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Shifting attributions for poverty motivates opposition to inequality and enhances egalitarianism

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Amidst rising economic inequality and mounting evidence of its pernicious social effects, what motivates opposition to inequality? Five studies ($n = 34,442$) show that attributing poverty to situational forces is associated with greater concern about inequality, preference for egalitarian policies and inequality-reducing behaviour. In Study 1, situational attributions for poverty were associated with reduced support for inequality across 34 countries. Study 2 replicated these findings with a nationally representative sample of Americans. Three experiments then tested whether situational attributions for poverty are malleable and motivate egalitarianism. Bolstering situational attributions for poverty through a writing exercise (Study 3) and a computer-based poverty simulation (Studies 4a and b) increased egalitarian action and reduced support for inequality immediately (Studies 3 and 4b), 1 d later and 155 d post-intervention (Study 4b). Causal attributions for poverty offer one accessible means of shaping inequality-reducing attitudes and actions. Situational attributions may be a potent psychological lever for lessening societal inequality.

Economic inequality continues to rise[1,2] despite mounting evidence that it is harmful to individuals and society[3]. A central focus of social science research has been to uncover processes that contribute to the persistence and intensification of inequality[4]. Various psychological mechanisms can serve to legitimize inequality and intensify it, including beliefs in social mobility[5,6] and biases to accept the status quo as fair[7]. We test one pervasive and accessible psychological process that may reinforce economic inequality and, in turn, be leveraged to help upend it: people's judgements about why the poor are poor.

A rich body of research examines individuals' causal attributions for poverty[8]. Although there are diverse types of poverty and poverty beliefs[8,9], attribution research primarily studies poverty using common labels such as 'the poor' and finds that an observer's attributions can vary in terms of certain dimensions, including locus (causes that are dispositional/individualistic versus situational/structural) and control (causes that are controllable versus uncontrollable)[8]. Controllable dispositional attributions may suppress inequality concerns. Indeed, many uncontrollable situational factors contribute to poverty[4], including high unemployment and stagnating wages[10], illness[11], predatory lending[12], discrimination[13] and chronic cognitive load[14]. However, people tend to fixate on controllable dispositional factors such as laziness[15,16], lack of self-control[17] and deficient planning[18]. Focusing on controllable dispositional causes of poverty places blame on the shoulders of the poor, whereas attention to uncontrollable situational causes is linked to beliefs that poverty is undeserved and, we posit, increases concerns over inequality and egalitarian tendencies to mitigate it. Following previous work, we will refer to controllable dispositional attributions for poverty as 'dispositional attributions' and uncontrollable situational attributions for poverty as 'situational attributions' (not pertinent to our investigation are fatalistic beliefs about poverty, some of which focus on uncontrollable individualistic factors such as chronic illness[8]).

If attributions for poverty contribute to tolerance for inequality, they present an accessible and potentially powerful lever for raising opposition to it—and actions to reduce it. Indeed, while tolerance for economic inequality and egalitarian tendencies are complex and multiply determined, we investigate if and how they are causally influenced by lay theories about poverty. This focus on causal attributions of poverty allows us to examine whether these perceptions are malleable and, if so, whether small interventions can have lasting consequences for egalitarian beliefs and behaviour.

Explanations of human behaviour and life outcomes typically reference uncontrollable causes exogenous to the individual (situational explanations) or controllable causes endogenous to the individual (dispositional explanations[19,20]). People, particularly Westerners, often favour the latter, drawing inferences about individuals' unique and enduring characteristics while ignoring situational forces[21]. Attribution theorists have long noted people's reliance on dispositional over situational attributions when generating causal explanations for behaviour, a bias that extends to attributions for poverty[8,15].

Explaining poverty in terms of dispositional factors can help satisfy the fundamental need to believe in a just world[16,22]. People who think disadvantaged individuals are personally responsible for their poverty are more likely to view them as deserving of it[23,24]. As a result, dispositional attributions for poverty correlate with greater blame and anger toward the poor[15,25], and increased support for restrictive social welfare policies[26]. By contrast, situational attributions for poverty signal that the poor do not deserve their economic status. In turn, situational attributions correlate with increased

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sympathy for and willingness to help the poor, and with support for progressive welfare programmes[26,27].

In short, because they emphasize uncontrollable forces, situational attributions for poverty correlate with views of the poor as less responsible for poverty. We reason that attributions surrounding the causes of poverty also relate to how people construe and react to economic inequality—whether they deem society's distribution of income problematic and in need of intervention[26,27]. Insofar as people view poverty as propelled by uncontrollable situational factors, they should view income disparities as less personally merited and fair. As a result, situational attributions for poverty should heighten concern about economic inequality and motivations to reduce it—the central premise guiding our investigation.

Attributions for poverty (as opposed to, for example, attributions for wealth) have been heavily emphasized in research[23–27]. This may be because, with some exceptions[28], it is poverty—not wealth—that people deem to be a dominant social problem. Poverty is a more 'problematized' and visible feature of inequality[29]. Additionally, negative events such as poverty prompt causal search more so than positive events such as wealth:[30] people exhibit a natural tendency to seek explanations for poverty. For these reasons, attributions for poverty are particularly worthy of exploration and, potentially, intervention.

Previous research has documented that macro-level institutional factors can shape concerns for the poor and inequality. For example, attending a college in the United States with a larger proportion of affluent students can socialize students to oppose progressive taxation[31]. By contrast, participation in schools in India[32] or programmes in the United States[33] that facilitate contact with poor individuals can reduce prejudice against the poor and increase egalitarian tendencies (for example, support for economic redistribution, generosity). Importantly, however, these interventions typically entail widescale institutional coordination and can be large and costly. Extending this work, we explore whether an individual-level psychological process—judgements about whether poverty is caused by situational (versus dispositional) factors—represents a practical, accessible and less costly route to shifting inequality support. We examine the role of these beliefs in explaining why people are (in)tolerant about inequality, and—more critically—whether small interventions targeting this pathway can shift attributions for poverty and lead to long-term increases in opposition to inequality.

We test these predictions in five studies using large cross-national, university and nationwide samples. Our first two studies provide a large-scale and thorough examination of the association between attributions for poverty and support for economic inequality. In Study 1, we examined whether situational (versus dispositional) attributions for poverty were associated with reduced support for economic inequality in large representative samples across 34 countries while controlling for several alternative explanations. In Study 2, we investigated whether situational and dispositional attributions for poverty were differently associated with support for economic inequality and greater support for inequality-reducing policies such as redistribution.

We next conducted three experiments to test whether bolstering situational attributions for poverty with relatively small, low-cost interventions (that is, a brief writing exercise and a 10-min poverty simulation) could produce substantial and sustained shifts in reactions to inequality. Such data would provide experimental evidence that situational attributions for poverty can cause egalitarianism. In Study 3, we examined whether experimentally primed situational attributions for poverty would increase action aimed at reducing inequality. In Studies 4a and b, we tested whether a brief virtual simulation of poverty would cause immediate and lasting (~155 d post-intervention) shifts in situational attributions for poverty, support for economic inequality and willingness to upend the economic status quo in favour of greater income equality.

Results

Study 1. We examined the relationship between situational attributions for poverty and support for economic inequality in a culturally diverse participant pool spanning 34 countries ($n = 32{,}064$)[34]. As part of a larger survey, participants selected whether they attributed poverty in their country to either situational causes (unfairness in society) or dispositional causes (laziness or lack of willpower). Participants also reported their support for income inequality by indicating whether they believed that income differences in their country should be more equal (scored as 1) or larger (scored as 10). Unless otherwise noted, all statistical analyses reported below and in subsequent studies are two-tailed.

As predicted, attributing poverty to situational factors was associated with decreased support for economic inequality (standardized beta weight $\beta = -0.09$, standardized score $z = -18.39$, $P < 0.001$, 95% confidence interval (CI) [−0.10, −0.08]; Fig. 1). We conducted a multi-level model to account for individual- and country-level variations in responses, and to control for relevant covariates including individuals' political ideology, relative income position, age, gender (coded as −1 for males and 1 for females) and religiosity, as well as country-level gross domestic product (GDP) per capita and inequality (as indexed by the Gini coefficient). Situational attributions for poverty were associated with lower support for economic inequality with all covariates in the model ($\beta = -0.07$, $z = -12.58$, $P < 0.001$, 95% CI [−0.08, −0.06]; see Supplementary Table 2). These findings demonstrate that situational attributions for poverty are associated with reduced support for inequality across a large number of countries around the globe. We next tested whether attributions for poverty are specifically linked to support for economic inequality as well as egalitarian values and policy preferences.

Study 2. In Study 2, we conducted a high-powered, pre-registered test of whether dispositional and situational attributions for poverty are associated with tolerance for economic inequality and preferences for economic inequality-reducing policies in a nationally representative sample of Americans (https://osf.io/yshq8/). Research indicates that dispositional and situational attributions are not ideological alternatives—they are commonly combined in people's thinking and, as such, are best not dichotomized when measured[8,27]. Thus, participants completed a widely used measure that independently assesses dispositional and situational attributions for poverty[35], alongside multi-item measures of support for economic inequality[36] and support for economic redistribution[37]. In Study 2, Shapiro–Wilk tests of normality demonstrated that some of our variables of interest were not normally distributed. As a result, we report Spearman's rank-order correlations, a non-parametric alternative to Pearson correlation, in Supplementary Information; results remain unchanged.

In this representative sample, mean scores for situational attributions for poverty were higher than for dispositional attributions (see Table 1), which parallels previous research using the same measure in Los Angeles County in 1993 and 2000[38,39] (though see Kluegel and Smith, who also used the same measure[27]). Results confirmed all four pre-registered predictions. Situational attributions for poverty were associated with reduced support for inequality (Pearson product moment correlation $r(574) = -0.69$, one-tailed $P < 0.001$) and greater support for economic redistribution ($r(574) = 0.63$, one-tailed $P < 0.001$). Dispositional attributions for poverty were also related to greater support for inequality ($r(574) = 0.30$, one-tailed $P < 0.001$) and reduced support for economic redistribution ($r(574) = -0.22$, one-tailed $P < 0.001$). All associations, with the exception of the relationship between dispositional attributions and support for redistribution, remained statistically significant when controlling for political ideology, income, age and gender (see Supplementary Table 4 for zero-order and partial correlations between measures).

