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10606
2023

August 2023

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CESifo

Impressum:

CESifo Working Papers
ISSN 2364-1428 (electronic version)
Publisher and distributor: Munich Society for the Promotion of Economic Research - CESifo GmbH
The international platform of Ludwigs-Maximilians University's Center for Economic Studies and the ifo Institute
Poschingerstr. 5, 81679 Munich, Germany
Telephone +49 (0)89 2180-2740, Telefax +49 (0)89 2180-17845, email office@cesifo.de
Editor: Clemens Fuest
https://www.cesifo.org/en/wp
An electronic version of the paper may be downloaded
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CESifo *Working Paper No. 10606*

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Abstract

While the existence of the in-group bias is a well-researched phenomenon in Economics, the established findings are of limited value for understanding its dynamics in the context of challenging societal and economic times. The aim of this paper is to shed more light on whether intergroup discrimination manifests itself differently in a loss compared to a gain domain (corresponding to periods of economic upturns and downturns). We run an online experiment with natural identities, in which participants allocate money between three recipients who vary in the social distance to the decision-maker. We find that, on average, the in-group favoritism documented in the gain domain vanishes in the loss domain. While this result seems to imply that participants become egalitarian in the loss domain, it is actually driven by out-group favoring allocation types becoming more extreme in their decisions. Overall, the loss domain leads to a stronger polarization regarding the question of how different social groups in the society should be treated.

JEL-Codes: C990, D300, D630, D910, J100, J150.

Keywords: in-group bias, favoritism, discrimination, gain and loss domain, polarization.

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Conflicts of interest: none
We are grateful for research funding by WHU – Otto Beisheim School of Management and University of Duisburg-Essen.

1. Introduction

Ample scientific evidence suggests that individuals exhibit more favorable behavior and attitudes toward others who share the same group identity as themselves (in-group) than toward others with a different group identity than themselves (out-group) (Akerlof and Kranton, 2000; Balliet, 2014; Lane, 2016; Charness and Chen, 2020). Such tendency of individuals to undertake discriminatory actions or have negative attitudes toward out-groups from different cultural, ethnic, and religious backgrounds (among other characteristics) is known as the in-group bias or in-group favoritism (Chen and Li, 2009; Turner et al., 1979; Tajfel and Turner, 1979). The latter is an important determinant of human behavior in politics (Jardina, 2021), law enforcement (Depew et al., 2017), financial markets (Jannati et al., 2023), organizations (Eren, 2023), employment (Carlsson and Eriksson, 2019), and various other realms.

While the in-group bias is a well-established phenomenon in Economics, prior studies, however, have predominantly focused on in-group favoritism or, equivalently, out-group discrimination, in a gain domain. In the usual economic experiments, individuals either earn or are provided with a certain amount of money and act as decision-makers in variants of games (e.g., dictator game, prisoners' dilemma game, public good game) played with in-groups and out-groups (Bernhard et al., 2006; Goette et al., 2006; Chen and Li, 2009; Charness et al., 2014). As not all real-life decisions are made in a gain domain, the established findings are of limited value for understanding the dynamics of the in-group bias in the context of challenging societal and economic times. For example, the outbreak of the Syrian civil war in 2011 and the Russo-Ukrainian war in 2022 has forced thousands of Syrian and Ukrainian citizens to flee their countries and seek safety in other parts of Europe. Yet, the destination countries are grappling with serious economic difficulties of their own, with high inflation, unemployment, and a record hit to living standards. Will the society members of host countries in crisis exhibit more out-group discrimination against immigrants than the society members of host countries that are not in crisis? Will the society members discriminate less against close out-groups (e.g., Ukrainian refugees in Poland) than against far out-groups (e.g., Syrian refugees in Poland). We tackle these questions by experimentally investigating the interplay between the in-group bias and the domain (gain *vs* loss) that people face.[1]

[1] In contrast, there exists a small economic literature on the influence of gains versus losses in other decision-making contexts (e.g., Thunström, 2019; Cochard et al., 2020; Fiedler and Hillenbrand, 2020; Benistant and Suchon, 2021; Antinyan et al., 2022, Steinel et al., 2022).

Because the dynamics of the in-group bias in a loss domain remain relatively unexplored, existing literature provides little systematic guidance. On the one hand scholars document increased animus and discrimination against the out-groups during times of economic distress (Anderson et al., 2020; Bianchi et al., 2018; Chattopadhyay and Bianchi 2021). On the other hand, studies in Social Psychology put forth the diametrically opposite conclusion that out-group discrimination found in the domain of gains decreases or even vanishes in the domain of losses (Amiot and Bourhis, 2003; Buhl, 1999; Gardham and Brown, 2001; Hewstone et al., 1981). In other words, those studies suggest that both in-groups and out-groups are treated equally in the loss domain. Overall, the inconsistency in extant research leads to a lack of consensus regarding the impact of the loss domain on intergroup discrimination.

In this paper, we design an experiment to test whether intergroup discrimination does indeed disappear in the loss domain. Our intuition builds on the idea that out-group discrimination persists in the domain of losses, but that its presence is masked by those individuals for whom the loss domain reinforces their solidarity and support for the out-groups.[2] This intuition is inspired by the societal dynamics that developed during the European migration crisis in the 2010s. While those times revealed pronounced discriminatory behavior by some individuals in EU countries, it is equally crucial to acknowledge the remarkable support and solidarity toward refugees by other individuals in the same countries. The German "Willkommenskultur"[3], i.e., a culture of welcoming (Hamann and Karakayali, 2016), serves as a compelling demonstration that, amidst the crises, many Europeans extended a helping hand and even arranged pro-immigrant protests. Hence, not only discriminatory but also anti-discriminatory sentiments were amplified.

