Does Poverty Undermine Cooperation in Multiethnic Settings? Evidence from a Cooperative Investment Experiment

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Abstract

What undermines cooperation in ethnically diverse communities? Scholars have focused on factors that explain the lack of inter-ethnic cooperation, such as prejudice or the difficulty to communicate and sanction across group boundaries. We direct attention to the fact that diverse communities are also often poor, and ask whether poverty, rather than diversity, reduces cooperation. We developed a strategic cooperation game where we vary the income and racial identity of the interaction partner. We find that beliefs about how poor people behave have clear detrimental effects on cooperation: cooperation is lower when people are paired with low-income partners, and the effect is particularly strong when low-income people interact among themselves. We observe additional discrimination along racial lines when the interaction partner is poor. These findings imply that poverty and rising inequality may be a serious threat to social cohesion, especially under conditions of high socio-economic segregation.

Keywords: Cooperation | Poverty | Ethnic Diversity | Cooperative Investment Game | Discrimination

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1 Introduction

Various research findings show that ethnoracially diverse communities have lower levels of social capital and public goods provision than homogeneous communities (Alesina et al., 1999; Costa and Kahn, 2003; Putnam, 2007; Habyarimana et al., 2007; Schaeffer, 2014; Robinson, 2016). A common reason that has been advanced to explain why ethnic heterogeneity may hinder the cooperative capacity of a community is racial prejudice (Allport, 1954; Oliver and Wong, 2003): negative attitudes towards non-coethnics may negatively affect prosocial behavior. Even if no aversion toward non-coethnics exists, other factors may undermine cooperation in ethnically heterogeneous settings, such as differences with regard to norms of cooperation, disagreement over preferred outcomes, or weak social networks and difficulties in communication and social control across ethnic groups (Miguel and Gugerty, 2005; Kimenyi, 2006; Habyarimana et al., 2009; Algan et al., 2016; Lieberman and McClendon, 2013; Enos and Gidron, 2016; Winter and Zhang, 2018). However, others have cautioned that the relationship between diversity and cooperation may also be spurious. Ethnic minorities often have low social status, and ethnically diverse communities are often also poor communities. Thus poverty, rather than ethnoracial diversity, might be at the basis of their lower cooperative capacity (Lawrance, 1991; Sampson et al., 1997; Sampson, 2012; Abascal and Baldassarri, 2015; Gereke et al., 2018).

Research in psychology and economics suggests that poverty produces a specific mind-set: in particular, poor people are affected by 'present-bias', according to which they tend to discount the future more than people who do not live in conditions of chronic disadvantage. Namely, because they constantly face pressing needs (e.g. paying bills, repaying short-term loans) or more essential expenses (e.g. buying food for their children, paying for medical emergencies), poor people tend to value immediate rewards more highly compared to better-off people (Banerjee and Duflo, 2011; Haushofer and Fehr, 2014). Poor people have also been shown to disproportionally experience stress and cognitive burden/attentional capture (Banerjee and Duflo, 2011; Shah et al., 2012; Mani et al., 2013; Mullainathan and Shafir, 2013), which has been associated with lower saving rates (Karlan et al., 2014).[1]

Extending this research to a new domain, we theorize that poverty may have negative effects on cooperative behavior. Community-level cooperation often generates from a series of small,

[1]The causal direction between poverty and present-bias remains moot. While most research points towards a causal effect of poverty on present-bias, we cannot exclude that individuals who exhibit present-bias and high time discounting become poor in part because of these characteristics.

repeated, reciprocal gestures that builds over time into more substantial forms of collective action (Gould, 1993; Kim and Bearman, 1997; Baldassarri, 2015). Poverty challenges this process. People experiencing poverty may be less prone to engage in cooperative behavior because they might discard the future benefits of cooperation, or might make commitments they cannot sustain. In addition, poverty may also affect expectations: poor people might be considered less reliable cooperation partners, and might have fewer opportunities to participate in cooperative endeavors in the first place because others anticipate poor people to be more present-bias and act accordingly (Bechtel and Scheve, 2017).

In order to test this idea, we developed a novel experimental design. Our framework allows us to capture how cooperative decisions are made as a function of an interaction partner's identity. We experimentally vary both the partner's racial identity (Black or White) and their poverty status (rich or poor). In addition, we distinguish between non-strategic behavior due to *aversion toward* racial out-groups and the poor and *strategic discrimination* based on expectations about others' behavior. Strategic interactions are captured with a new two-player behavioral game – the cooperative investment game – while non-strategic behavior is captured with a classic dictator game.

We find evidence of strategic discrimination based on income: poor interaction partners elicit substantially lower cooperation rates. Much of this discrimination is due to participants who are low-income themselves. Race also matters, in particular when the interaction partner is poor. While high-income Blacks command similar levels of cooperation to high-income Whites, low-income Blacks are considered worse cooperation partners than low-income Whites.

2 Research Design and Methods

We conducted our experiment with 1,190 participants whom we recruited on the online crowdsourcing marketplace Amazon Mechanical Turk.[2] The experiment was programmed using oTree (Chen

[2]MTurk respondents are a diverse subject pool with respect to their age, ethnicity and socio-economic status (Mason and Suri, 2011), thus providing a pool that is more diverse than most lab experiments. They are, nonetheless, younger and more highly educated than the overall population, and this likely makes our results a low benchmark for assessing discrimination (cp. Table A9 in the Appendix). Because questions about both ethnicity and income are sensitive, it may help that the online interface affords more anonymity over conventional lab environments. While experiments on convenience samples such as MTurk have raised discussion about the external validity, research comparing results from survey experiments on a nationally representative population-based sample and MTurk have found considerable similarity (Mullinix et al., 2015).

et al., 2016), and we pre-registered our research design and analysis plan with egap.org.[3] Here we present in detail the most important components of our research design. Additional information is available in the Appendix.

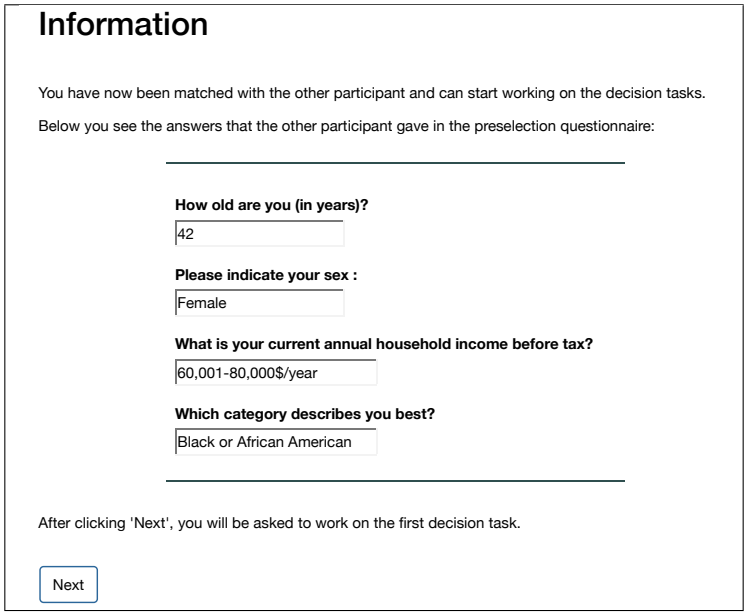

Figure 1: Matching and visualization of partner's profile. Screenshot from the experiment.