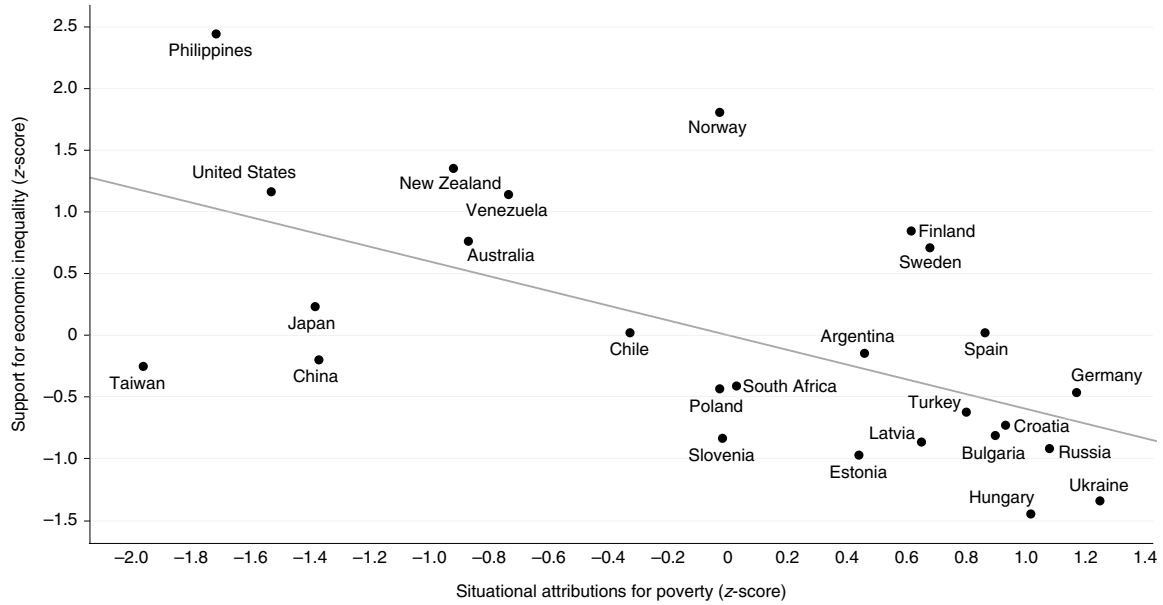

Fig. 1 | Situational attributions for poverty and support for economic inequality. Graph depicting the negative relationship between situational attributions for poverty and support for economic inequality across countries ($n_{country} = 34$; $n_{observed} = 32{,}064$) in Study 1 ($\beta = -0.09$, $z = -18.39$, $P < 0.001$, 95% CI [−0.10, −0.08]).

Studies 1 and 2 provide robust evidence that situational attributions for poverty are associated with reduced support for economic inequality and increased support for egalitarian policies. Although dispositional attributions for poverty also correlated with increased support for inequality and decreased support for economic redistribution in Study 2, these relationships were notably weaker and inconsistent when accounting for important covariates. This suggests that situational attributions for poverty may be a particularly powerful predictor of inequality-related attitudes and behaviour. However, the correlational nature of these findings precludes causal inference, meaning that other variables may account for this association. Moreover, we have yet to test whether attributions for poverty, which are frequently conceptualized as a stable individual difference[40], are responsive to intervention. Study 3 examines whether a 'low-touch' intervention designed to bolster situational attributions for poverty could successfully do so and, in turn, be one potential driver of actions to reduce economic inequality.

Study 3. In Study 3 we experimentally manipulated situational attributions for poverty to investigate their effects on inequality-reducing behaviour—specifically, donations to an organization combatting economic inequality by increasing the national minimum wage. Via an online survey, a geographically diverse sample of American adults ($n = 1{,}027$) was randomly assigned to write three things about either (1) why some people in society are poor and do not deserve to be (situational attributions prime) or (2) people who are poor (control prime). The situational attributions prime was premised on the notion that a perceived lack of deservingness for poverty orients individuals to situational factors that cause poverty[24], a hypothesis we tested by having two trained coders (blind to condition and hypotheses) rate each written entry for evidence of situational and dispositional explanations of poverty (see Supplementary Information for description of coding procedure). We designed the control condition to eliminate possible demand effects (that is, both the treatment and control condition were about poverty) and to ensure that thinking about situational reasons for poverty, as opposed to poverty in general, causes inequality-reducing behaviour.

After participants had completed a manipulation check, they were then given ten entries into a bonus raffle for US$25.00. Participants could anonymously donate all, none or a portion of their raffle tickets to the 'Fight for $15' campaign, an organization working to combat economic inequality by increasing the US federal minimum hourly wage to US$15.00. Lastly, participants indicated their support for economic inequality.

In Study 3 and in subsequent studies, Shapiro–Wilk tests of normality demonstrated that some of our variables of interest were not normally distributed within each experimental condition. Because *t*-tests are robust to non-normal distributions when samples are large[41,42], we used these to compare means across conditions (Mann–Whitney *U*-tests, a non-parametric alternative to *t*-tests, always yielded similar results and these are reported in the Supplementary Information). Additionally, we followed recommendations to use Welch's unequal variance *t*-test, which performs similarly to Student's *t*-test but does not require equal variances between conditions[43,44].

Participants who wrote about undeserved poverty viewed the poor as less deserving of their economic circumstances (mean (M) = 5.94, s.d. = 1.20) than control participants ($M = 5.56$, s.d. = 1.54; $t(972.78) = 4.44$, $P < 0.001$, effect size Cohen's $d = 0.28$, 95% CI [0.15, 0.40]), and made more situational attributions for poverty ($M = 3.24$, s.d. = 0.89) than control participants ($M = 1.97$, s.d. = 0.75; $t(989.45) = 24.77$, $P < 0.001$, $d = 1.55$, 95% CI [1.41, 1.69]). We did not find evidence that the control ($M = 1.67$, s.d. = 0.63) and experimental ($M = 1.68$, s.d. = 0.57) conditions differed on dispositional attributions for poverty ($t(1{,}017.60) = 0.16$, $P = 0.875$, $d = 0.01$, 95% CI [−0.11, 0.13]). These findings verify that our manipulation shifted situational attributions as intended.

As expected, participants in the situational attributions condition gave more raffle tickets to the Fight for $15 campaign ($M = 4.48$, s.d. = 3.67) than those who wrote about poverty ($M = 3.90$, s.d. = 3.53; $t(1{,}022.30) = 2.59$, $P = 0.010$, $d = 0.16$, 95% CI [0.04, 0.28]). However, we did not find evidence that the situational attributions prime shifted support for inequality ($M = 2.44$, s.d. = 1.46) relative to the control group ($M = 2.55$, s.d. = 1.44; $t(1{,}023.30) = -1.23$, $P = 0.219$, $d = -0.08$, 95% CI [−0.20, 0.05]).

Table 1 | Constructs, measures, sources, sample sizes and descriptive statistics across all five studies

Variable	Source	Observations (*n*)	*M* (s.d.)	Range
Study 1 (worldwide sample, 1995–1998)				
Attributions for poverty: dispositional versus situational (1 item)	Inglehart et al.[34]	40,031	1.71 (0.46)	1–2
Support for economic inequality (1 item)	Inglehart et al.[34]	40,031	5.94 (2.95)	1–10
Study 2 (online, summer 2019)				
Situational attributions for poverty (5 items)	Feagin[18]	602	3.41 (0.96)	1–5
Dispositional attributions for poverty (4 items)	Feagin[18]	602	3.10 (0.99)	1–5
Support for economic inequality (5 items)	Wiwad et al.[36]	602	3.00 (1.43)	1–7
Support for redistribution (4 items)	Pew Research Center[37]	602	3.09 (0.77)	1–4
Study 3 (online, winter 2017)				
Manipulation check: poor deserve to be poor (1 item)	Present work	1,027	5.75 (1.39)	1–7
Situational attributions for poverty (1 item, coded by 2 RAs)	Coded text, present work	1,027	2.60 (1.04)	1–5
Dispositional attributions for poverty (1 item, coded by 2 RAs)	Coded text, present work	1,027	1.67 (0.60)	1–5
Support for economic inequality (1 item)	Adapted from Wiwad et al.[36]	1,027	2.50 (1.45)	1–7
Inequality-reducing action: donations to Fight for $15 (1 item)	Present work	1,027	4.18 (3.61)	1–10
Study 4a (in lab, western Canada, winter 2017)				
Situational attributions for poverty (11 items)	Nickols & Nielsen[45]	164	4.58 (0.59)	1–7
Situational attributions for poverty (7 items)	Guimond, Begin & Palmer[35]	164	3.52 (0.70)	1–7
Dispositional attributions for poverty (17 items)	Nickols & Nielsen[45]	164	3.38 (0.63)	1–7
Dispositional attributions for poverty (4 items)	Guimond, Begin & Palmer[35]	164	2.41 (0.90)	1–7
Support for economic inequality (5 items)	Wiwad et al.[36]	164	2.61 (0.86)	1–7
Support for redistribution (4 items)	Pew Research Center[37]	164	3.16 (0.49)	1–4
Empathy (21 items)	Davis[62]	164	3.58 (0.42)	1–5
Study 4b (in lab, western Canada, fall 2017)				
Situational attributions for poverty (11 items)	Nickols & Nielsen[45]	611	4.66 (0.60)	1–7
Dispositional attributions for poverty (17 items)	Nickols & Nielsen[45]	611	3.28 (0.61)	1–7
Support for economic inequality (5 items)	Wiwad et al.[36]	610	2.67 (0.91)	1–7
Support for redistribution (4 items)	Pew Research Center[37]	608	3.22 (0.52)	1–4

Individual item information for each scale can be found in the Supplementary Information. Scale means are collapsed across conditions in Studies 3 and 4b. Attributions for poverty in Study 1 are coded such that a higher mean corresponds to more situational attributions. For every other scale, higher means correspond to stronger endorsement of the given construct.

Study 3 found that a brief writing prompt, drawing attention to the situational factors contributing to poverty, increased donations to an organization working to reduce economic inequality. These findings reveal how small interventions can significantly increase egalitarian action. We failed to find evidence that the manipulation shifted support for inequality. This may be due to the indirect nature of the experimental manipulation in which participants free-recalled reasons for undeserved poverty. Thus, in the following study, we used a potentially stronger manipulation—a short and freely available game simulating the situational hardships of poverty. We predicted that the vivid, first-hand poverty simulation, though brief, would yield robust shifts in attributions surrounding poverty and support for inequality.

Study 4a. Study 4a tested whether an online game that simulates the structural challenges of living in poverty could increase situational attributions for poverty and, in turn, opposition to economic inequality and support for economic redistribution. The game we used is freely available and relatively brief (lasting around 10 min), making this a low-cost and accessible intervention.