To test the influence of the gain and loss domain on intergroup discrimination, we designed an experiment consisting of two treatments. Specifically, participants in the role of decision-makers distribute either monetary gains (treatment ***GAIN***) or monetary losses (treatment ***LOSS***) between three passive recipients: an in-group, a close out-group, and a far out-group.

[2] To illustrate, suppose that the members of a host country are in favor of allocating more resources to current residents and citizens (in-groups) rather than to refugees (out-groups). This difference captures out-group discrimination, which is usually evidenced in the gain domain. Now imagine that during economic distress, some members of the society become more hostile while others become more sympathetic toward the out-groups. Under these circumstances, if out-group favoring society members increase their support for the out-groups more than in-group favoring society members increase their support for the in-groups, the difference between the resources allocated to in-groups and out-groups will be diminished (or can even vanish). Thus, a mere focus on the average preferred distribution of resources might lead to the erroneous conclusion that, in the loss domain, society members treat in-groups and out-groups more equally. However, in reality, the society members' attitudes become more polarized, concealing the persistence of out-group discrimination.

[3] Word of the Year in Austria in 2015 (thelocal.at, 2015).

We take advantage of the ethnic variations and the complex registration system (called *"hukou"* system) in China. In our experiment, decision-makers belong to the Han ethnicity and have an urban (Shanghai) hukou. The three recipients vary in whether they belong to the in-group (same ethnicity and hukou as the decision-maker), to a close out-group (same ethnicity, but different hukou than that of the decision-maker), or to a far out-group (different hukou and ethnicity than that of the decision-maker).[4]

Overall, we extend existing literature on in-group favoritism in three crucial ways. First, and most importantly, we extend the decision-making context to the loss domain. Second, we introduce two out-group recipients who belong to a social group that is either socially close or socially distant from the decision-maker's social group (close *vs* far out-group).[5] Conceivably, the in-group bias might manifest differently depending on the degree of social proximity between the in-group and the out-group. This idea is compellingly exemplified by the documented increase in solidarity for Ukrainian refugees in European countries compared to that for refugees from other racial backgrounds (Castello and Foster, 2022; Esposito, 2022).[6] Third, most existing studies use the minimal or near minimal group paradigm (e.g., Tajfel et al., 1971; Turner, 1978; Chen and Li, 2009; Charness et al., 2007), where participants are randomly assigned to artificial groups based on a criterion that is intended to be as meaningless as possible. By taking advantage of the ethnic variations and the hukou system in China we can conversely base our priming on natural social identities.

Our results are as follows. First, the decision-makers' average allocation of resources reveals an out-group discriminating behavior in the domain of gains. Interestingly, the discriminatory behavior is equally pronounced for both the far and the close out-groups, which suggests that the social distance between the out-groups does not matter in the sense that decision-makers treat both out-groups equally. When focusing on the loss domain, we evidence no difference in the average allocation of resources to all three recipients, which seems to imply that in-group favoritism vanishes in the loss domain (in other words, a decision-maker does not distinguish between in-groups and out-groups and allocates an equal amount of loss to all three recipients).

[4] Post-experimental manipulation checks show that the manipulation of the social identity through the selected criteria was successful. More specifically, the decision-makers experience the smallest social distance toward the in-group, followed by the close out-group, and the far out-group.

[5] To the best of our knowledge, Grimm et al. (2017) is the only paper that introduces multiple out-groups. Unlike us, however, they do not impose a clear ordering of the out-groups (i.e., a close out-group and a far out-group) and do not extend the decision-making context to the loss domain.

[6] In this context, some European/American media outlets discussed the early days of the Russian aggression against Ukraine as very shocking and unacceptable given that the Ukrainians are more like Western Europeans/Americans unlike Iraqis and Afghans (theguardian.com, 2022).

However, when classifying decision-makers into different allocation types (egalitarians, in-group favoring, and out-group favoring), we find that decisions become more extreme rather than egalitarian compared to those in the gain domain. Zooming in on the average allocations of in-group and out-group favoring participants, we identify that the out-group favoring participants seem to be the main driver of these results. While the in-group favoring participants discriminate against the out-groups to the same extent in both gains and losses, the out-group favoring participants increase their allocations to the close out-groups at the expense of the in-groups in the loss domain. Overall, the behavior of in-group and out-group favoring individuals leads to the erroneous impression that in-group favoritism and out-group discrimination vanishes in the loss domain, when there is in fact even stronger polarization regarding the question of how different social groups should be treated.

The remainder of the paper is organized as follows. Section 2 explains the experimental design and procedure. We present our results in Section 3. Section 4 concludes with a brief discussion of the results.

2. The Experimental Design and Protocols

2.1. The Experimental Design

In our experiment, participants are randomly allocated to one of two treatments: ***GAIN*** or ***LOSS***. Participants in the role of decision-makers are matched with three other passive participants in the role of recipients. Depending on the treatment, decision-makers allocate a certain amount of gain or loss among the recipients. The allocation decisions do not affect the decision-makers' own payoffs and cannot be influenced by the recipients. We opted for this design to focus on our main research question of how in-group favoritism manifests in a loss compared to a gain domain net of any strategic considerations and material self-interest of the decision-maker. An alternative design used by some prior studies includes a classic dictator game, where decision-makers share money between themselves and a recipient (Chen and Li, 2009). However, we refrained from a dictator game as the decision-makers' self-interest might interact with our domain manipulation, confounding the results on in-group favoritism.[7]

In ***GAIN***, every decision-maker starts with an endowment of 20 RMBs, while each of the three recipients starts with 0 RMBs. All participants take part in a lottery with two possible outcomes.