2.1 Randomization of Partner's Identity

When relying on observational data, scholars have no control over the intersection of race and socio-economic status, thus making it difficult to disentangle their effect on cooperative behavior. In our experimental framework, we systematically manipulated the identity of our participants' interaction partners. Namely, we randomized the income (alternating between '10,000-20,000$/year' and '60,001-80,000$/year'), race (alternating between 'White' and 'Black or African American') and gender of the interaction partner, while keeping his/her age constant. In particular, participants were first asked to provide socio-demographic information about themselves: their age, sex, household income, and race. They were then matched with another participant and shown their partner's demographic information in the same format used to collect their own information (Figure 1). Using the same format, we aimed at increasing the realism of the experiment while making explicit both the race and social class of the partner. Moreover, by adding information about gender and age we reduced the emphasis on income and race, with the goal of making participants less suspicious about the experimental treatment. This novel procedure overcomes limitations of previous experiments on race, in which the race treatment (e.g. typical Black names) often goes hand in hand with

[3]The pre-analysis plan can be found at https://egap.org/registration/2375.

perceptions of social class (Gaddis, 2014, 2017). Thus we adopted a 2^3 factorial design, in which the partner's profile varied according to gender, economic status, and race.

We are, however, mainly interested in the effect of the partner's income and race on our participants' decision, and thus focus our analysis on the four treatment conditions depicted in Table 1.

Table 1: Treatment conditions of interest and associated sample size

		Partner's Race	
		White	**Black**
Partner's Income	**Poor** ($10–20k)	N=296	N=287
	Rich ($60–80k)	N=316	N=291

2.2 The cooperative investment and dictator games

Participants engaged in two decision tasks with their assigned partner: the cooperative investment game (CIG) and a dictator game (DG). They were presented with these tasks in a random order and were informed about their payoffs only after making both decisions.

The CIG is a two-player ('participant' and 'partner'), strategic cooperation game that has the structure of a stag hunt game (Skyrms, 2004), and includes a time dimension. In the CIG, participants are given an endowment (here, ₵150),[4] and have to decide whether they want to keep the endowment or invest it. If they decide to keep the endowment, participants receive the amount immediately. Investing promises a 33% return on investment (here, a payoff of ₵200) after a two-week wait. However, this return is only realized if their interaction partner chooses to invest too. If the partner chooses *not* to invest, participants lose 20% of their endowment and still have to wait two weeks to receive their reduced payoff of ₵120 (Table 2).[5]

In the CIG, cooperation is the optimal solution if the participant is confident that their partner will cooperate (and believes that the other person also holds this belief). Cooperation tasks have been used before to study strategic discrimination of non-coethnics (Fershtman and Gneezy, 2001; Habyarimana et al., 2007; Enos and Gidron, 2016). Notwithstanding, scholars have tended to consider games that capture the trade-off between individual and group interest, such as prisoner

[4] Amounts were presented to the participants in the artificial currency ₵. $1 corresponds to ₵325. The conversion is done to make amounts and relative differences easier to understand.

[5] Since it is prohibited to implement real-time matching, our participants were matched with a person whose sociodemographic profile corresponds to the partner described in the experiment. The person's decision in the CIG was recorded in a pre-test.

dilemma or public goods games. While in a one-shot prisoner dilemma game the optimal solution is always to defect – defection maximizes individual payoff while inflicting a loss on the partner – in the CIG, an individual's optimal decision crucially depends on his/her expectations about their partner's behavior. Cooperation is the best option if the partner cooperates, while non-cooperation is preferable if the partner does not cooperate. Finally, non-cooperation should not be considered a neutral choice, because it inflicts a cost on the partner in case s/he cooperates.

Table 2: Payoff structure of Cooperative Investment Game (CIG)

		Partner	
		Keep	**Invest**
Participant	**Keep**	100% immediately/ 100% immediately	100% immediately/ 80% in two weeks
	Invest	80% in two weeks/ 100% immediately	133% in two weeks/ 133% in two weeks

The time component likens the CIG to cooperation situations where the reward of a cooperative act accrues at a later point, and makes it sensitive to differences in 'present-bias', the main mechanism through which we expect poverty to affect cooperation. In an extreme scenario, for individuals with high time-discounting rates, the cooperation payoff (133% of the endowment) may be discounted to the point of being lower than the value of the endowment that is received immediately. For such individuals, it is optimal not to invest. Participants in the CIG should thus gauge their partner's time-discounting rate, and how their partner will assess their own time-discounting rate. The game was intentionally constructed this way to provide a measure of cooperation that is sensitive to expectations about the partner's willingness to cooperate, and to reflect the fact that many real-life cooperation situations take time to come to fruition.

The randomization of the partners' profiles allows us to causally assess the impact of a partner's racial identity and economic status on participants' cooperative behavior. Comparing across the four cells of Table 1, we ask whether being matched with a poor Black partner, poor White partner, rich Black partner or rich White partner makes a difference in the way in which people behave in this strategic cooperative situation.[6]

In order to distinguish strategic considerations from aversion towards a partner's economic class or race, we measured prosocial inclination toward the partner with a dictator game (DG), a two-player

[6] Among our participants, 77 individuals (6%) indicated that they were black themselves. Excluding these individuals from the sample marginally decreases the precision of the estimates, but leaves the substantial results reported here unaffected. See Tables A4 and A5.

allocation task that does not entail strategic interaction. This game is traditionally used to measure altruistic behavior (Camerer, 2003), and varying the identity of the recipient makes it possible to assess 'taste-based' discrimination (Becker, 1957; Fershtman and Gneezy, 2001; Whitt and Wilson, 2007; Adida et al., 2014). In the DG, a pair of players is allocated a fixed sum (here, ₵100). One person in the pair is then selected as the decider and has to decide, anonymously, how to split the amount between him/herself and the other player. In our experiment, all participants were assigned the role of the decider. If our participants held negative sentiments towards Blacks or the poor, we would expect overall levels of contributions in the DG to be lower when participants are matched to partners from these categories.[7] Since participants were matched to the same partner for the DG and CIG, contributions in the DG can also be used as a control for prosociality in the analysis of CIG behavior, thus strengthening our interpretation of behavior in the CIG as driven by strategic considerations rather than non-strategic considerations.[8]

3 Hypotheses and Results

3.1 Hypotheses

Our main hypotheses concern the causal effect of the partner's identity – namely his/her race and economic status – on our participants' cooperative behavior in the CIG. First of all, we expect that participants matched with a poor partner will be less likely to invest.

Hp 1: Participants invest at lower rates in the CIG when matched with a low-income rather than high-income partner.

Based on arguments made in observational research on the negative effects of ethnoracial diversity, we also expect that:

Hp 2: Participants invest at lower rates in the CIG when matched with a Black rather than White partner.