Participants ($n = 164$) were randomly assigned to one of two conditions. In the experimental condition, participants played SPENT, an online poverty simulation (playspent.org), for around 10 min. In this game, participants were tasked with surviving poverty as they confronted a series of difficult finance-related decisions. This simulation reveals situational barriers and challenges that can render poverty difficult to escape. Participants in the control condition played Monopoly, a computer game also involving financial decisions, for 10 min. After the game, participants completed measures of attributions for poverty[45], support for economic inequality[36], support for redistribution[46] and demographics (see Supplementary Information for ancillary results of measures not reported here).

Participants randomly assigned to play the poverty simulation endorsed more situational attributions for poverty ($M = 4.79$, s.d. $= 0.52$) than control participants ($M = 4.37$, s.d. $= 0.57$; $t(160.59) = -4.96$, $P < 0.001$, $d = 0.78$, 95% CI $= [-0.59, -0.26]$). Additionally, participants who played the poverty simulation reported lower dispositional attributions for poverty ($M = 3.25$, s.d. $= 0.63$) than control participants ($M = 3.51$, s.d. $= 0.61$; $t(161.86) = 2.68$, $P = 0.008$, $d = 0.42$, 95% CI $= [0.07, 0.45]$).

Importantly, participants who played the poverty simulation reported less support for economic inequality ($M = 2.41$, s.d. $= 0.78$) than those in the control condition ($M = 2.81$, s.d. $= 0.89$; $t(159.1) = 3.05$, $P = 0.002$, $d = 0.48$, 95% CI $= [0.14, 0.66]$). However, we did not find evidence that participants who played the poverty simulation reported more support for economic redistribution ($M = 3.20$, s.d. $= 0.49$) than control participants ($M = 3.12$,

s.d. = 0.49; $t(161.95) = -0.98$, $P = 0.327$, $d = 0.15$, 95% CI = [−0.23, 0.08]; see Extended Data Fig. 1).

Furthermore, data were consistent with the possibility that situational attributions for poverty explained the relationship between condition assignment and support for economic inequality. Situational attributions for poverty (indirect effect: $\beta = -0.17$, $z = -3.92$, $P < 0.001$, 95% CI [−0.26, −0.09]) mediated the relationship between the poverty simulation and lower support for economic inequality (mediation model presented in Extended Data Fig. 2).

In Study 4a, we found that playing a game that simulates the structural challenges of living in poverty shifted attention away from dispositional causes of poverty toward the situational forces that help give rise to it and, in turn, increased opposition to economic inequality. At the same time, certain questions and limitations remained. First, we found no credible evidence that the poverty simulation significantly changed support for economic redistribution, possibly because of insufficient statistical power (as per our a priori power analysis, we were only adequately powered (80%, Type I error tolerance $\alpha = 0.05$) to detect an effect as small as Cohen's $d = 0.44$). Second, our control condition may have introduced confounds or alternative explanations (for example, heightening anti-egalitarian tendencies). Third, the poverty simulation altered poverty attributions and support for inequality immediately after the manipulation, but how long do these effects last?

We designed Study 4b to address these limitations. We conducted a high-powered, pre-registered replication of Study 4a with several methodological improvements. First, we recruited a sample nearly four times that of Study 4a and pre-registered our key hypotheses, methods, measures and analyses (https://osf.io/26aw3/). Second, we replaced the Monopoly control condition with a no-game control condition to ensure that our results were driven by the poverty simulation and not by any contrasting effects of a different game. Third, we conducted two follow-up assessments—1 d later (Time 2) and approximately 5 months later (Time 3)—to examine sustained shifts in attitudes toward inequality. As such, we aimed to examine whether situational attributions for poverty can be enhanced with an intervention that is relatively low-cost and freely accessible, and lead to both short- and long-term changes in support for inequality.

Study 4b. We randomly assigned participants in Study 4b ($n = 611$) to either play the poverty simulation (SPENT game) for 10 min before completing our key measures, or simply to complete the measures (no-game control condition). We used the same measures as in Study 4a, and included several exploratory measures for which we did not have pre-registered hypotheses (a discussion of these can be found in the Supplementary Information). Before data collection, we pre-registered the prediction that, compared to the control condition, the poverty simulation would increase situational attributions for poverty, decrease dispositional attributions for poverty, reduce support for inequality and increase support for economic redistribution (https://osf.io/26aw3/).

Confirmatory analyses of immediate effects. Consistent with our pre-registered hypothesis, participants who completed the poverty simulation reported higher situational attributions for poverty ($M = 4.80$, s.d. = 0.59) than those in the no-game control condition ($M = 4.51$, s.d. = 0.57; $t(608.97) = 6.16$, one-tailed $P < 0.001$, $d = 0.50$, 95% CI = [0.21, ∞]). However, contrary to expectations, we did not find credible evidence that dispositional attributions for poverty were lower in the poverty simulation condition ($M = 3.25$, s.d. = 0.61) than in the control condition ($M = 3.31$, s.d. = 0.61; $t(608.51) = -1.29$, one-tailed $P = 0.098$, $d = 0.10$, 95% CI = [∞, 0.02]). Importantly, however, participants in the poverty simulation condition reported lower support for economic inequality ($M = 2.58$, s.d. = 0.90) than those in the no-game control condition ($M = 2.76$, s.d. = 0.90; $t(607.86) = -2.45$, one-tailed $P = 0.007$, $d = 0.20$, 95% CI = [∞, −0.06]; Fig. 2 and Extended Data Fig. 3), and they reported higher support for redistribution ($M = 3.26$, s.d. = 0.51) than control participants ($M = 3.17$, s.d. = 0.52; $t(605.51) = 2.16$, one-tailed $P = 0.015$, $d = 0.17$, 95% CI = [0.02, ∞]). Furthermore, consistent with our pre-registered hypothesis, situational attributions for poverty mediated the relationships between engaging in the poverty simulation (versus a no-game control) and both lower support for economic inequality (indirect effect: $\beta = 0.12$, one-tailed $P < 0.001$, $z = 5.65$, 95% CI = [0.08, 0.17]) and higher support for redistribution (indirect effect: $\beta = -0.09$, one-tailed $P < 0.001$, $z = -5.03$, 95% CI [−0.12, −0.05]; models presented in Extended Data Fig. 4).

Exploratory follow-up analyses of long-term effects. We conducted two follow-up surveys to explore the longevity of the poverty simulation intervention (versus control) on support for economic inequality. The first follow-up was conducted 1 d after the experiment by emailing participants an identical survey (91.4% of the original sample responded and attrition did not differ by condition; $n_{spent} = 278$, $n_{control} = 277$). Participants in the poverty simulation condition reported higher situational attributions for poverty ($M = 4.66$, s.d. = 0.60) than control participants ($M = 4.47$, s.d. = 0.59; $t(552.99) = 3.64$, $P < 0.001$, $d = 0.31$, 95% CI [0.08, 0.28]) after a 1-d delay. Participants in the poverty simulation condition also continued to express lower support for economic inequality ($M = 2.79$, s.d. = 0.98) relative to control participants ($M = 3.00$, s.d. = 0.93; $t(551.46) = -2.53$, $P = 0.012$, $d = 0.22$, 95% CI [−0.36, −0.05]; Fig. 2). Furthermore, participants in the poverty simulation condition continued to report greater support for redistribution ($M = 3.18$, s.d. = 0.53) relative to those in the no-game control condition ($M = 3.08$, s.d. = 0.54; $t(552.76) = 2.21$, $P = 0.028$, $d = 0.18$, 95% CI [0.01, 0.19]). Finally, higher situational attributions for poverty still mediated the effect of the poverty simulation on support for economic inequality (indirect effect: $\beta = 0.16$, $P < 0.001$, $z = 3.54$, 95% CI [0.07, 0.25]) and redistribution (indirect effect: $\beta = -0.06$, $z = -3.37$, $P = 0.001$, 95% CI [−0.09, −0.02]; Time 2 mediation results are presented in Extended Data Fig. 5).

We also conducted a second follow-up at the end of the semester. Although we had not planned on gathering these data when we launched the study, they allowed us to test the effects of our intervention after several months' delay. We invited all 611 participants to complete one additional survey (18% responded and attrition did not differ by condition; data for two participants who entered incorrect IDs could not be linked to previous responses; $n_{spent} = 59$, $n_{control} = 50$). The average time among respondents since participating in the experiment was 155 d (range, 44–246 d). Despite this delay, all but one effect persisted. Participants in the poverty simulation condition continued to report higher situational attributions for poverty ($M = 4.77$, s.d. = 0.73) than control participants ($M = 4.49$, s.d. = 0.57; $t(106.72) = 2.23$, $P = 0.025$, $d = 0.45$, 95% = CI [0.04, 0.53]), and they reported less support for economic inequality ($M = 2.33$, s.d. = 0.88) than control participants ($M = 2.76$, s.d. = 0.91; $t(102.59) = -2.53$, $P = 0.013$, $d = 0.48$, 95% CI [−0.78, −0.10]; Fig. 2). Unlike at the other two time points, however, we found no credible evidence that participants in the poverty simulation condition supported more redistribution ($M = 3.28$, s.d. = 0.56) than control participants ($M = 3.18$, s.d. = 0.49; $t(104.82) = 0.92$, $P = 0.359$, $d = 0.20$, 95% CI [−0.11, 0.29]). Because the observed effect size at Time 3 is roughly equivalent to that at Time 1, this null result is possibly due to a lack of statistical power as opposed to a diminished effect over time (although our Time 1 sample was adequately powered (80%, $\alpha = 0.05$) to detect effects as small as Cohen's $d = 0.20$, attrition at Time 3 rendered our sample sufficiently sensitive to detect effects as small as Cohen's $d = 0.53$). Finally, situational attributions for poverty continued to explain the relationship between the poverty simulation and support for economic inequality (indirect effect $\beta = 0.20$, $z = 2.28$, $P = 0.023$, 95% CI [0.02, 0.35]; Time 3 mediation results