[7] So far, there is inconclusive evidence on the impact of the loss domain on decision-makers' self-interest (Benistant and Suchon, 2021; Cochard et al., 2020; Thunström, 2019). Only recently have some scholars started to investigate the reason for the mixed results (Antinyan et al., 2022).

If Outcome 1 occurs, the study ends and participants receive their initial endowments. If Outcome 2 occurs, everyone gains additional money. The decision-maker receives additional 10 RMBs while the recipients receive additional 30 RMBs in total. The decision-maker is asked to divide the 30 RMBs among the recipients under two restrictions: a) the entire 30 RMBs should be allocated among the three recipients and b) no single recipient should receive more than 20 RMBs.

In ***LOSS***, the decision-maker starts with an endowment of 40 RMBs, while each of the three recipients starts with 20 RMBs. As in ***GAIN***, the participants take part in a lottery with two possible outcomes. If Outcome 1 occurs, the study ends and participants receive their initial endowments. If Outcome 2 occurs, everyone loses a share of their endowment. The decision-maker loses 10 RMBs while the recipients lose 30 RMBs in total. The decision-maker is asked to divide the loss of 30 RMBs among the recipients. As in ***GAIN***, two restrictions for the allocation decision apply: a) the decision-maker should allocate the entire loss of 30 RMBs among the three recipients and b) no single recipient should be allocated a loss of more than 20 RMBs (as the recipients cannot end up with negative payoffs).

Table 1 summarizes the key experimental features. For our analysis, we focus on the behavior of the experimental participants when Outcome 2 occurs.[8] Note that we ensure that the participants' payoffs in ***GAIN*** and ***LOSS*** are comparable: the decision-maker always receives 30 RMBs while the recipients always receive 30 RMBs in total.[9]

*Table 1: Summary of the decision-makers' (DM) and the recipients' (R) payoffs for Outcome 1 and Outcome 2 in **GAIN** and **LOSS.***

	GAIN		LOSS	
	Decision-maker	Recipient *i*	Decision-maker	Recipient *i*
Outcome 1	$\pi_{DM} = 20$	$\pi_{R_i} = 0$	$\pi_{DM} = 40$	$\pi_{R_i} = 20$
Outcome 2	$\pi_{DM} = 30$	$\pi_{R_i} = 0 + x_i$	$\pi_{DM} = 30$	$\pi_{R_i} = 20 - x_i$

Note(s): The table summarizes the participants' payoffs depending on the decision-makers' allocation decisions, denoted by $x_i \in [0,20]$, $\sum_i x_i = 30$, *i={1,2,3}.*

[8] In ***GAIN*** as well as ***LOSS***, Outcome 1 occurs with 1% probability, while the probability of Outcome 2 is 99%. The probabilities are not communicated to the participants. We chose those probabilities to collect sufficiently many analysis-relevant decisions within a given budget constraint.

[9] Please also note that in both treatments, decision-makers can, in principle, assign the same gain (loss) to all three recipients as what they experience themselves. Finally, the minimum and maximum possible inequality between the decision-maker and a given recipient is also the same across treatments.

When designing the experiment, we had to solve two important design challenges. First, how to manipulate participants' social identities? Second, how to manipulate losses and gains?

Regarding the social identity manipulation, we follow the stream of literature that primes social identities with the help of natural identities (Chen et al., 2014; Chmura et al., 2016; Dimant, 2023; Goette et al., 2006; Hoff and Pandey, 2006; Levine et al., 2005; Mobius et al., 2016; Ravetti et al. 2019).[10] More specifically, we take advantage of the ethnic variations and the complex registration system in China. While the major ethnic group in China is the Han ethnicity, there are also many minority ethnic groups such as the Uyghur ethnicity (Turkic ethnic group) located in the Xinjiang region. The registration system (called "hukou" system) identifies each Chinese citizen as a permanent resident of an area. It classifies the Chinese citizens as either agricultural (rural) hukou holders or non-agricultural (urban) hukou holders. The agricultural hukou holders are considered as migrants in urban areas and not entitled to the same benefits as the urban hukou holders. In our experiment, the decision-makers belong to the Han ethnicity and have an urban (Shanghai) hukou. The profiles of the three recipients are as follows:

- Like the decision-maker, the in-group recipient belongs to the Han ethnicity and has a Shanghai hukou.
- The close out-group recipient belongs to the Han ethnicity but has a rural hukou from an area nearby Shanghai and is a migrant in Shanghai. Thus, the close out-group recipient differs from the decision-maker only in the hukou status.
- The far out-group recipient belongs to the Uyghur ethnicity, has a rural hukou from an area nearby Urumqi (the capital city of Xinjiang province), and is a migrant in Shanghai. Thus, the far out-group recipient differs from the decision-maker in both the ethnicity and the hukou status.

To make sure that our manipulation of the social identities works in the predicted direction, we use a post-experimental questionnaire assessing how socially close the decision-maker perceives the three recipient groups. We use an adaptation of a Bogardus social distance scale (Wark and Galliher, 2007). The scale lists different levels of hypothetical intimacy of social relations and asks the respondents to choose the maximum level of intimacy that they are

[10] An alternative approach employed in prior studies is to use the minimal or near minimal group paradigm (Tajfel et al., 1971; Turner, 1978; Chen and Li, 2009; Charness et al., 2007).

willing to accept with a representative member of a social group. In our study, the decision-makers separately answer the question for each of the three recipients (see Appendix B).

Regarding the loss/gain manipulation, we introduce a lottery which either increases the initial endowments of both the decision-makers and the recipients (in ***GAIN***) with some probability or decreases the initial endowments of both the decision-makers and the recipients with the same probability (in ***LOSS***) (Antinyan et al., 2022; Benistant and Suchon, 2021). The idea is that a decision-maker forms a reference point based on the status quo (the initial endowment) or expectations (the expected endowment as the result of the lottery draw[11]) and evaluates her and the recipients' final endowment relative to this reference point (Benistant and Suchon, 2021). The main purpose of introducing gains and losses both for the decision-makers and the recipients is to mimic situations in which the society as a whole is either in an economic downturn or in an economic upturn.