[7] The resulting dictator allocations were given to individuals in our sample that fit the profile of the interaction partner. These payments were made after the conclusion of the data collection.

[8] In the experiment the DG and the CIG were presented in random order. That is, about half of our participants (n=579) engaged in the CIG first and then in the DG, while the other half (n=611) first played the DG, and then the CIG. All our models include a dummy variable controlling for the order of games played, which in no case is statistically significant.

Apart from testing these general hypotheses, we seek to determine whether differences in behavior are likely to be driven by distaste/dislike, or by strategic considerations. If lower levels of cooperation with poor people and ethnic minorities are due to taste (e.g. dislike of Blacks, belief of poor people as undeserving etc.), we would find evidence in terms of lower contributions to poor and Black partners in the DG. If, instead, cooperative behavior is mainly based on specific expectations about the strategic behavior of minorities and poors, then we would not see discrimination in non-strategic interactions like the DG, even though we would observe it in the strategic CIG.

Hp 3: If differences in behavior are driven by 'distaste', participants will discriminate against poor or Black partners in the DG.

3.2 Results

We start our analysis by ruling out this last hypothesis (Hp 3). In regressions of the amounts sent in the DG on the partner's income status and race (reported in Table A1 in the Appendix), we find little evidence for taste-based discrimination. In line with other studies of the US population that have used the DG (Fong and Luttmer, 2011; Abascal, 2015), we find that our participants sent virtually identical amounts to Black and White partners. Along the income dimension, we find that our participants give slightly *more* to poor partners (3% points) – although this difference is only marginally statistically significant, and does not hold up when controlling for pre-treatment controls. We therefore believe that taste-based discrimination plays a minor role in our experimental setting.

Next, we turn our attention to behavior in the CIG with the binary outcome 'invest'/'not invest'. Unlike the DG, this is a strategic cooperation setting where expectations about the partner's behavior factor in when deciding about one's own behavior. Results from linear probability models are reported in Table 3.[9] Looking first at the race-dimension (Hp 2), we see that the proportion of participants who invest in the CIG when matched with a White partner is 47.5%. This proportion is somewhat lower (minus 3.6% points) when participants are matched with Black partners, but the difference is not statistically significant at conventional levels (Table 3, Model 1). Controlling for pre-treatment covariates of participants (sex, age, race, education, income, household size, occupation), as stipulated in the pre-analysis plan, does not improve the precision of the estimates (Table 3, Model 2).

[9]OLS is used for ease of interpretation; logit and probit models produce virtually identical results.

Table 3: Regression of investment behavior on treatment conditions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)		
Income class player							*Low*	*Middle*	*High*
High income partner			0.037	0.051**	0.061***		0.114**	-0.008	0.042
			(0.024)	(0.023)	(0.021)		(0.046)	(0.053)	(0.031)
Partner Black	-0.036	-0.031							
	(0.025)	(0.026)							
High income × partner White						ref.			
High income × partner Black						-0.015			
						(0.043)			
Low income × partner White						-0.036			
						(0.037)			
Low income × partner Black						-0.081**			
						(0.031)			
Constant	0.475***	0.427***	0.439***	0.384***	0.254***	0.441***	0.519***	0.281	0.341
	(0.014)	(0.044)	(0.016)	(0.053)	(0.046)	(0.038)	(0.096)	(0.304)	(0.252)
Demographic controls	–	yes	–	yes	yes	yes	yes	yes	yes
DG behavior	–	–	–	–	yes	–	–	–	–
N	1,190	1,190	1,190	1,190	1,190	1,190	382	388	420

OLS regression; DV: Participant invested in the CIG; Model 1 and 3: No controls; Model 2 and 4: Demographic controls as per pre-analysis plan; Model 5: Demographic controls and prosocial behavior as recorded in DG; Model 6: Effects for the four combinations of poverty status and race, white high-income partners as reference category; Model 7: Treatment effects for different income groups; Standard errors in parentheses,* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

In contrast, playing the game with a rich as compared to a poor partner is associated with a 3.7% points higher share of respondents that choose to invest—a difference that increases to 5.1% points and is statistically significant when controlling for pre-treatment demographics (Table 3, Models 3 and 4). Model 5 additionally controls for the amount passed on in the DG. DG donations are not strictly pre-treatment, so this estimate is merely exploratory. Nevertheless, it is conceptually informative: the estimate in Model 5 can be considered the effect of strategic considerations net of the effect of 'taste'. As can be seen, the coefficient is larger in size and more precisely estimated, reinforcing the point that, if anything, 'taste' reduces discrimination in the CIG.

Both treatment conditions were randomly assigned, meaning our design allows us to provide causal estimates of the simultaneous effect of race and income. For this purpose, we coded a categorical variable that takes four values for White & high-income, White & low-income, Black & high-income, and Black & low-income interaction partners. White high-income partners serve as the reference category. Results are presented in Table 3, Model 6, and Figure 2, which plots margins for each partner-category. Here we see that participants generally invest less when their partner is poor, but that this effect is amplified when the partner is Black. High-income Blacks elicit 6.5% points higher cooperation rates than low-income Blacks (p=0.051) while for White

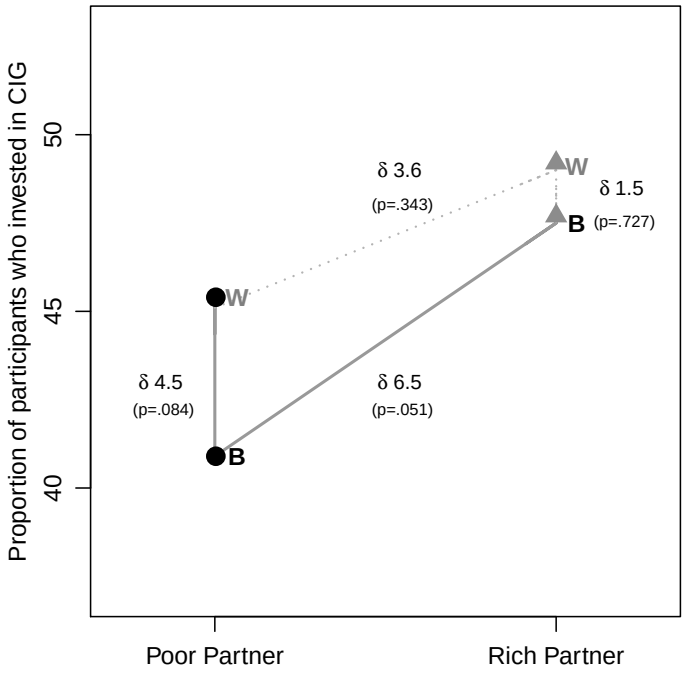

Figure 2: Effects of the combination of the partner's income and race on cooperation in the CIG. Marginal effects from OLS regression as in Table 3, Model 4. Investment decisions when matched with 'Poor Partners' depicted as black circles, when matched with 'Rich Partners' as grey triangles; W stands for 'White Partner', B for 'Black Partner'. Indicated p-values are for pairwise comparisons. Solid lines indicate differences that are significant at p<0.1, dotted lines differences that are not statistically significant at conventional levels.

partners, the difference is a more modest 3.6%, and not statistically significant at conventional levels (p=0.343). That is, the cooperation-reducing effect of poverty is only fully visible when the partner is Black. The figure also shows that low-income Black participants elicit lower cooperation rates overall than low-income White participants. Low-income Blacks are 4.5% points less likely to elicit cooperation than low-income Whites, a difference that is marginally statistically significant (p=0.084).