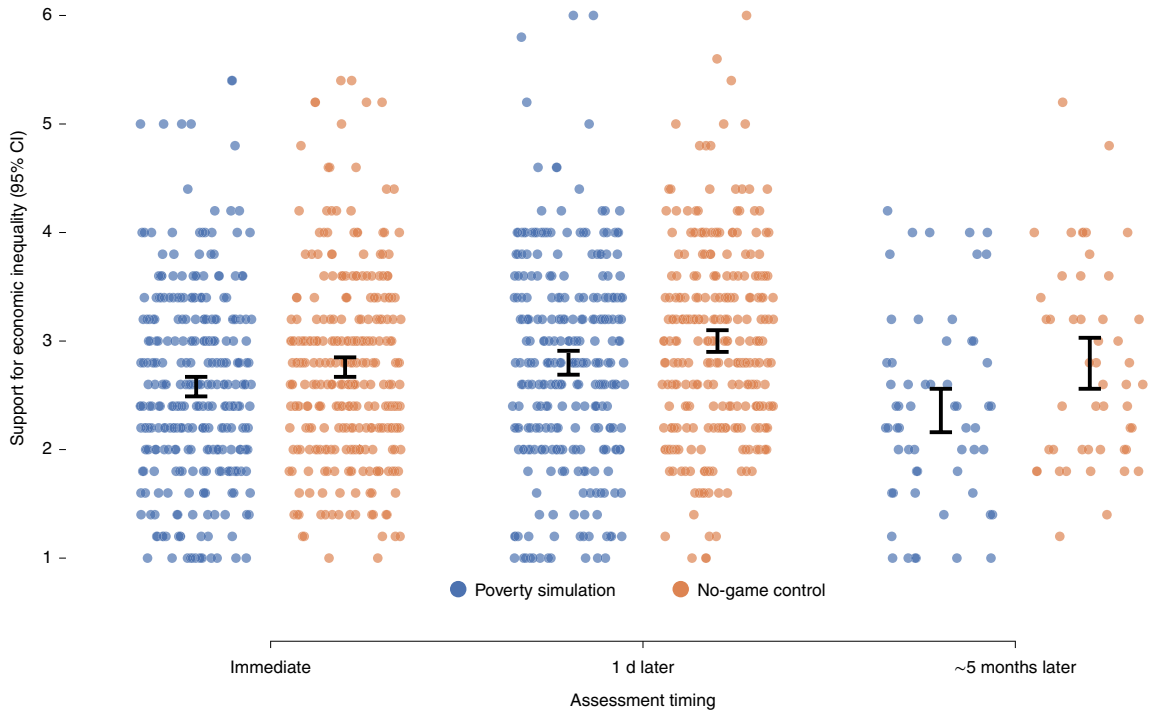

Fig. 2 | Effects of SPENT game on support for economic inequality over time. The effects of poverty simulation (SPENT game) versus no-game control condition on support for economic inequality immediately ($n = 611$; $t(607.86) = -2.45$, one-tailed $P = 0.007$, $d = 0.20$, 95% CI = [∞, −0.06]), 1 d ($n = 555$; $t(551.46) = -2.53$, $P = 0.012$, $d = 0.22$, 95% CI [−0.36, −0.05]) and ~5 months ($n = 110$; $t(102.59) = -2.53$, $P = 0.013$, $d = 0.48$, 95% CI [−0.78, −0.10]) post-intervention in Study 4b (error bars represent standard errors).

are presented in Extended Data Fig. 6). These follow-up analyses of long-term effects were also robust to the statistical tests we conducted to ensure they were not artefacts of attrition or shifts in responses over time (see Supplementary Information).

Using a high-powered sample and pre-registered methods and hypotheses, Study 4b provides strong support for our predictions. We found that a brief poverty simulation yielded sustained shifts in situational attributions for poverty, indicating that they are malleable and sensitive to intervention. Finally, situational attributions for poverty drove increased support for economic redistribution and greater opposition to economic inequality—the latter effect persisting for an average of 5 months.

Discussion

Amidst near-historic economic inequality and mounting concern over it, what factors cause people to be more intolerant of inequality and motivated to combat it? Five studies demonstrate that attributions for poverty are one significant driver of people's support for inequality. In two large surveys, including a large cross-national sample with over 32,000 people in 34 countries, situational attributions for poverty were associated with greater opposition to economic inequality and support for egalitarian policies. Critically, we harnessed this information in three follow-up experiments to document the causal nature of this relationship. Specifically, three studies found that small interventions, such as a free and interactive virtual simulation of poverty, can heighten situational attributions for poverty, reduce support for inequality (for up to 155 d post-intervention) and prompt egalitarian behaviour aimed at alleviating inequality.

Why do situational attributions for poverty motivate opposition to economic inequality? People are particularly sensitive to whether opportunities to get ahead in society are perceived to be available[5,47]. For example, the belief that one's economic standing is based on merit is a key feature of the American Dream[23]. Recognizing that situational factors beyond one's personal control can contribute to poverty represents a potent threat to these perceptions. We posit that, insofar as people perceive that situational forces prevent the poor from getting ahead, they will view economic disparities between the rich and poor as unfair and support a more equitable system over the status quo. Doing so may help individuals restore a sense of fairness—a deeply rooted and valued moral sentiment[48–50].

Future research should bolster and extend our findings in key ways. First, studies should further delineate the nature of our effects using measures that utilize different inequality-related terms (for example, 'differences between the rich and poor'), distinguish between beliefs about what the government can versus should do about inequality, and disentangle motivations to reduce poverty from motivations to reduce economic inequality. Studies in this realm should also examine the antecedents and consequences of beliefs about different types of poverty (for example, people who are born poor versus become poor)[9], as well as extend our analysis to beliefs about other forms of stigma (for example, obesity) that may also be shaped by situational attributions.

Second, although research documents that experiments are surprisingly robust to experimenter demand effects[51], it is possible that our participants inferred the purposes of our studies and responded to confirm our hypotheses. We took steps to address this concern, such as by using control and treatment conditions that both reference poverty in Study 3, and probing participants' suspicions in Study 4b. However, future research should further address possible demand effects (for example, by using different poverty simulations that vary in the degree to which they alter situational attributions).

Third, our experimental results used convenience non-probabilistic samples of students (Studies 4a and b) and online survey respondents (Study 3). Past research has found that experiments on sociopolitical attitudes obtain similar results when conducted on online survey workers versus a representative sample of Americans[52]. Although we are cautiously optimistic that our results would generalize to the

broader population, future work should test our interventions in nationally representative probabilistic samples in which poverty attributions are independently randomized. Such studies would provide compelling evidence for the generalizability of our interventions.

It is worth noting that situational attributions for poverty, but not dispositional attributions, were consistently and significantly associated with opposition to inequality and preferences for inequality-reducing policies (for example, in Study 2). Moreover, although the poverty simulation significantly increased situational attributions for poverty, we did not find consistent evidence that it also reduced dispositional attributions. These findings are notable for both theoretical and practical reasons. First, they indicate that situational and dispositional attributions should not be conceptualized as opposites; people can simultaneously endorse both, and shifts in the salience of one do not necessarily imply shifts in the other. This parallels previous work indicating that these constructs are distinct, even orthogonal[8,47,53]. Second, people may be particularly committed to the role of dispositional factors (for example, merit) in determining economic outcomes, rendering them resistant to intervention. Situational factors, however, may be more malleable, particularly given humans' sensitivity to situational obstacles to success[54]. Raising awareness of situational barriers may thus be an effective and non-threatening route to highlight economic unfairness and increase opposition to economic inequality.

The present work offers a potentially promising step towards addressing growing economic inequality. Our studies demonstrate that situational attributions for poverty and consequent opposition to inequality can be bolstered through relatively short, accessible and free interventions. The SPENT game, for example, is widely available and relatively brief (~10 m), making this a low-cost, engaging and accessible intervention. This final feature suggests that the present findings may be scalable to large groups, such as middle and high school students in classrooms around the country. The relative ease with which these interventions can be administered, alongside their possible long-term effectiveness, make them a particularly viable route to tackling rising inequality—one of the most pressing social issues of this generation[55].

Methods

Our studies comply with all relevant ethical regulations, and informed consent was obtained from all human participants. Study 1 reports analyses from two publicly available datasets that are not individually identifiable, rendering it exempt from institutional review board (IRB) review. Study 2 was approved by the IRB at the University of British Columbia, Study 3 was approved by the IRB at the University of California, Irvine and Studies 4a and b were approved by the IRB at Simon Fraser University. In Study 3, data collection was conducted blind to the conditions of the experiment. In Studies 4a and b, researchers were not blind to condition because they had provided participants with their randomly assigned materials. However, all dependent variables were reported by the participant while alone in a testing room and were not accessible to the researchers, thereby minimizing contact between researchers and participants following the manipulations. All analyses in Studies 3, 4a and b were performed blind to experimental condition.

Study 1. *Participants.* We examined whether situational attributions for poverty were associated with support for economic inequality. To provide a broad test of this question, rather than limit our analysis to one country, culture or sample of respondents, we examined data from 32,064 respondents (M_{age} = 35–44, 50.5% male) living in 34 countries by combining data from the 1995–1998 wave of the World Values Survey (WVS[34]) with 1995–1998 country-level GDP per capita and the Gini coefficient from the World Bank[56].

In compiling this dataset, we began with 77,129 responses to the WVS (M_{age} = 35–44, 50.5% male). We removed participants who were not asked (n = 13,057) or otherwise did not complete all of our key measures (n = 24,041; attributions for poverty, support for inequality, political ideology, age, gender, education, income and religiosity), leaving 40,031 respondents across 46 countries. Finally, we excluded responses from 12 countries that did not have data for one or both of the country-level measures of GDP per capita or Gini. We visually assessed assumptions of linearity, heteroscedasticity and normality of residuals and found no significant deviations (see Extended Data Figs. 7 and 8).

While constraining the data to participants with complete data from countries with key prosperity and inequality measures provides a more comprehensive test of the relationship between attributions for poverty and support for inequality accounting for various relevant controls, this did result in a significant amount of data reduction. Fortunately, the conclusions appear generalizable for at least two reasons. First, the remaining sample containing all central variables encompasses a large portion of the globe, including countries from all six major continents.