2.2. The Experimental Protocol

The experiment was administered online through Qualtrics and took place between November and December 2019. The data collection was outsourced to a survey company operating in China. The company recruited 255 participants of Han ethnicity with a Shanghai hukou, acting as decision-makers. The experimental participants were randomly allocated to ***GAIN*** or ***LOSS***. Out of the 255 decision-makers, 224 accomplished the money allocation task but only 204 provided their contact information for payment. Our data analyses focus on these 204 participants, as we believe that their decisions are incentive compatible. The median time spent in the experiment was around 7 minutes, while the mean payment was 29.95 RMBs. Out of the 204 individuals mentioned above we eliminate 8 observations, as they needed more than 25 minutes for completing the study.[12] Thus, we end up with a sample of 196 participants with a mean age of 32.49 (sd=8.99), and 40.31% of them were male.[13]

Before proceeding to the allocation task, decision-makers were provided with detailed experimental instructions and answered a set of control questions, testing their understanding

[11] In our experiment, the exact probabilities of the lottery draw are not communicated to the participants. However, unless a decision-maker is overly pessimistic in ***LOSS*** or overly optimistic in ***GAIN*** (i.e., she thinks Outcome 2 will occur with a 100% probability), she will be in the loss domain in ***LOSS*** and in the gain domain in ***GAIN***, compared to the expected endowments.

[12] When leaving these 8 individuals in the sample, we obtain the qualitatively same conclusions.

[13] The descriptive statistics of the sample we work with are provided in Appendix A. We do not find any statistically significant differences in the observable characteristics of the participants between the two treatments (Wilcoxon rank-sum tests: $p>0.205$ for all comparisons), indicating that the randomization procedure was successful.

of the instructions. Decision-makers could not proceed until they had answered all the control questions correctly. In the final part of the experiment, they answered a post-experimental questionnaire consisting of socio-demographic questions (gender, age, household income, education, marital status, employment status) and the Bogardus scale, eliciting their perceived social distance to different recipient groups.[14]

3. Results

3.1. Manipulation check

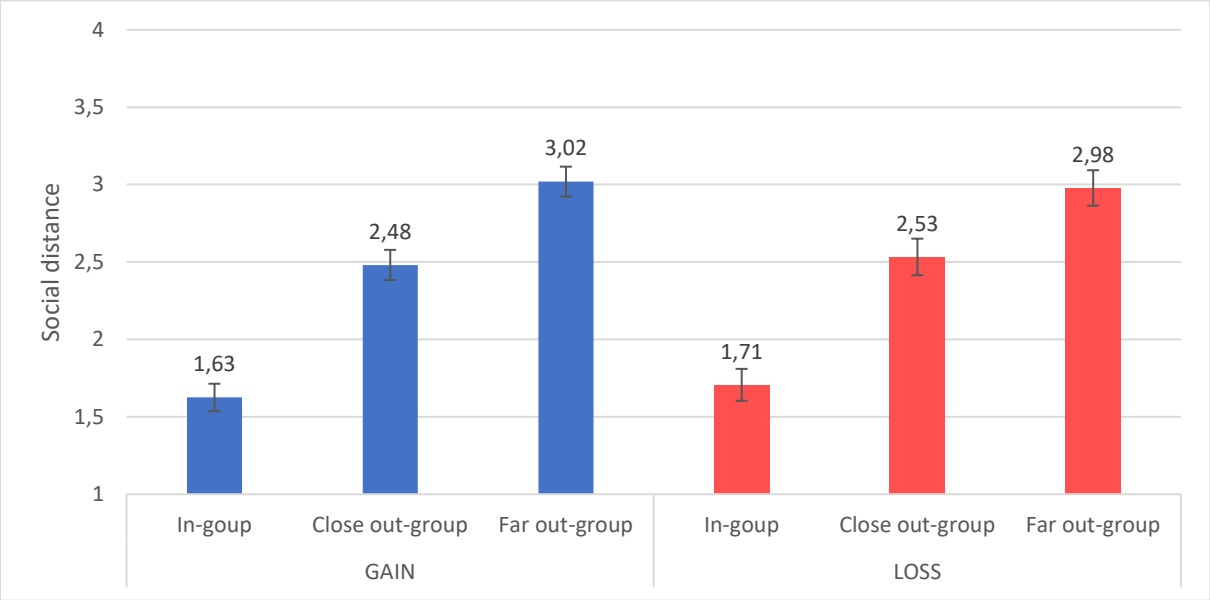
We first test whether the social identity manipulation was successful. As illustrated in Figure 1, the decision-makers' perception of the social distance toward the recipients increases as we move from the in-group to the close out-group and further to the far out-group. All binary comparisons between recipient groups are statistically significant at the 1%-level (Wilcoxon signed-rank tests: $|z|>4.200$, $p<0.001$ for all comparisons).[15] This suggests that our manipulation was successful. As a last check, we also compared the social distance score between ***GAIN*** and ***LOSS*** for each recipient group. Because we do not find statistically significant differences (Wilcoxon rank-sum tests: $|z|<0.532$, $p>0.595$ for all comparisons), we conclude that the assignment to the experimental treatments did not alter the decision-makers' perception of the social distance.[16]

[14] The experimental instructions, including the control questions and the post-experimental questionnaire, can be found in Appendix B.

[15] Whenever we speak about several binary comparisons, we report the maximum (minimum) z-value and the minimum (maximum) p-value for statistically significant (insignificant) results.

