zero-sum thinking independent of participants' economic standing, suggesting that the mere act of comparing one's finances to better-off others fosters zero-sum beliefs about success. Nevertheless, different aspects of relative deprivation may have different psychological consequences, and future research could examine how much zero-sum beliefs are due to people's emotional dissatisfaction with their resources (i.e., the *affective component* of relative deprivation) versus their mere tendency to engage in unfavorable comparisons (i.e., the *cognitive component* of deprivation; Smith et al., 2012). Whereas Study 1 found that dissatisfaction with one's resources is related to zero-sum thinking, Study 4 showed that chronically comparing oneself to better-off others did not predict zero-sum beliefs about success, suggesting that only the former may be critical for fostering such beliefs.

Finally, despite our multimethod approach, there may be specific limitations to each individual study. For instance, although the benefits of analyzing a large and nationally representative sample may compensate for this limitation, it should be noted that Study 1 only measured the *affective* component of relative deprivation (i.e., satisfaction with one's finances), a limitation that was resolved in subsequent studies. Similarly, as mentioned above, the zero-sum statements in Studies 2A–2C could have prompted different psychological processes, a concern that we resolved in Studies 3A and 3B by having all participants respond to the same measure of zero-sum thinking. And, given Study 4's correlational design, alternative explanations may account for its mediational analyses. For instance, in contrast to the (preregistered) hypothesis that was supported in the study, cynical views about society may increase both deprivation and the belief that success is zero-sum. Although we have reason to doubt this alternative explanation (e.g., it is unclear why viewing the world as unjust would lead people to focus exclusively on the most fortunate, but not the least fortunate, members of society), it nonetheless merits consideration. In addition, future research could consider our findings' generalizability. Whereas Study 1 examined zero-sum thinking in 60 different countries, the remaining studies recruited U.S. participants from Amazon's Mechanical Turk—which, despite being more diverse than most samples in psychological research, may still differ from the general population (Buhrmester et al., 2018). Thus, although the entire package of studies reveals a robust relationship between relative deprivation and zero-sum thinking, future research could build upon each study's specific limitations.

## Conclusion

In recent years, political rhetoric has increasingly become a battleground of zero-sum ideologies. During the 2019 U.K. General

Elections, for instance, both the Labor Party and the Conservative Party depicted an image of success as zero-sum, the former by portraying the fortunes of wealthier Britons as coming at the expense of their less-fortunate compatriots and the latter by portraying the fortunes of the European Union as coming at Great Britain's expense. Despite the markedly different ideologies underlying these political views, the two main parties seemed to speak to the same shared sentiment—a deep economic dissatisfaction among the electorate relative to others and a feeling of having been unfairly disadvantaged. This sentiment, of course, is not unique to the United Kingdom, and politicians in many countries often appeal to people's sense of disadvantage and dissatisfaction. Moreover, because the financial fallout following the COVID-19 pandemic has exacerbated economic inequalities, it may further increase this sense of deprivation and focus people's anger and frustration toward other groups or individuals who seem to be gaining at their expense. Understanding the dynamics of relative deprivation and zero-sum thinking may therefore be the first step in reducing such antagonistic mindsets and behaviors.

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