Second, the key conclusions and results of Study 1 do not change when we conduct a 'multiverse' analysis exploring the key hypothesis in various iterations of the initial dataset[57]. In a multiverse analysis, data are analysed on a multiverse of possible datasets (that is, wherein each dataset is the result of different decisions regarding participant exclusions). In our case, these decisions surround missing data. We constructed this multiverse of four datasets and, as we expected, we found consistent results across all four. First, we analysed all participants who had responses on attributions for poverty and support for economic inequality (n = 56,210). Participants who demonstrated more situational attributions for poverty were less supportive of economic inequality ($\beta = -0.23$, $z = -16.95$, $P < 0.001$, 95% CI [−0.25, −0.20]). Second, we analysed participants who had responses on the previous two measures plus controls (n = 40,031; age, gender, education, income and religiosity) and results were consistent ($\beta = -0.06$, $z = -11.58$, $P < 0.001$, 95% CI [−0.07, −0.05]). Third, we analysed a complete dataset in which we imputed all missing values on the key variables and controls using the Mice package in R[58] (n = 64,072). We imputed all missing data 20 times, and all b coefficients for attributions for poverty predicting support for economic inequality were nearly identical to the coefficient reported in the main body of the manuscript ($b_{pooled} = -0.34$, $z = -11.58$, $P < 0.001$, 95% CI [−0.40, −0.28]). Lastly, we analysed participants with all the previous information plus country-level information (n = 32,064; the final dataset in Main).

Procedure. The WVS measured situational attributions for poverty with the question, "Why, in your opinion, are there people in this country who live in need?" Participants could select: (people) are poor "1: due to laziness or lack of willpower" or "2: because of an unfair society" (M = 1.71, s.d. = 0.46). Support for inequality was measured with the question, "How would you place your views on this scale?" measured from 1 ("Incomes should be made more equal") to 10 ("We need larger income differences as incentives"; M = 5.94, s.d. = 2.95). See Table 1 for complete descriptive statistics.

We conducted a cross-national, multi-level model to account for the relative level of prosperity and inequality in each respondent's country. This provided a more powerful analysis at the individual level while accounting for within-country dependence on the dependent variable. We acquired 1995–1998 country-level data on GDP per capita and the Gini coefficient from the World Bank[56].

To confirm that multi-level modelling was appropriate for these data, we ran an unconditional random analysis of variance (the 'null model'), entering the grouping variable (country) and the outcome variable (attitude towards inequality) into Model 1. Country of residence explained approximately 8% (intraclass correlation = 0.08) of the variance in attitudes toward inequality. As our sample size exceeds 30,000, 8% is sufficient within-country clustering of the dependent variable to significantly inflate type I error rates[59]. Thus, multi-level modelling was justified for these data. Next, in Model 2 we entered attributions for poverty and replicated our initial result, that situational attributions for poverty were associated with support for income inequality. Finally, in Model 3 we included all covariates: individual-level political ideology, subjective position on the income ladder, gender, age and religiosity[34]. We also controlled for country-level inequality using the Gini coefficient and GDP per capita using 1995 figures (or, when not possible, the next closest year up to and including 1998; results presented in Supplementary Table 1). Additionally, we computed variance inflation factors (VIFs) to assess for multicollinearity; all VIFs were approximately 1, suggesting that there is no issue with multicollinearity (see Supplementary Table 2).

Study 2. *Participants.* We recruited 602 (M_{age} = 45.92, 55.1% female) participants in the summer of 2019 using TurkPrime Panel Services. We requested a sample that was representative of the United States across three demographic characteristics: geographic location, age and income quintiles matching 2015 cut-offs[60] as closely as TurkPrime would allow (see Supplementary Table 3 for our nationally representative recruitment targets and our sample's final demographic). As indicated in the pre-registration (https://osf.io/yshq8/), we calculated our target sample size based on the smallest effect size of interest, r = 0.20. Importantly, as specified in the pre-registration document, we conducted one-tailed tests for each pre-registered hypothesis because our predictions were directional. To detect an effect as small as r = 0.20 with sufficient power (one-tailed $\alpha = 0.05$, $\beta = 0.95$), we required a sample of 266 participants. However, to account for participants who would fail the attention check and to allow for sufficient data collection across five income quintiles, geographical region and age, we opted to increase the sample size to 500. Moreover, when there are multiple quotas to participant recruitment (for example, income, age and geography), TurkPrime Panel Services deliberately over-samples to ensure that all quotas are met. As a result, our final recruited sample included 102 extra participants above the specified 500. The results below report the findings for the 576 participants who passed an attention check, resulting in a sample that was representative of the United States across our three criteria as well as political ideology. Results are consistent when all participants are included (see Supplementary Information for analyses).

Procedure. Participants reported their attributions for poverty using Feagin's[61] measure as presented in Kluegel and Smith[27]. Participants were asked to "Please rate how important you believe each of the following factors are in explaining poverty in the United States" for 12 statements using a scale of 1 (not at all important) to 5 (extremely important). As in previous research[27], items were mean composited into separate subscales for situational attributions for poverty (for example, "Failure of society to provide good schools for Americans"; $M=3.42$, s.d. $=0.97$, $\alpha=0.85$) and dispositional attributions for poverty (for example, "Lack of effort by the poor themselves"; $M=3.08$, s.d. $=0.99$, $\alpha=0.79$); see Supplementary Information for all items and Table 1 for all descriptive statistics.

Participants indicated their support for economic inequality using the Support for Economic Inequality Scale[36]. Participants rated their agreement with five items on a scale of 1 (strongly disagree) to 7 (strongly agree) (for example, "The negative consequences of economic inequality have been largely exaggerated"). Items were mean composited ($M=2.98$, s.d. $=1.44$, $\alpha=0.91$; for all items see Supplementary Information). This measure has been validated in several ways. First, research has shown that it is comprised of a set of unidimensional and reliable items. Second, individuals with higher scores on this measure were more willing to sign a petition to combat inequality by increasing the national minimum wage. Third, in a separate validation study, scores on this measure better predicted actual donations to an organization combatting inequality than other conceptually similar measures (for example, economic system justification).

To measure support for redistribution, we used four items adapted from PEW Research Center[37]. Participants were asked to rate their support for redistributive policies by responding to each item (for example, "How much, if anything, should the government do to reduce the gap between the rich and everyone else?") on a scale from 1 (nothing at all) to 4 (a lot). Responses were mean composited ($M=3.08$, s.d. $=0.78$; for all items see Supplementary Information). Although items formed a reliable scale ($\alpha=0.89$), it is worth noting that two of the items reference what the government should do about redistribution whereas the other two reference what the government can do. These two sets of items could tap separate beliefs: wanting the government to redistribute versus trusting that it is able to redistribute effectively. Importantly, separate analysis of each set of items yielded parallel results (see Supplementary Information).

Study 3. *Participants.* An a priori power calculation revealed that a minimum of 940 participants was required to achieve 80% power to detect an effect size of $d=0.16$ or larger at $\alpha=0.05$. We over-sampled to recruit 1,080, to account for the possibility that up to 15% of participants might fail an attention check. Participants were recruited from Amazon's Mechanical Turk in exchange for US$0.25. While there is some concern about the usefulness of online crowdsourced data such as mTurk, recent research demonstrates that crowdsourced samples are roughly equivalent in data quality to population-based probability samples[52]. To ensure that our sample provided the cleanest possible test of our hypothesis, we excluded 52 participants who either failed or neglected to respond to our attention check item ("Select disagree, which is the second option from the left"), and one participant who did not complete our dependent measure. This left a total sample of 1,027 participants ($M_{age}=36.96$, 58.85% female). Importantly, results remain the same if participants who failed the attention check are included in analyses (see Supplementary Information).

Procedure. Participants were randomly assigned to either the situational attributions for poverty prime or the control condition via a computer algorithm. In the situational attributions condition, participants were prompted to "Write three reasons why some people in society are poor and do not deserve to be." In the control condition, participants were prompted to "Write three things about people in society who are poor." Two research assistants who were blinded to condition coded each of these responses for the degree to which situational or dispositional factors are responsible for the descriptions provided (1 = not at all, 5 = very much).

As a manipulation check, participants rated their agreement with the item, "In the United States, some people who are poor do not deserve to be" (1 = strongly disagree to 7 = strongly agree; $M=5.75$, s.d. $=1.39$). We then assessed participants' willingness to engage in inequality-reducing action. Participants were given ten raffle tickets in their name that would be entered for a US$25.00 prize drawing upon conclusion of the study. Participants then read a paragraph describing the Fight for $15 Campaign as "an advocacy organization that is fighting to reduce economic inequality by raising the minimum wage … from $7.25 to $15 an hour nationwide" (full description in Supplementary Information). Participants then chose how many of their raffle tickets, if any, they would like to transfer to Fight for $15 ($M=4.18$, s.d. $=3.61$). Next, participants reported their support for inequality on a two-item measure (1 = strongly disagree to 7 = strongly agree): "I am very disturbed by the amount of inequality in the world today" and "I think the state of income inequality in the United States is unfair" (both reverse-scored; $M=2.50$, s.d. $=1.45$, $\alpha=0.89$). Lastly, participants reported their demographics and were debriefed. See Table 1 for all descriptive statistics.

Study 4a. *Participants.* We recruited 164 participants ($M_{age}=19.69$, 70.1% female) from a large western Canadian university in exchange for course credit. No statistical methods were used to pre-determine sample size in this study. The final sample provided 80% power to detect an effect of size $d=0.44$ or larger (at two-tailed $\alpha=0.05$).

Procedure. Participants arrived at the laboratory and were seated in a private testing room. Participants were randomly assigned via a random number generator to either the experimental (SPENT poverty simulation) or control (Monopoly) condition and were given an iPad pre-loaded with the appropriate game. In the experimental condition, participants played an entire round of SPENT. The SPENT game is designed to simulate the direct experience of poverty, exposing players first-hand to situational factors—beyond individual control—that make poverty difficult to escape (see Supplementary Information for a detailed description of SPENT). In the control condition, participants played a computer-based version of Monopoly. Monopoly was used as a comparison game because it, like SPENT, involves financial decisions and avoiding bankruptcy. Participants played Monopoly for 10 min, equivalent to the average time it took several research assistants to complete the SPENT game.

After playing their randomly assigned game, participants completed our measures of interest. Each of the following scales was scored from 1 (strongly disagree) to 7 (strongly agree) unless otherwise noted (for a complete list of all items see Supplementary Information). First, participants reported their attributions for poverty[45]. We separated this 30-item measure into the subscales dispositional (for example, "People who are poor earn what they deserve"; $M=3.38$, s.d. $=0.63$, $\alpha=0.79$) and situational (for example, "People are poor because of things that happen to them"; $M=4.58$, s.d. $=0.59$, $\alpha=0.59$), as per the original paper[45]. Second, participants reported their support for economic inequality (for example, "The negative consequences of economic inequality have been largely exaggerated";[36] $M=2.61$, s.d. $=0.86$, $\alpha=0.78$). Third, participants reported their support for economic redistribution on four items using a scale ranging from 1 (nothing at all) to 5 (a lot) (for example, "How much, if anything, should the government do to reduce the gap between the rich and everyone else?";[34] $M=3.16$, s.d. $=0.49$, $\alpha=0.68$). Lastly, participants reported their demographics, including gender, age, ethnicity, political ideology and income. We also gathered a second measure of attributions of poverty[35] that yielded parallel, albeit somewhat weaker, results, as well as a measure of general feelings of empathy[62]—see Supplementary Information for the items and ancillary results for these scales and Table 1 for all descriptive statistics.