[16] To prevent false positives when testing multiple hypothesis, we also employed the procedure suggested by List et al. (2019), yielding similar results. Table 4 in Appendix A replicates these results parametrically (also controlling for participants' characteristics).

Figure 1: Decision-Makers' Perceived Social Distance toward Recipients.



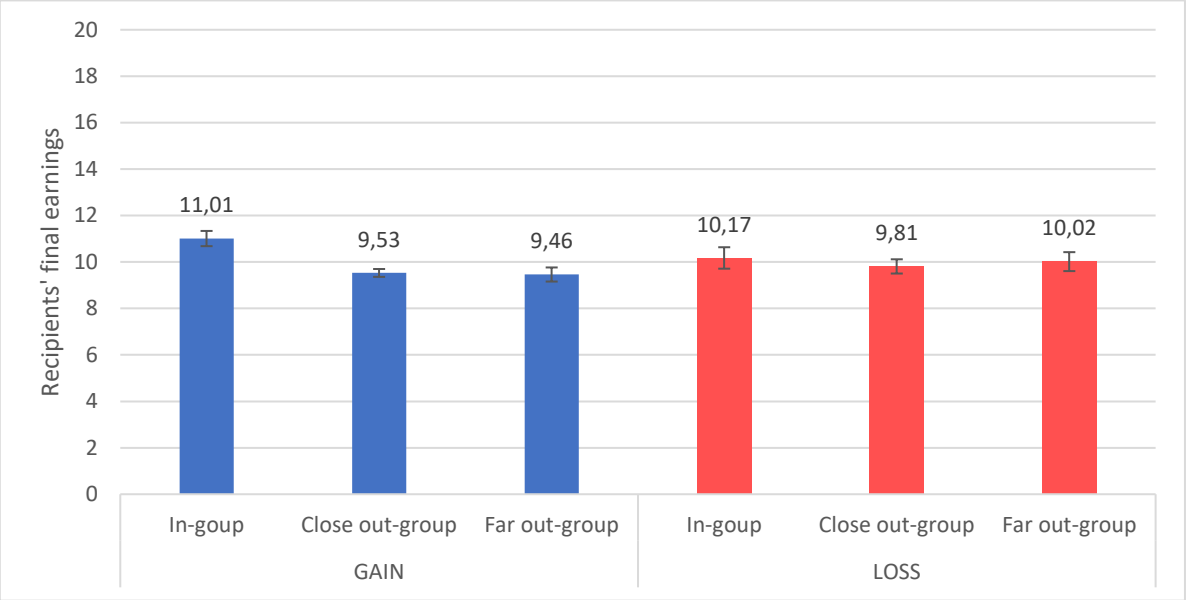
*Notes: The figure indicates the decision-makers' mean perceived social distance toward recipients in **GAIN** and **LOSS** (standard errors are indicated). Social distance is measured using an adaptation of the Bogardus social distance scale (Wark and Galliher, 2007) ranging from 1 to 4, where higher values indicate a higher social distance.*

3.2. Main results

To investigate the in-group bias in the gain and loss domain, we use the recipients' final earnings (π_{R_i} in Table 1) as our main dependent variable because of their comparability across treatments. Figure 2 graphically summarizes recipients' average final earnings in both treatments. In ***GAIN***, the average final earnings of in-group recipients are statistically significantly higher than those of both out-groups at the 1%-level based on Wilcoxon signed-rank tests (in-group *vs* close out-group: |z|=2.997, p=0.003; in-group *vs* far out-group: |z|=3.041, p=0.002). Interestingly, there are no statistically significant differences between the two out-groups (Wilcoxon signed-rank test: |z|=0.560, p=0.576). Hence, while decision-makers perceive to be more socially distanced from the far than from the close out-group, they do not seem to discriminate against the far out-group more. Instead, the decision-makers seem to use a simple dichotomy of in-group versus out-group without further differentiation.

Moving on to ***LOSS***, we observe that the average final earnings do not differ across all three recipient groups based on Wilcoxon signed-rank tests (in-group *vs* each of the out-groups: |z|<0.897, p>0.370).

Figure 2: Recipients' Earnings.



*Notes: The figure indicates the average earnings of the recipients in **GAIN** and **LOSS** (standard errors are indicated). The allocations can result in earnings between 0 and 20 RMB.*

Result 1: In the gain domain, the average earnings of in-groups are higher than the average earnings of both out-groups, whereas, in the loss domain, there are no statistically significant differences between the average earnings of the in-group and the two out-groups.

Result 1 gives rise to the intuitive implication that participants in the loss domain become more egalitarian than in the gain domain (i.e., both in-groups and out-groups are treated similarly). In the remainder of the paper, we analyze whether we can confirm this intuition or whether our results provide a different explanation for the ostensive lack of discriminatory behavior. As a first step, we classify the decision-makers into the following allocation types:

- *Egalitarian*: participants assigned to this category split the money equally.
- *In-group favoring*: participants assigned to this category favor the in-group recipient more than both out-group recipients.
- *Out-group favoring*: participants assigned to this category favor both out-group recipients more than the in-group recipient.[17]

[17] In Section 4, we provide a brief explanation for why we observe out-group favoring individuals.