We conclude our analysis by looking at who is strategically discriminating against the poor. We divide our participants in three income categories, low-income (no income-$30,000), middle-income ($30,001-$60,000), and high-income ($60,001-$100,000 or more), and analyze their respective behavior when matched with low- or high-income partners (Figure 3). We find that most of the discrimination against poor partners is enacted by participants who are low-income themselves: participants making less than $30,000 display a 11.4% points difference in cooperation levels when matched with a high- versus low-income partner (p=0.022). The gap is much smaller, and

non-significant, among middle-income (-0.8% points, p=0.881) and high-income (4.2% points, p=0.196) participants.[10]

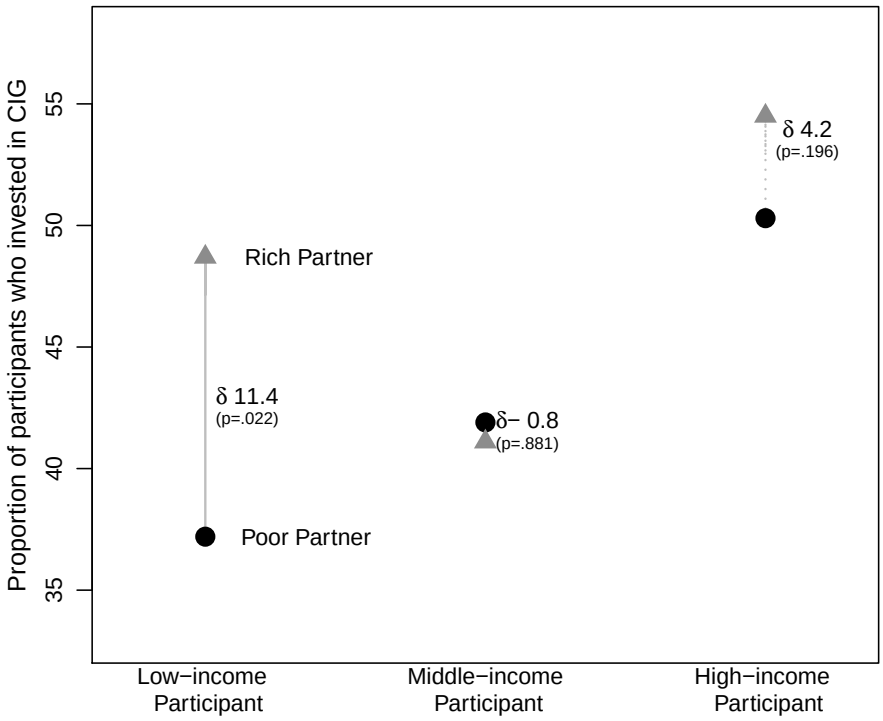

Figure 3: Effect of the partner's income status (Rich or Poor) on the investment behavior in the CIG for different income categories of participants. Marginal effects from OLS regression as in Table 3, Model 7. Black circles report participants' investment decisions when matched with 'Poor Partners', grey triangles for 'Rich Partners'. Indicated p-values are for pairwise comparisons. Solid lines indicate differences that are significant at p<0.1, dotted lines differences that are not statistically significant at conventional levels.

We point out that the true effects of this finding are multiplicative. To calculate the probability for cooperation to take place in the CIG, the propensity to invest of *both interaction partners* has to be taken into account. Thus, in our game, if a high-income participant encounters another rich partner, the probability of a successful investment is 30%. If a high-income participant encounters a poor partner, this probability lowers to 24%. And if a low-income participant encounters another poor participant, it is 14% – less than *half* that of an encounter between two high-income participants.

Our experiment does not allow us to point to the exact source of this strategic discrimination of the poor against the poor. Our initial intuition was inspired by a literature that suggests that the poor are often present-biased. We find, however, that poorer participants do not invest less in general –

[10] In a sensitivity analysis in the Appendix, we show that this finding does not rely on the particular cutoff chosen. There is substantial strategic discrimination among all participants earning less than $40,000, while the picture is more mixed among those earning more.

indeed when they are paired with a rich interaction partner, their investment rates are no different from those of rich participants. Nonetheless, it appears that poorer respondents *believe other poor people to be present-biased* and therefore discriminate against them.

Tentative evidence for this interpretation comes from an additional test that we conducted on a reduced sample (n=222).[11] We removed the time dimension from the CIG, holding all other aspects of the experimental setup constant. That is, in this version, players did not have to wait two weeks for the investment to be paid out. Removing the time dimension almost doubled the investment rate. More importantly, no discrimination against rich or poor partners was observable, neither among wealthier nor among poorer participants. It thus appears that participants take close notice of the time aspect of the game, and consider how the wait will influence the likelihood to invest by a specific partner.

While we can exclude that mere inter-group animus is at the root of the discriminatory behavior, and have produced evidence that perceptions of the partner's cooperative inclinations are important, we cannot entirely rule out that other/additional reasons govern the behavior of our participants.[12] Teasing out the exact cause of the strategic discrimination behavior remains an important task for future research.

4 Discussion

What undermines cooperation in diverse communities? Understandably, scholars' attention has converged on the factors that make inter-ethnic relationships difficult, from prejudice to weaker sanctioning capacity. Here we switched our attention to a factor that many diverse communities have in common: poverty. Building on findings on the effects of poverty, we explore the possibility that material distress may undermine cooperative efforts.

Through a strategic game that captures the nature of the cooperative dilemma in multiethnic settings we examined the effects of income and race on strategic cooperation. We find evidence for strategic discrimination against the poor, especially against poor Blacks, while rich Blacks command the same amount of cooperation than rich Whites. Intriguingly, strategic discrimination against the poor

[11] The full results of this test are reported in Tables A6 and A7 in the Appendix.

[12] For instance, there is evidence of a penalty for Blacks among middle-income participants, and, although not significant, among low-income participants. See Table A8 and Figure A1 in the Appendix.

is enacted by other poor people. This discriminatory behavior does not seem to be motivated by a simple dislike of ethnic minorities or the poor. Rather, expectations and stereotypes about foresight and lower strategic outlook among the poor and poor Blacks in particular appear to explain the findings. This explanation is tentative, however, and in need of more rigorous testing.

What are the implications of our findings? First, economic disadvantage, more than ethnic diversity, might be at the basis of lower levels of cooperation in contemporary societies. Since minority status and economic disadvantage are often associated, it is possible that the lower levels of cooperation that we observe in ethnoracially diverse communities are not exclusively related to ethnicity, but rather due to expectations about the short time-horizon of poor people. However, we caution that our findings across racial lines (Black and White) in the US may not extend to other ethnic groups or to immigrants, or to other countries with a different history of racial or ethnic marginalization. More work is needed to determine whether the mechanism we identified here also applies in other contexts where ethnicity and poverty are entwined.