Study 4b. *Participants.* As specified in our pre-registration, we determined the smallest effect size of interest in Study 4b to be Cohen's $d=0.20$ (ref. [63]). An a priori power analysis determined that an adequate sample size ($\beta=0.80$, $\alpha=0.05$) to detect this effect size using a one-tailed *t*-test is 620. Importantly, as specified in the pre-registration document, we conducted one-tailed tests for each pre-registered hypothesis because our predictions were directional. Over two semesters we were able to recruit 613 participants ($M_{age}=19.26$, 66.1% female) at a large western Canadian university in exchange for course credit, giving us a 79% chance of detecting an effect $d=0.20$ or larger. Two participants stopped responding to the survey approximately 25 and 50% of the way through and were thus excluded from data analysis, leaving a final sample of 611.

Procedure. Participants arrived at the laboratory and were seated in a private testing room. Participants were then randomly assigned via a random number generator to either the experimental (SPENT poverty simulation) or no-game control condition. In the experimental condition, as in Study 4a, participants played an entire round of SPENT before completing a survey with our key measures. Participants in the control condition simply completed the survey.

The survey contained primarily the same measures as Study 4a. First, participants reported their situational ($M=4.66$, s.d. $=0.60$, $\alpha=0.62$) and dispositional ($M=3.28$, s.d. $=0.61$, $\alpha=0.77$) attributions for poverty[45]. Second, participants reported their support for economic inequality[36] ($M=2.67$, s.d. $=0.91$, $\alpha=0.84$). Third, participants reported their support for redistribution[34] ($M=3.22$, s.d. $=0.52$, $\alpha=0.73$). See Table 1 for all descriptive statistics. Participants reported their gender, age, ethnicity, political ideology and income, and were debriefed before exiting the study.

Follow-ups. Participants were asked to complete the same survey 1 d following their initial participation. We re-contacted participants at a later date (in mid-May 2018), offering them the chance to complete one additional follow-up survey for an opportunity to win one of five US$500 cash prizes. Participants completed the same survey as in Times 1 and 2, with additional funnel debriefing questions to explore whether or not they could recall the hypotheses from the original study (all questions can be found on the Open Science Framework at https://osf.io/85pyd/). Specifically, we asked participants to free-recall the hypothesis before asking them to select the correct hypothesis from six options. Thirty-three of 110 respondents selected the correct hypothesis on the multiple-choice question; however, of those 33, only three were able to freely recall the hypothesis. The Supplementary Information contains a detailed discussion of analyses accounting for these results.

Reporting Summary. Further information on research design is available in the Nature Research Reporting Summary linked to this article.

Data availability

All data supporting the findings in this manuscript are publicly available on the Open Science Framework and can be found here: https://osf.io/85pyd/

Code availability

All custom code for data cleaning and analysis supporting the findings in this manuscript are available on the Open Science Framework and can be found here: https://osf.io/7cg2h/

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Author contributions

P.K.P. and D.W. contributed equally. All authors helped develop the study concepts and contributed to the study designs. Testing and data collection were performed by P.K.P., D.W. and A.R.R. P.K.P., D.W. and A.R.R. analysed and interpreted the data and drafted the manuscript, and B.M., L.B.A. and A.S. provided critical revisions. All authors approved the final version of the manuscript for submission.

Competing interests

The authors declare no competing interests.

Additional information

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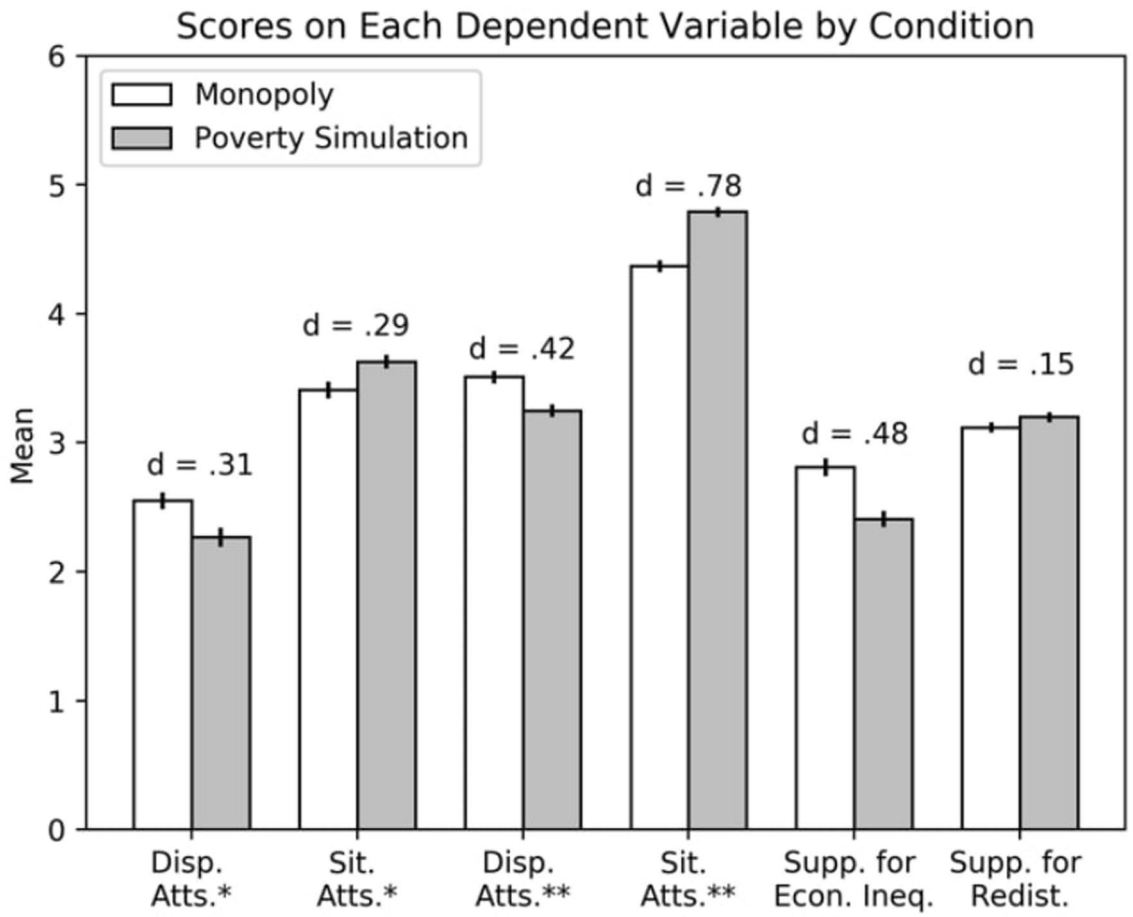
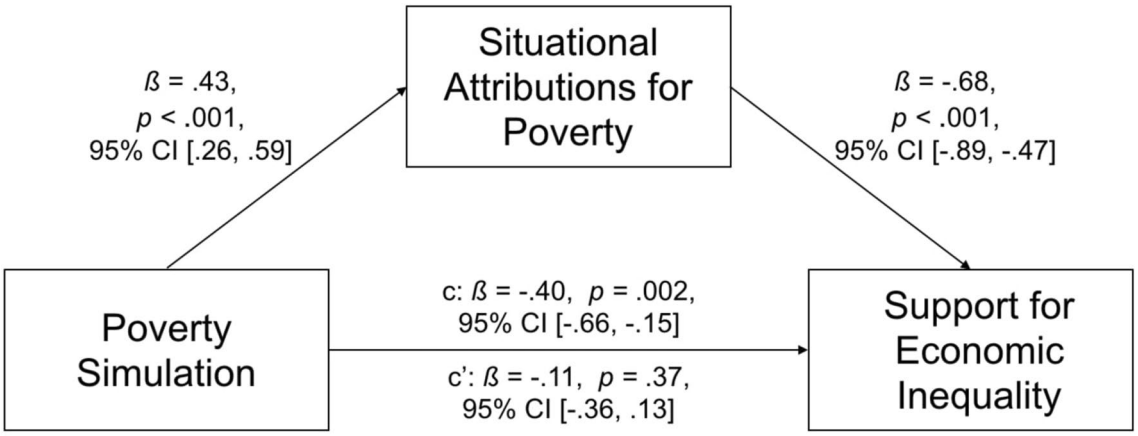
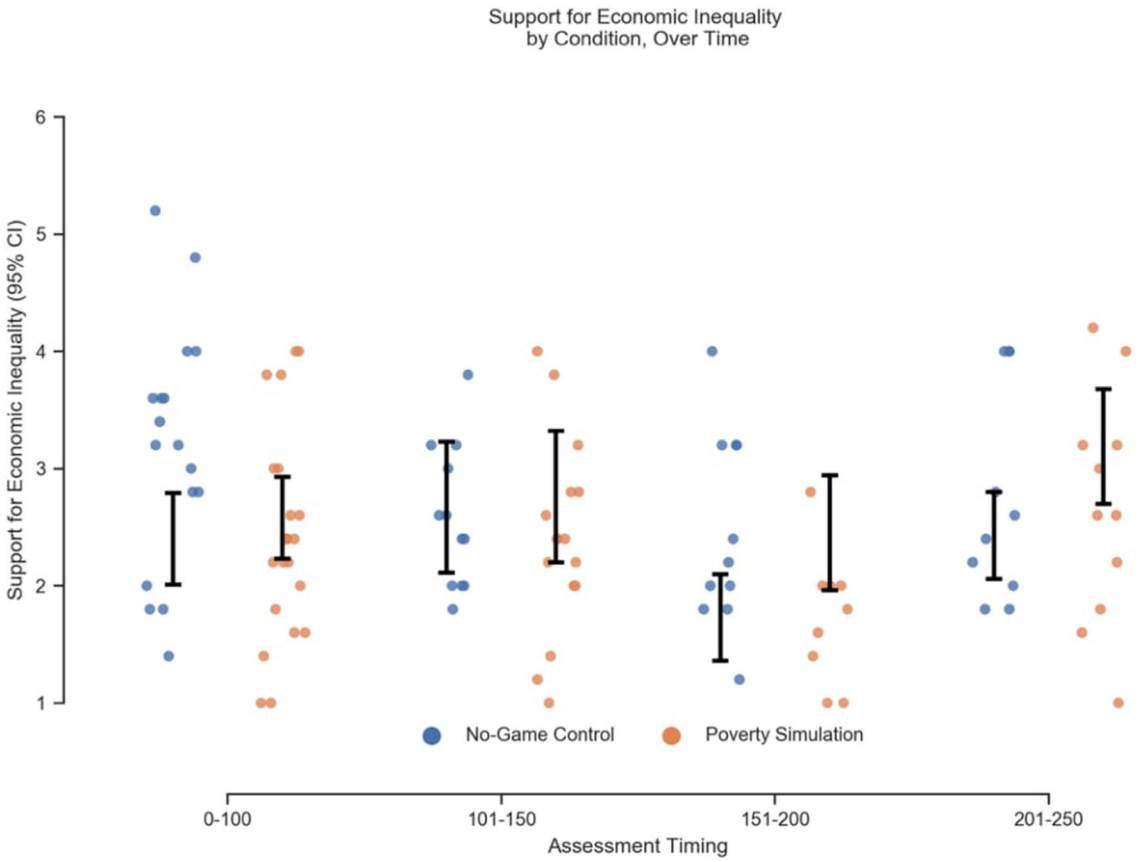