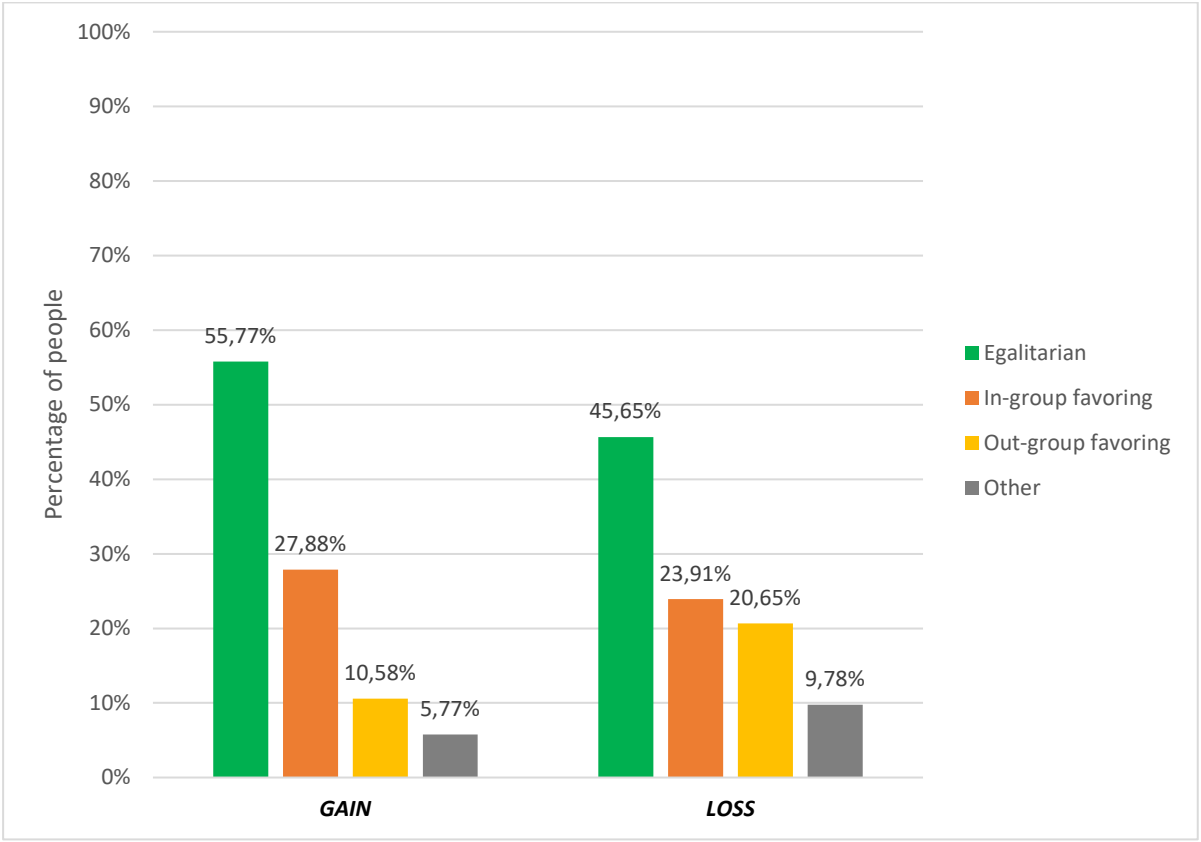
- *Others*: participants who do not fall into any of previous three categories are assigned to this category.[18]

Given the above classification, we can differentiate between two potential explanations for why the average in-group bias evidenced in ***GAIN*** might be softened and even disappear in ***LOSS***. The first explanation builds on the extensive margin and suggests that there may be fewer in-group favoring decision-makers in the loss than in the gain domain (e.g., in times of crisis, more individuals may become solidary toward immigrants and even join pro-immigrant protests). The second explanation builds on the intensive margin and suggests that the loss domain induces out-group favoring types to become more extreme in their allocation decisions than in-group favoring types (e.g., pro-immigration supporters increase their support for immigrants more than anti-immigration supporters increase their support for locals).

Regarding the extensive margin, Figure 3 depicts the frequency of the decision-makers in the four categories by treatment. We observe that *Egalitarians* clearly form the biggest group in ***GAIN*** as well as in ***LOSS***. The share of *Egalitarians* in ***LOSS*** reduces by over 10 percentage points compared to ***GAIN***, though the difference is not statistically significant on conventional levels (Fisher's exact test: $p = 0.198$). Similarly, the share of *In-group favoring* participants does not differ between the two treatments (Fisher's exact test: $p = 0.625$). Lastly, the difference in the share of *Out-group favoring* participants is only marginally statistically significant (Fisher's exact test: $p = 0.073$). Overall, we do not find a significant relation between the distribution of the four allocation types and the domain (Fisher's exact test: $p = 0.140$). In sum, when focusing on the extensive margin, the absence of the in-group bias in the loss domain (*Result 1)* can be explained neither by the increased number of egalitarian decision-makers nor to a sufficiently large extent by the increased number of out-group favoring decision-makers in ***LOSS***.

[18] Because 92.35% of participants fall into the first three categories (51.02% *Egalitarians*, 26.02% *In-group favoring* participants, and 15.31% *Out-group favoring* participants), we chose to subsume all other conceivable allocation types into one category (*Others*).