Second, our research design highlighted the extent to which cooperation is contingent on the identity of the interaction partners. Thus, to fully appreciate how individual actions scale up into group-level outcomes – i.e., community-level cooperation – we must consider the social composition of the environment where individuals operate. In particular, the US has remarkable and persisting levels of geographic segregation (Massey, 1990; Sampson, 2012; Logan, 2013), and, as a consequence, social interactions are very homogeneous along racial and income lines. That the strategic discrimination of the poor is mostly engendered by other low-income people is therefore a result that is particularly worrisome for cooperation, due to the multiplicative depressive effect that this might have on diverse communities. Growing levels of inequality (Piketty and Saez, 2014) add to this scenario, enlarging the pool of people that might experience the negative consequences of poverty. In this perspective, policies oriented at lifting people from chronic poverty might not only improve their economic conditions but also the cooperative capacity of their communities.

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Appendix

A Sample and payment

The data was collected on the Amazon's Mechanical Turk platform in 22 sessions in February and March 2017. To ensure the quality of responses (Peer et al., 2014), we restricted our recruitment to workers who had performed at least 100 tasks and had an approval rating of over 85%. We recruited 1,247 subjects.

After they gave their informed consent, participants were presented with the following tasks: i) a questionnaire inquiring their age, sex, income category and race, ii) the cooperative investment game (CIG), iii) the dictator game (DG), iv) a test asking to recall characteristics (sex, income category, race) of their interaction partner, v) questions inquiring the motives for their decision in the behavioral tasks, and vi) a questionnaire with additional socio-demographic information (marital status, parental status, number of dependent children, self-reported risk aversion). To minimize cross-contamination, the order of games ii) and iii) was randomized.

We took a few steps to improve the quality of our analysis. First, we control for the order in which games were presented in our regression models. (We do not find any order effect). Second, in response to our open questions about their motivations in the behavioral tasks, most participants mentioned the payoff that would be optimal for them, stated their beliefs with regard to the motives of their interaction partner and/or his/her socio-economic condition. However, 57 individuals explicitly stated that they did not believe that their interaction partner was real. We excluded these individuals from the analysis, thus leading to a final sample of 1,190 subjects. Including these observations in the data does not qualitatively change the results, but decreases the precision of estimates. Third, to control for potential session-specific effects, we cluster standard errors at the session level in all models.

Participants received a fixed payment of \$0.20, and a variable payment from the dictator game and cooperative investment game of \$0.32–\$0.80. Overall, participants earned an average of \$0.78 for a task that took them about 6 minutes. Thus, the average payment per hour was around \$7.80, slightly more than the US federal minimum wage of \$7.25.

B Additional results

Table A1: Regression of dictator game donation on treatment conditions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)		
Income class player							*Low*	*Middle*	*High*
High income partner			-0.029*	-0.024	-0.030*		-0.014	-0.022	-0.029
			(0.016)	(0.017)	(0.016)		(0.029)	(0.024)	(0.033)
Partner Black	-0.005	-0.003							
	(0.011)	(0.011)							
High income × partner White						ref.			
High income × partner Black						-0.007			
						(0.017)			
Low income × partner White						0.021			
						(0.025)			
Low income × partner Black						0.021			
						(0.013)			
Constant	0.350***	0.277***	0.362***	0.289***	0.248***	0.269***	0.356***	0.262***	0.342***
	(0.012)	(0.022)	(0.011)	(0.024)	(0.022)	(0.026)	(0.048)	(0.084)	(0.083)
Demographic controls	–	yes	–	yes	yes	yes	yes	yes	yes
CIG investment	–	–	–	–	yes	–	–	–	–
N	1,190	1,190	1,190	1,190	1,190	1,190	382	388	420

OLS regression; DV: Share of endowment passed on to partner in DG; Model 1 and 3: No controls; Model 2 and 4: Demographic controls as per pre-analysis plan; Model 5: Demographic controls and prosocial behavior, simultaneously controlling for decision in CIG; Model 6: Interaction with white/black partner; Model 7: Treatment effects for different income groups; Standard errors in parentheses,* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A2: Regression of dictator game donation on treatment conditions – Full results for Table A1

	(1)	(2)	(3)	(4)	(5)	(6)	(7)		
Income class player							*Low*	*Middle*	*High*
High income partner			-0.029*	-0.024	-0.030*		-0.014	-0.022	-0.029
			(0.016)	(0.017)	(0.016)		(0.029)	(0.024)	(0.033)
Partner Black	-0.005	-0.003							
	(0.011)	(0.011)							
High income × White (ref.)									
High income × Black						-0.007			
						(0.017)			
Low income × White						0.021			
						(0.025)			
Low income × Black						0.021			
						(0.013)			
27-32 years (ref.)									
18-26 years		0.015		0.015	0.011	0.014	0.001	0.058	-0.014
		(0.028)		(0.028)	(0.026)	(0.028)	(0.036)	(0.035)	(0.030)
33-41 years		0.042		0.039	0.033	0.039	0.023	0.049	0.040
42+ years		0.046		0.044	0.039	0.044	0.036	0.058	0.030
		(0.028)		(0.028)	(0.027)	(0.028)	(0.031)	(0.045)	(0.034)
White (ref.)									
Black/African American		0.038*		0.039*	0.048**	0.038*	0.060	0.007	0.043
		(0.021)		(0.021)	(0.020)	(0.022)	(0.049)	(0.033)	(0.031)
Hispanic		-0.032		-0.031	-0.021	-0.031	0.012	-0.067	-0.071
		(0.037)		(0.038)	(0.034)	(0.037)	(0.071)	(0.041)	(0.046)
Asian		-0.032		-0.030	-0.034	-0.030	0.004	-0.081*	-0.015
		(0.027)		(0.027)	(0.026)	(0.027)	(0.072)	(0.042)	(0.060)
Other		0.049		0.044	0.038	0.045	-0.014	0.035	0.101**
		(0.039)		(0.039)	(0.035)	(0.039)	(0.115)	(0.087)	(0.046)
College degree (ref.)									
High school		0.013		0.014	0.023	0.014	-0.051*	0.056**	0.055
		(0.022)		(0.022)	(0.021)	(0.022)	(0.029)	(0.020)	(0.033)
Master's or further		0.009		0.008	0.000	0.008	-0.059	0.052	0.010
		(0.019)		(0.019)	(0.019)	(0.019)	(0.068)	(0.039)	(0.028)
Annual HH income		-0.002		-0.002	-0.003	-0.002	-0.024*	0.003	-0.008
		(0.005)		(0.005)	(0.005)	(0.005)	(0.013)	(0.019)	(0.013)
Household size		0.011		0.011	0.010	0.011	0.011	0.020	0.006
		(0.006)		(0.006)	(0.006)	(0.007)	(0.011)	(0.016)	(0.008)
Parent		-0.002		-0.001	0.010	-0.001	0.038	-0.061	0.016
		(0.018)		(0.019)	(0.018)	(0.019)	(0.024)	(0.036)	(0.031)
Full/part-time work (ref.)									
Housework		0.027		0.025	0.012	0.024	0.034	-0.014	0.031
		(0.020)		(0.020)	(0.019)	(0.020)	(0.042)	(0.040)	(0.030)
Retired		0.040		0.041	0.055	0.041	0.083	0.038	0.031
		(0.046)		(0.044)	(0.045)	(0.045)	(0.067)	(0.096)	(0.056)
Unemployed/other		0.021		0.021	0.022	0.020	0.043*	-0.036	-0.011
		(0.025)		(0.024)	(0.021)	(0.024)	(0.025)	(0.039)	(0.045)
CIG presented before DG		-0.013		-0.013	-0.012	-0.013	-0.005	-0.030	-0.007
		(0.012)		(0.012)	(0.012)	(0.012)	(0.018)	(0.027)	(0.019)
Constant	0.350***	0.277***	0.362***	0.289***	0.248***	0.269***	0.356***	0.262***	0.342***
	(0.012)	(0.022)	(0.011)	(0.024)	(0.022)	(0.026)	(0.048)	(0.084)	(0.083)
N	1,190	1,190	1,190	1,190	1,190	1,190	382	388	420