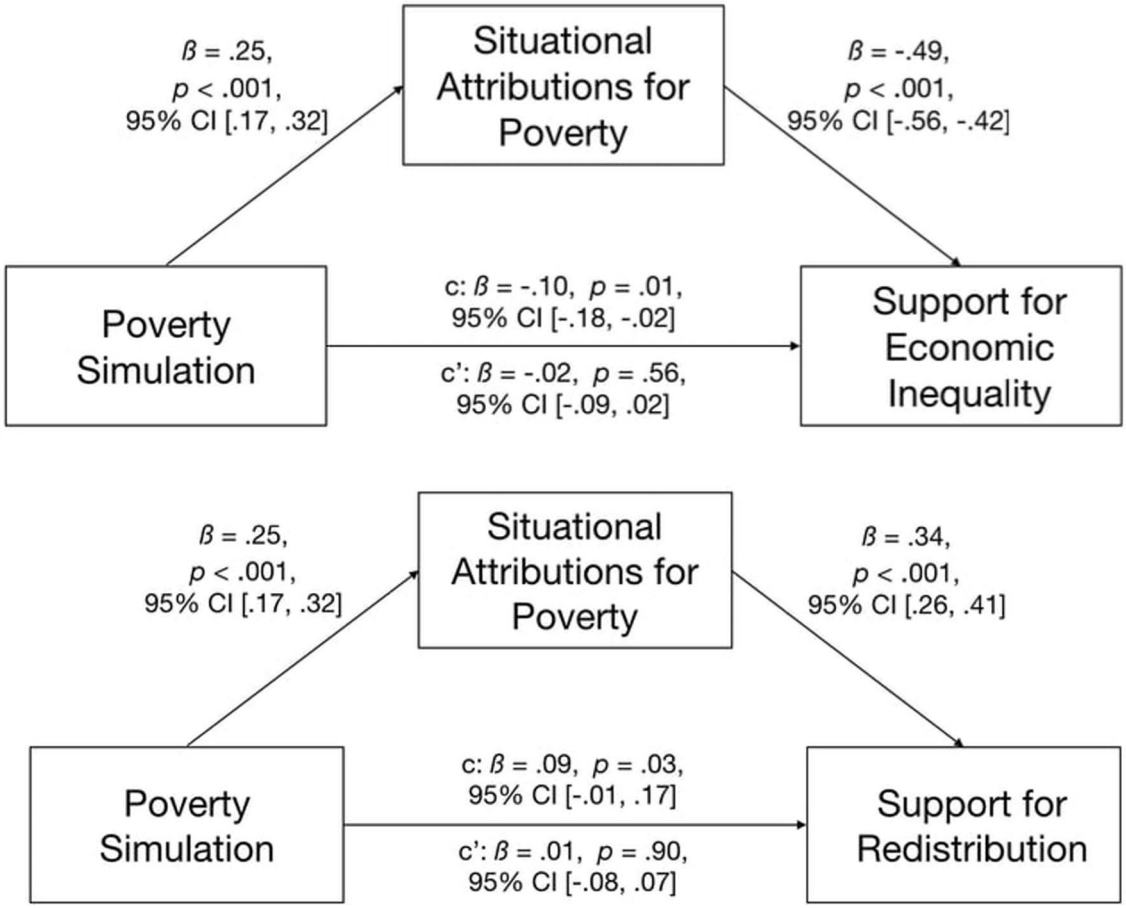
Extended Data Fig. 1 | Effect sizes and standard errors for each dependent variable in Study 4a. * denotes the Guimond et al.[35] measure of attributions for poverty and ** denotes the Nickols and Nielsen[45] measure of attributions for poverty (as reported in the main text).



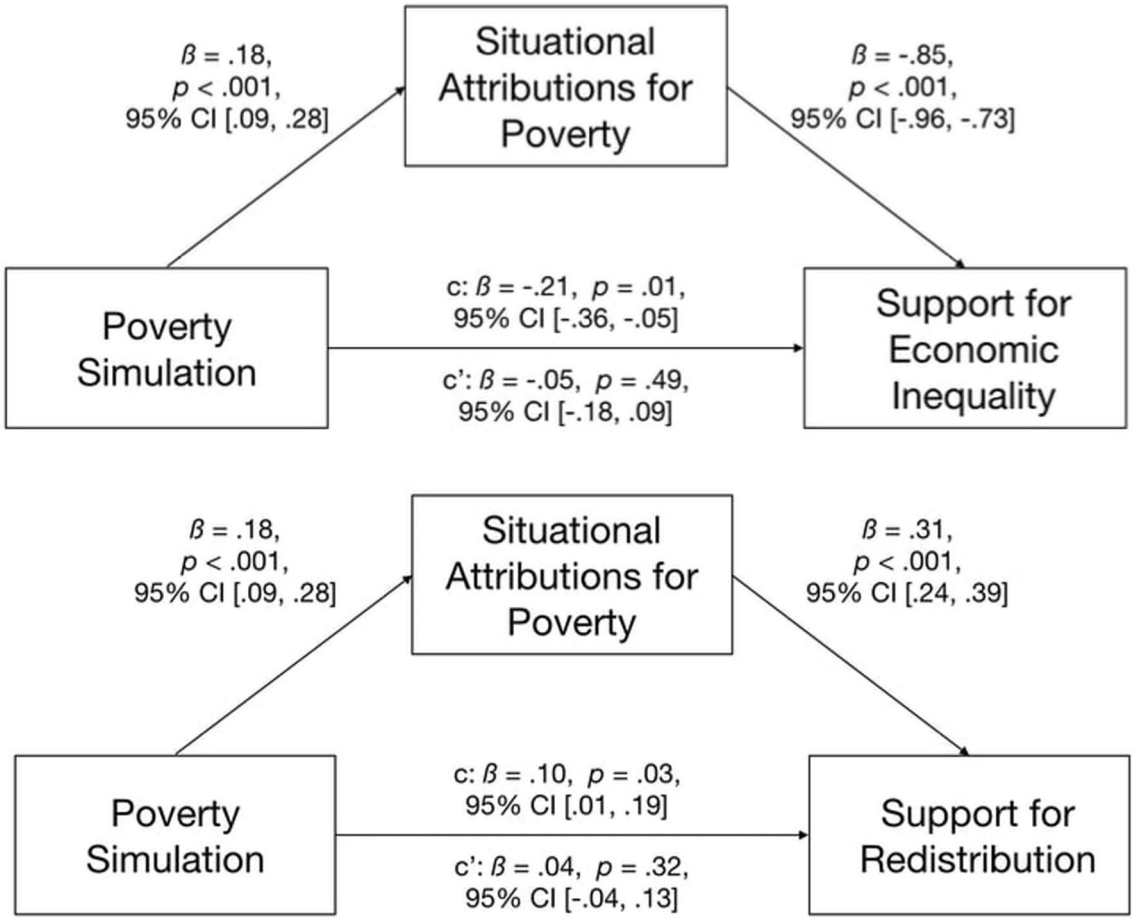
Extended Data Fig. 2 | Study 4a mediation model. Mediation model with the Nickols and Nielsen[45] measure of situational attributions for poverty in Study 4a ($n = 611$). Situational attributions for poverty mediated the effect of the poverty simulation on support for economic inequality.



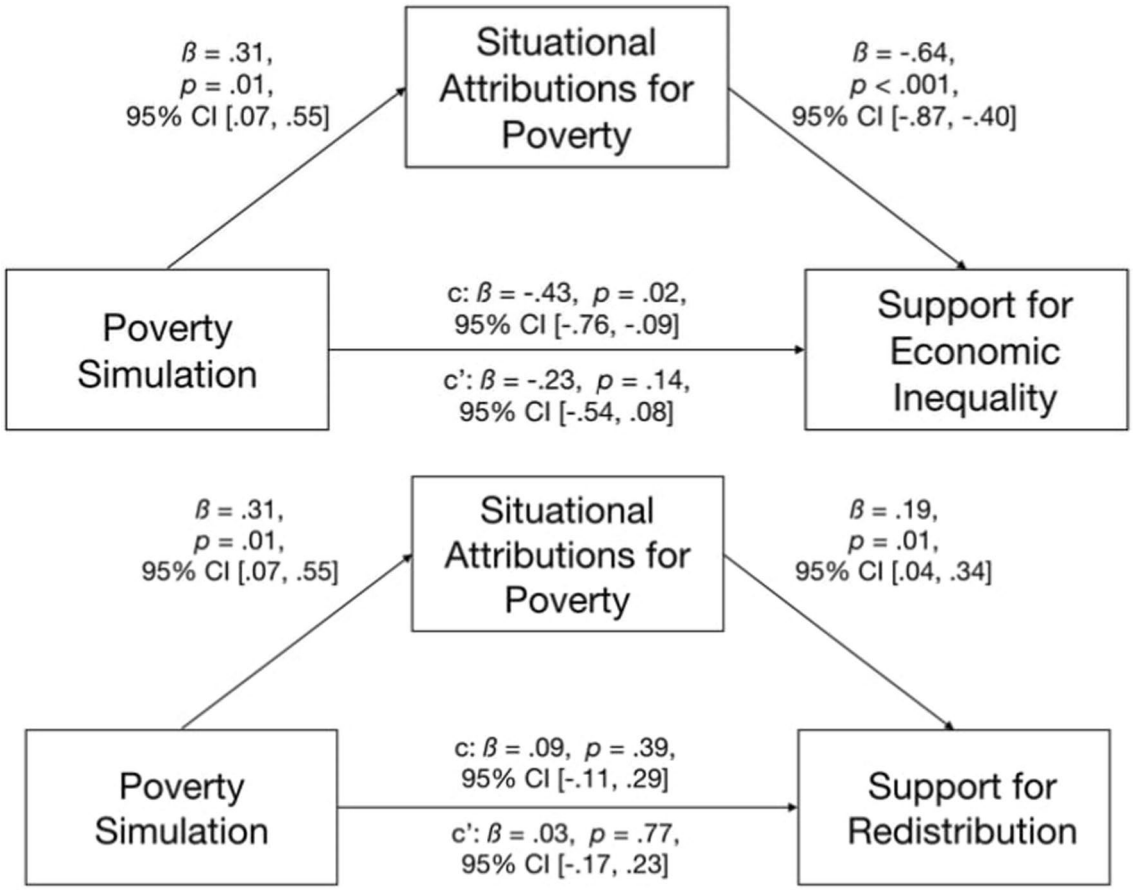
Extended Data Fig. 3 | The effects of SPENT on support for economic inequality over time. Graph illustrating the effects of the poverty simulation (SPENT game) versus no-game control condition on support for economic inequality over days between first (Time 1) and last survey (Time 3; $n = 111$).