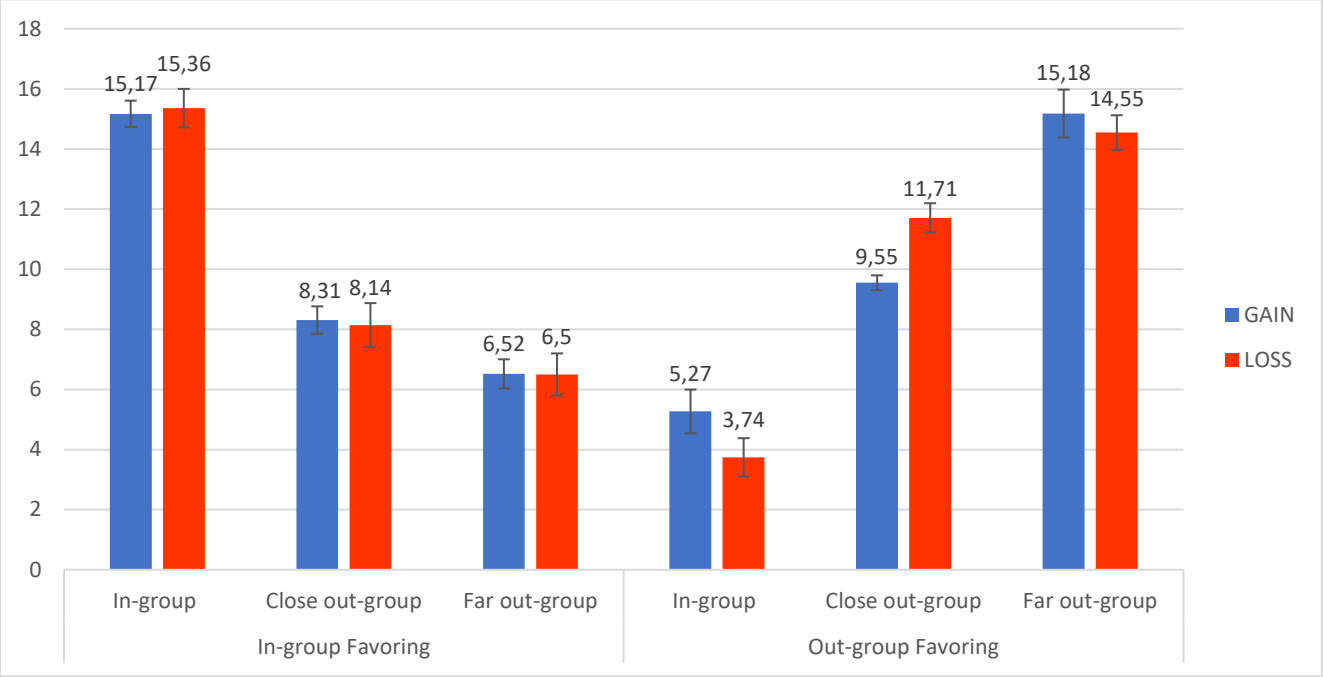
Figure 3: Frequency of Allocation Types.



Notes: Egalitarian participants are those who split the money equally; In- group favoring participants are those who favor in-group members more than both out-group members; In-group discriminating participants are those who favor in-group members less than both out-group members; Others are participants who do not fall into any of the previous three categories.

Next, we check the intensive margin to understand whether there are changes in the allocation decisions of the different types across the loss and the gain domain that can mitigate the in-group bias. Figure 4 graphically summarizes recipients' average final earnings resulting from the two most interesting allocation types – *In-group favoring* and *Out-group favoring* – in ***GAIN*** and ***LOSS***.

Figure 4: Recipients' Earnings.



*Notes: The figure indicates the average earnings of recipients resulting from In-group favoring and Out-group favoring allocation types in **GAIN** and **LOSS** (standard errors are indicated). The allocations can result in earnings between 0 and 20 RMB.*

Figure 4 suggests that *In-group favoring* types do not change their allocation decisions between the two domains neither for the in-group nor the two out-groups (Wilcoxon rank-sum tests: $|z|<0.392$, $p>0.695$). Regarding the *Out-group favoring* types, the loss domain does not induce a change in the allocations toward the far out-group compared to the gain domain (Wilcoxon rank-sum tests: $|z|=0.281$, $p=0.779$), but starkly increases the allocations to the close out-group (Wilcoxon rank-sum tests: $|z|=3.139$, $p=0.002$). Overall, this behavior translates into marginally lower allocations toward the in-group in the loss domain compared to that in the gain domain, though the difference reaches marginal significance only (Wilcoxon rank-sum tests: $|z|=1.712$, $p=0.0868$).[19]

> **Result 2:** Compared to the gain domain, the loss domain does not lead to a change in the distribution of allocation types (extensive margin). However, the loss domain induces *Out-group favoring* allocation types to become more generous toward the close out-group while all other allocation types do not change their allocation decisions.

[19] We do not find statistically significant differences in allocations between ***GAIN*** and ***LOSS*** for *Others* (Wilcoxon rank-sum tests: $|z|<0.712$, $p>0.477$), and, by construction, also not for *Egalitarians.*

Overall, the attenuation of the in-group bias in ***LOSS*** compared to ***GAIN*** (Result 1) is not due to an increase in the share of egalitarian decision-makers. Instead, the loss domain seems to prompt individuals who tend to favor the out-group to further increase their support, particularly for close out-groups (Result 2). The loss domain, thus, seems to lead to more polarization in decisions than the gain domain.

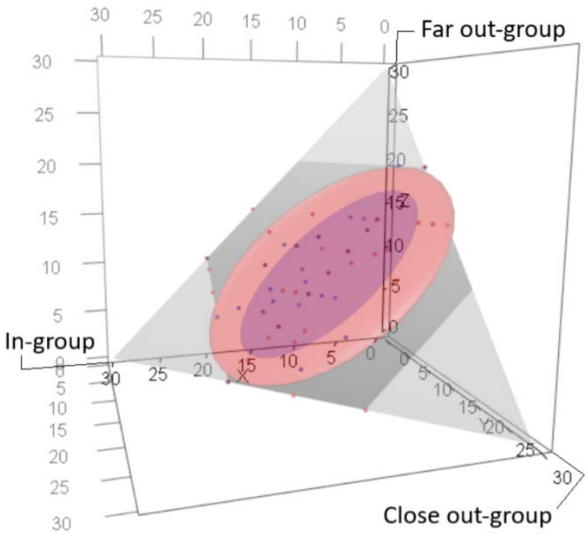
3.1. Testing for polarization

Finally, we conduct additional analyses to formally illustrate that the decisions become more polarized in the loss domain. The final earnings of the three recipients of a given decision-maker can be represented by a point in the three-dimensional space. Figure 5 combines all these points to graphically illustrate the dispersion of the allocation decisions in ***GAIN*** and ***LOSS***. The dispersion of preferences or of actual behavior in a sample is often used as a measure of polarization (DiMaggio et al., 1996; Gay et al., 1996; Lindqvist and Östling, 2010).