OLS regression; DV: Share of endowment passed on to partner in DG; Model 1 and 3: No controls; Model 2 and 4: Demographic controls as per pre-analysis plan; Model 5: Demographic controls and prosocial behavior, simultaneously controlling for decision in CIG; Model 6: Interaction with white/black partner; Model 7: Treatment effects for different income groups; Standard errors in parentheses,* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A3: Regression of cooperative investment game behavior on treatment conditions – Full results for Table 3

	(1)	(2)	(3)	(4)	(5)	(6)	(7)		
Income class player							*Low*	*Middle*	*High*
High income partner			0.037	0.051**	0.061***		0.114**	-0.008	0.042
			(0.024)	(0.023)	(0.021)		(0.046)	(0.053)	(0.031)
Partner Black	-0.036	-0.031							
	(0.025)	(0.026)							
High income × White (ref.)									
High income × Black						-0.015			
						(0.043)			
Low income × White						-0.036			
						(0.037)			
Low income × Black						-0.081**			
						(0.031)			
27-32 years (ref.)									
18-26 years		0.034		0.037	0.030	0.036	0.068	0.014	0.004
		(0.037)		(0.037)	(0.031)	(0.037)	(0.086)	(0.063)	(0.062)
33-41 years		0.052		0.058	0.041	0.059	0.044	0.076	0.025
		(0.037)		(0.037)	(0.028)	(0.037)	(0.079)	(0.060)	(0.074)
42+ years		0.046		0.049	0.029	0.048	0.088	0.037	-0.017
		(0.030)		(0.031)	(0.030)	(0.031)	(0.072)	(0.063)	(0.065)
White (ref.)									
Black/African American		-0.086*		-0.088*	-0.105**	-0.086*	-0.126	-0.044	-0.075
		(0.046)		(0.046)	(0.043)	(0.048)	(0.102)	(0.103)	(0.129)
Hispanic		-0.087		-0.090	-0.077	-0.090	-0.042	-0.151*	-0.107
		(0.065)		(0.066)	(0.059)	(0.066)	(0.075)	(0.077)	(0.137)
Asian		0.038		0.036	0.049	0.035	-0.043	0.114*	0.016
		(0.045)		(0.044)	(0.044)	(0.043)	(0.072)	(0.065)	(0.111)
Other		0.047		0.057	0.037	0.053	-0.116	0.070	0.162
		(0.090)		(0.089)	(0.083)	(0.091)	(0.224)	(0.192)	(0.106)
College degree (ref.)									
High school degree		-0.084**		-0.086***	-0.092***	-0.085***	-0.056	-0.052	-0.166***
		(0.030)		(0.029)	(0.026)	(0.030)	(0.055)	(0.062)	(0.047)
Master's or further		0.073		0.075	0.071	0.075	0.021	0.103	0.051
		(0.061)		(0.060)	(0.058)	(0.060)	(0.120)	(0.123)	(0.065)
Annual HH income		0.009		0.009	0.009	0.009	-0.081**	0.022	0.035
		(0.006)		(0.006)	(0.006)	(0.006)	(0.036)	(0.055)	(0.027)
Household size		0.009		0.009	0.004	0.009	0.002	0.030	-0.002
		(0.010)		(0.010)	(0.010)	(0.010)	(0.022)	(0.023)	(0.025)
Parent		-0.105**		-0.108**	-0.108***	-0.107**	-0.035	-0.165**	-0.108
		(0.039)		(0.039)	(0.036)	(0.040)	(0.063)	(0.071)	(0.076)
Full/part-time work (ref.)									
Housework		0.109**		0.117**	0.105**	0.115**	-0.041	0.090	0.242***
		(0.051)		(0.050)	(0.048)	(0.050)	(0.086)	(0.091)	(0.081)
Retired		-0.131*		-0.133*	-0.151*	-0.136*	-0.229	-0.038	-0.098
		(0.073)		(0.073)	(0.077)	(0.072)	(0.175)	(0.153)	(0.142)
Unemployed/other		-0.018		-0.016	-0.026	-0.016	-0.055	-0.056	-0.061
		(0.041)		(0.042)	(0.035)	(0.042)	(0.046)	(0.080)	(0.068)
CIG presented before DG		-0.012		-0.011	-0.005	-0.010	0.029	-0.017	-0.045
		(0.025)		(0.025)	(0.025)	(0.025)	(0.048)	(0.046)	(0.047)
Constant	0.475***	0.427***	0.439***	0.384***	0.254***	0.441***	0.519***	0.281	0.341
	(0.014)	(0.044)	(0.016)	(0.053)	(0.046)	(0.038)	(0.096)	(0.304)	(0.252)
N	1,190	1,190	1,190	1,190	1,190	1,190	382	388	420

OLS regression; DV: Participant invested in the CIG; Model 1 and 3: No controls; Model 2 and 4: Demographic controls as per pre-analysis plan; Model 5: Demographic controls and prosocial behavior as recorded in DG; Model 6: Interaction with white/black partner; Model 7: Treatment effects for different income groups; Standard errors in parentheses,* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

B.1 Non-black participants only

Table A4: Regression of investment behavior on treatment conditions, excluding Black participants