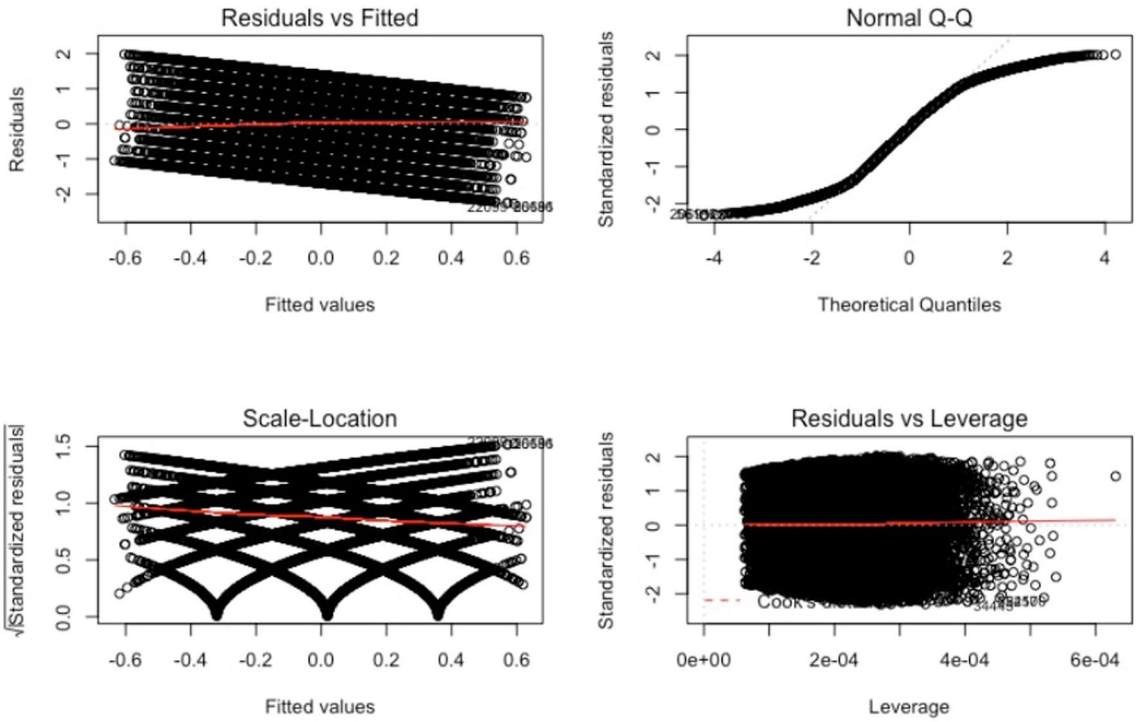
Extended Data Fig. 4 | Study 4b time 1 mediation models. Study 4b mediational models showing that the poverty simulation (SPENT) led to reduced support for economic inequality (top) and increased support for redistribution (bottom) by inducing greater situational attributions for poverty at Time 1 ($n = 611$).



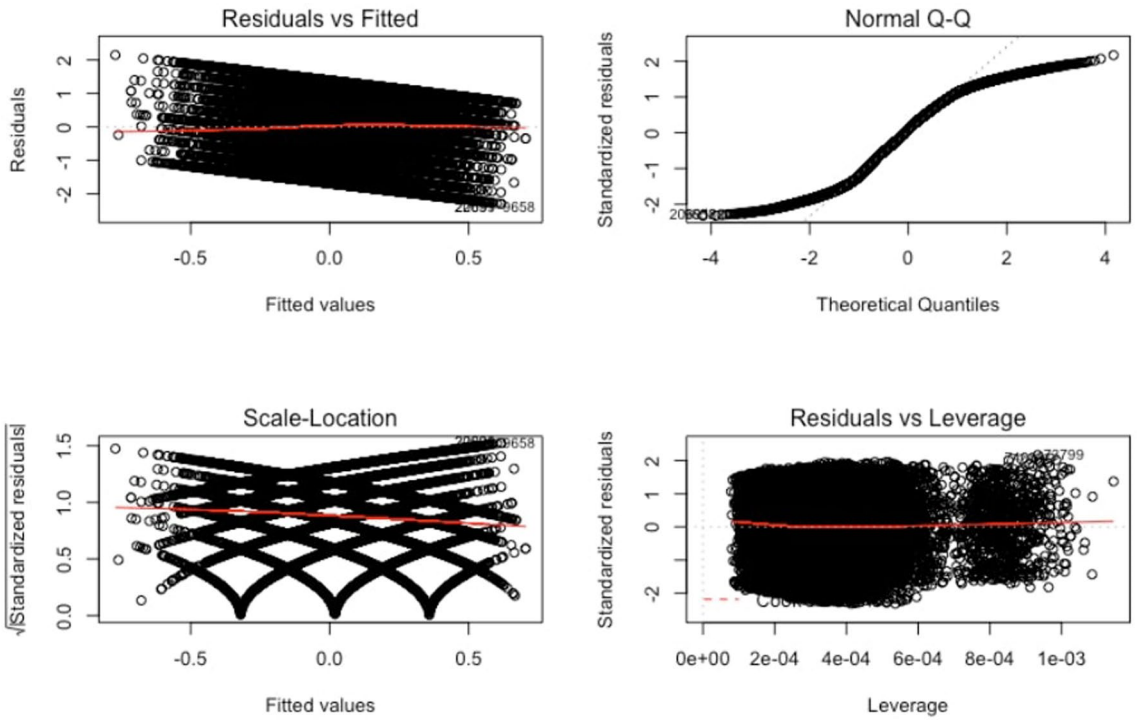
Extended Data Fig. 5 | Study 4b time 2 mediation models. Study 4b mediational models showing that the poverty simulation (SPENT) led to reduced support for economic inequality (top) and increased support for redistribution (bottom) by inducing greater situational attributions for poverty at Time 2 ($n = 555$).



Extended Data Fig. 6 | Study 4b time 3 mediation models. Study 4b mediational models showing that the poverty simulation (SPENT) led to reduced support for economic inequality (top) and increased support for redistribution (bottom) by inducing greater situational attributions for poverty at Time 3 ($n = 110$).



Extended Data Fig. 7 | Visual inspection of regression assumptions for linear regression in Study 1.



Extended Data Fig. 8 | Visual inspection of regression assumptions for multilevel model in Study 1.

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Software and code

Policy information about availability of computer code

Data collection	no software was used
Data analysis	All statistical analyses in Studies 1, 2, 4a, and 4b were conducted using the R programming language and built in packages (R Core Team, 2016) and the R Studio user interface (RStudio Team, 2015). We utilized various additional packages to conduct the following analyses: We computed descriptive statistics using psych (Revelle, 2017), multilevel models using nlme (Pinheiro, Bates, DebRoy, Sarkar, & R Core Team, 2018), effect sizes using effsize (Torchiano, 2016), power analyses using pwr (Champely, 2018), and path analyses using lavaan (Rosseel, 2012). All statistical analyses in Study 3 was conducted using Stata 14.2. All code available via https://osf.io/26aw3/

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Behavioural & social sciences study design

All studies must disclose on these points even when the disclosure is negative.

Study description	five studies, all quantitative
Research sample	samples vary from representative and cross-national samples (studies 1 and 2) to university samples and online adult samples
Sampling strategy	sampling strategy outlined in main text - convenience samples were used with the exception of Study 1 and 2 (representative samples through World Values Survey and Turkprime Panel Services, respectively)
Data collection	computers were used to gather data, researchers were blind to all hypotheses and conditions
Timing	Study 1: There is no start and stop date given archival data Study 2: Collected July 23rd, 2019 Study 3: Collected December 22nd, 2017 to January 12th, 2018 Study 4a - Data Collection ran January 2017 to April 2017 Study 4b - Data Collection ran September 2017 to April 2018
Data exclusions	all exclusions described in main text
Non-participation	all instances of non-participation are described in main text
Randomization	participants were randomly assigned to experimental condition using a computer algorithm

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n/a	Involved in the study
☒	☐ ChIP-seq
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Policy information about studies involving human research participants

Population characteristics	See above.
Recruitment	Study 1 was archival data, thus there was no participant recruitment. Participants in Study 2 were recruited via TurkPrime panel services. Participants in Study 3 were recruited on Amazon's Mechanical Turk. Participants in Studies 4a and 4b were recruited via the psychology student participant pool at a Western Canadian University. There were no opportunities to introduce self-selection or other biases as Studies 1 and 2 were correlation and Studies 3 through 4b utilized random assignment and hypothesis concealment.
Ethics oversight	Study 1 reports analyses from two publicly available data sets that are not individually identifiable, rendering it exempt from IRB review. Study 2 was approved by the Institutional Review Board (IRB) at University of British Columbia, Study 3 was approved by the IRB at University of California, Irvine, and Studies 4a and 4b were approved by the IRB at Simon Fraser University.

Note that full information on the approval of the study protocol must also be provided in the manuscript.