	(1)	(2)	(3)	(4)	(5)	(6)	(7)		
Income class player							*Low*	*Middle*	*High*
High income partner			0.029	0.041*	0.051**		0.100*	-0.024	0.033
			(0.022)	(0.021)	(0.019)		(0.052)	(0.048)	(0.030)
Partner Black	-0.039	-0.031							
	(0.028)	(0.029)							
High income × partner White						ref.			
High income × partner Black						-0.013			
						(0.053)			
Low income × partner White						-0.023			
						(0.042)			
Low income × partner Black						-0.074**			
						(0.030)			
Constant	0.482***	0.432***	0.449***	0.394***	0.262***	0.440***	0.532***	0.297	0.319
	(0.014)	(0.047)	(0.015)	(0.053)	(0.049)	(0.043)	(0.096)	(0.279)	(0.261)
Demographic controls	–	yes	–	yes	yes	yes	yes	yes	yes
DG behavior	–	–	–	–	yes	–	–	–	–
N	1,113	1,113	1,113	1,113	1,113	1,113	354	358	401

OLS regression; DV: Participant invested in the CIG; Model 1 and 3: No controls; Model 2 and 4: Demographic controls as per pre-analysis plan; Model 5: Demographic controls and prosocial behavior as recorded in DG; Model 6: Interaction with white/black partner; Model 7: Treatment effects for different income groups; Standard errors in parentheses,* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A5: Regression of dictator game donation on treatment conditions, excluding Black participants

	(1)	(2)	(3)	(4)	(5)	(6)		(7)	
Income class player							*Low*	*Middle*	*High*
High income partner			-0.028*	-0.022	-0.027		-0.003	-0.031	-0.030
			(0.015)	(0.017)	(0.016)		(0.027)	(0.027)	(0.035)
Partner Black	-0.004	-0.002							
	(0.012)	(0.012)							
High income × partner White						ref.			
High income × Black						-0.009			
						(0.018)			
Low income × White						0.016			
						(0.024)			
Low income × Black						0.020			
						(0.013)			
Constant	0.346***	0.281***	0.359***	0.292***	0.249***	0.274***	0.363***	0.252***	0.336***
	(0.012)	(0.022)	(0.011)	(0.024)	(0.023)	(0.026)	(0.049)	(0.085)	(0.087)
Demographic controls	–	yes	–	yes	yes	yes	yes	yes	yes
CIG investment	–	–	–	–	yes	–	–	–	–
N	1,113	1,113	1,113	1,113	1,113	1,113	354	358	401

OLS regression; DV: Share of endowment passed on to partner in DG; Model 1 and 3: No controls; Model 2 and 4: Demographic controls as per pre-analysis plan; Model 5: Demographic controls and prosocial behavior, simultaneously controlling for decision in CIG; Model 6: Interaction with white/black partner; Model 7: Treatment effects for different income groups; Standard errors in parentheses,* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

B.2 Replication without time dimension

This section presents an additional test answering to the question what happens if the the CIG is played without the time dimension, i.e. omitting the two-week wait for the cooperative outcome to materialize, but rather offering immediate payout. In this case, the game structurally conforms with a typical stag hunt game, where it is optimal for a participant to cooperate as long as s/he believes that his/her partner will also cooperate.

Table A6: Regression of investment behavior on treatment conditions in the modified version of the CIG without time dimension

	(1)	(2)	(3)	(4)	(5)	(6)	(7)		
Income class player							*Low*	*Middle*	*High*
High income partner			0.000	-0.027	-0.005		0.013	-0.029	-0.076
			(0.069)	(0.072)	(0.076)		(0.106)	(0.139)	(0.145)
Partner Black	0.058	0.063							
	(0.048)	(0.053)							
High income × partner White						ref.			
High income × Black						0.019			
						(0.097)			
Low income × White						-0.016			
						(0.056)			
Low income × Black						0.088			
						(0.080)			
Constant	0.771***	0.820***	0.802***	0.861***	0.729***	0.822***	1.070***	0.272	1.162***
	(0.050)	(0.097)	(0.059)	(0.069)	(0.089)	(0.106)	(0.154)	(0.517)	(0.283)
Demographic controls	–	yes	–	yes	yes	yes	yes	yes	yes
DG behavior	–	–	–	–	yes	–	–	–	–
Observations	222	220	222	220	220	220	68	87	65

OLS regression; DV: Participant invested in the CIG; Model 1 and 3: No controls; Model 2 and 4: Demographic controls as per pre-analysis plan; Model 5: Demographic controls and prosocial behavior as recorded in DG; Model 6: Interaction with white/black partner; Model 7: Treatment effects for different income groups; Standard errors in parentheses,* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

We can see that taking out the time dimension from the CIG (Table A6) almost doubles the cooperation rate. Without the time dimension, there is no evidence that the partner partners induce lower cooperation rates among participants, and the racial identity of the partner no longer negatively influences the participants' investment decision. This suggests that it is indeed the anticipation of the present-bias by the interaction partner that can explain our results.

It should also be noted that the behavior in the dictator game (Table A7) closely resembles that of the main experiment, increasing the confidence that the above results are not driven by strong differences in the composition of the sample.

Table A7: Regression dictator game donation on treatment conditions in the modified version of the CIG without time dimension

	(1)	(2)	(3)	(4)	(5)	(6)	(7)		
Income class player							*Low*	*Middle*	*High*
High income partner			-0.037	-0.055	-0.051		0.003	-0.078	-0.102
			(0.034)	(0.038)	(0.034)		(0.037)	(0.059)	(0.071)
Partner Black	0.041*	0.043							
	(0.019)	(0.025)							
High income × partner White						ref.			
High income × Black						0.087			
						(0.059)			
Low income × White						0.098*			
						(0.053)			
Low income × Black						0.108*			
						(0.055)			
Constant	0.340***	0.281***	0.379***	0.323***	0.201**	0.225**	0.440***	0.100	0.680*
	(0.021)	(0.081)	(0.031)	(0.067)	(0.065)	(0.097)	(0.082)	(0.307)	(0.311)
Demographic controls	–	yes	–	yes	yes	yes	yes	yes	yes
CIG investment	–	–	–	–	yes	–	–	–	–
Observations	222	220	222	220	220	220	68	87	65

OLS regression; DV: Share of endowment passed on to partner in DG; Model 1 and 3: No controls; Model 2 and 4: Demographic controls as per pre-analysis plan; Model 5: Demographic controls and prosocial behavior, simultaneously controlling for decision in CIG; Model 6: Interaction with white/black partner; Model 7: Treatment effects for different income groups; Standard errors in parentheses,* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

B.3 Treatment effects for partner's race by participant's income

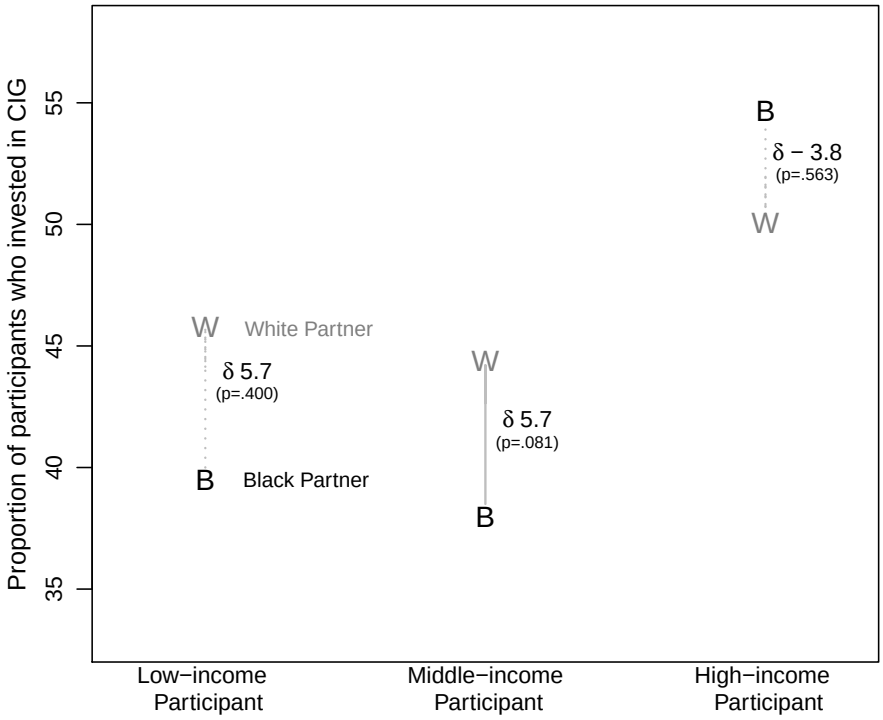

Figure A1: Effect of partner's race (White or Black) on the investment behavior in the CIG for different income categories of participants. W stands for 'White Partner', B for 'Black Partner'. Marginal effects from OLS regression as in Table A8, Model 2. Solid lines indicate differences that are significant at p<0.1, dotted lines differences that are not statistically significant at conventional levels.

Table A8: Regression of investment behavior on race of partner, by income category of the participant

	(1)		(2)	
Income class player		*Low*	*Middle*	*High*
Partner White		0.057	0.057*	-0.038
		(0.067)	(0.031)	(0.065)
High income × partner White	ref.			
High income × partner Black	-0.015			
	(0.043)			
Low income × partner White	-0.036			
	(0.037)			
Low income × partner Black	-0.081**			
	(0.031)			
Constant	0.441***	0.518***	0.259	0.383
	(0.038)	(0.106)	(0.282)	(0.264)
Demographic controls	yes	yes	yes	yes
Observations	1,190	382	388	420

OLS regression; DV: Participant invested in the CIG; Model 1: Interaction with white/black partner, identical to Table 3, Model 6 in the main text; Model 2: Treatment effects for different income groups, equivalent to Table 3, Model 7 in the main text, but with race of partner as independent variable; Standard errors in parentheses,* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

C Summary statistics

	Mean	SD	Min	Max	N
Invested in CIG	0.46	0.50	0.00	1.00	1,190
Share sent in DG	0.35	0.24	0.00	1.00	1,190
Participant female	0.50	0.50	0.00	1.00	1,190
Participant age	35.5	11.2	18.0	73.0	1,190
Education	1.75	0.68	1.00	3.00	1,190
Annual HH income in $10,000	5.30	3.60	0.00	13.0	1,190
Parent	0.40	0.49	0.00	1.00	1,190
Household size	2.64	1.40	1.00	9.00	1,190
High income partner	0.51	0.50	0.00	1.00	1,190
Partner white	0.51	0.50	0.00	1.00	1,190
CIG presented before DG	0.49	0.50	0.00	1.00	1,190

D Sensitivity analysis for heterogeneous treatment effects

We may be concerned that the heterogeneous treatment effect by income (as in Table 3, Model 7, for example) depends on the exact cutoff points for the three categories formed. Figure A2 below plots the treatment effects when participants face either a Rich or a Poor partner for groups of participants earning an annual household income of i) up to $10k, ii) up to $20k, iii) up to $30k etc. While confidence intervals overlap for all but the first income category due to relatively small sub-sample sizes, a clear pattern emerges. While there is clear differences in investment behavior for the lower income classes, these differences largely disappear for participants with a household income beyond $30k. Among those with middle-range incomes the treatment consistently has no effect, while for participants with higher incomes the treatment effect fluctuates.

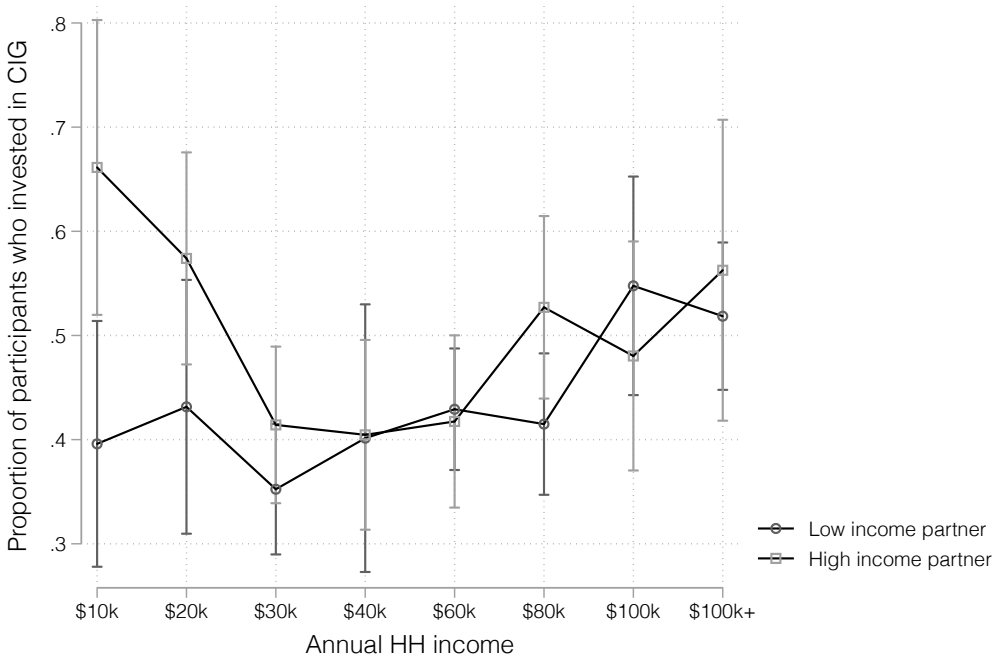

Figure A2: Marginal effects from regression of investment behavior in the CIG interacted with participants' income. Model analogous to Table 3, Model 4, controlling for demographics. Vertical bars are 90% confidence intervals.

E Comparison MTurk sample general population

Table A9 compares the MTurk sample with the US population in 2015. As shown, the sample is a bit younger, more White and clearly more educated, but similar in terms of gender composition and income.

Table A9: Comparison of MTurk sample with general population

	General population 2015	MTurk sample
Gender		
Share female	51%	50%
Age (share in workforce)		
18-24 years	12%	13%
25-54 years	65%	79%
over 54 years	22%	8%
Race		
White	61%	78%
Black	13%	6%
Hispanic	18%	5%
Asian	6%	8%
Education		
High school degree at most	40%	12%
Some college or more	60%	88%
Median income	$56,516	$50,000 (est.)
Population size	318,454,000	1,190
Source	(Proctor, Semega, and Kollar 2016; Bureau of Labor Statistics 2016)	Study participants