Figure 5 depicts the dispersion of the allocation decisions in each domain by drawing the 90% data ellipses for ***GAIN*** (blue) and ***LOSS*** (red). The ellipses are drawn around the spatial medians of the corresponding samples (the purple color results from the intersection of red and blue colors).[20] The light-grey triangles in Figure 5 depict the constraints that the final earning of each recipient must be non-negative and sum up to 30 RMBs. The dark-grey hexagon (the ultimate payoff space) represents the additional constraint that each recipient cannot be allocated a gain (loss) of more than 20 monetary units. According to the figure, allocation decisions are more dispersed in ***LOSS*** than in ***GAIN***.

[20] Data ellipses are often used for a visual summary of the dispersion of multivariate data (see Friendly et al., 2013). The larger the ellipse, the more dispersed the sample. These ellipses are based on the covariance matrix of the data and are often drawn in a way to cover 40%, 68%, 90%, or 95% of the data around the centroid. We use the 90% ellipses, but the picture looks similar when we use other levels.

Figure 5: The Dispersion of Allocation Decisions.



*Notes: The figure shows the dispersion of allocation decisions (90% data ellipses around the spatial medians). Each axis in the diagram represents the earnings of a recipient. The associated allocation decisions in **GAIN** (**LOSS**) are in blue (red). The purple color results from the intersection of red and blue colors.*

This visual evidence is confirmed more formally by a permutation test of multivariate homogeneity of group dispersions (variances) (Anderson, 2006).[21] The analysis shows that the dispersion is greater in ***LOSS*** (average distance to the spatial median=4.38) than in ***GAIN*** (average distance to the spatial median=3.01). The test of homogeneity of multivariate dispersions provides statistically significant result at the 5%-significance level (F=4.591, p=0.033).

Result 3: Compared to the gain domain, the decision-makers' allocation decisions in the loss domain become more polarized.

4. Discussion and Conclusion

This study experimentally investigates in-group favoritism and out-group discrimination in the domains of gains and losses (corresponding to periods of economic upturns and downturns).

[21] The methodology we follow is an extension of Levene's test to account for the facts that our response variable is not univariate and that the components of our response variable neither individually nor jointly follow a normal distribution. The method developed by Anderson (2006) allows for different specifications of distance measure for distances between observations. We consider the Euclidean distance, while the results become statistically more significant with Manhattan or Mahalanobis distance measures.

We document in-group favoritism in the domain of gains that vanishes in the domain of losses. While this seems to imply that decision-makers become egalitarian in the loss domain (in other words, decision-makers do not distinguish between in-groups and out-groups), they actually become more extreme in their allocation decisions. More specifically, while the in-group favoring individuals treat the in-group recipients in the same way both in the gain and the loss domain, the out-group favoring individuals increase their support for the close out-group recipients at the expense of the in-group recipients. In sum, the loss domain leads to a stronger polarization regarding the question of how different social groups in the society should be treated.

In the remainder of this section, we address two important questions: 1) Why do we observe out-group favoring individuals? 2) Why do out-group favoring individuals increase their support for the close out-groups in the loss domain?[22] Regarding the existence of out-group favoring individuals, the "social utility model" postulates that the decision-makers extract utility from two sources: a) an absolute payoff component, which reflects the value of the own outcome to the individual, and b) a comparative payoff component, which reflects the value an individual attaches to the outcomes of other interested parties in comparison with that of her own (e.g., Blount, 1995). In general, individuals may attach substantial weight to the comparative payoff component and may want to refrain from disadvantaging those who are worse off when making decisions (van Dijk and Vermunt, 2000). Given the social context in China, the far out-groups in our framework are worse off than close out-groups (since Uyghurs are generally more disadvantaged in the Chinese society than Hans), while the latter are worse off than the in-groups (since rural hukou holders are generally more disadvantaged than Shanghai hukou holders). A decision-maker who attached substantial weight to the comparative payoff component will hence be out-group favoring and will favor the far out-group over the close out-group. Figure 4 is aligned with this intuition (see the panel on the right for out-group favoring individuals).

As for the second question posed above, the two domains invoke different social norms (List, 2007). More specifically, the loss domain is a "taking" game, in which the decision-maker decides how much money to take from each of the recipients, while the gain domain is a "giving" game, in which the decision-maker decides how much money to give to each of the recipients. The decisions involving taking from a recipient are less socially appropriate (Krupka

[22] In Appendix C, we sketch a simple conceptual model that unifies and rationalizes the allocation decisions of both in-group favoring and out-group favoring decision-makers.

and Weber, 2013) and morally more costly (Korenok et al., 2018) than the decisions involving not giving to a recipient. Given that it's morally costly to impose a loss on a person and given that it is intuitively more so when there is a large imbalance between the decision-maker and the recipient, the decision-makers may refrain from imposing too much loss on the far out-groups. When choosing how to divide the remaining loss between the close out-group and the in-group, the existing imbalance and the associated moral costs will then motivate decision-makers to make decisions in favor of the close out-group. This ex-post rationalization of the behavior is again aligned with the evidence in Figure 4.

On a general note, our study has a bearing on the scientific discourse surrounding the interplay between polarization, social norms, and their implications for democratic processes. Particularly in times of crisis, joining forces is of utmost importance for accelerating the process of restoring normalcy. Hence, the social norms of cooperation and trust in governmental institutions represent critical facilitators for effectively implementing governmental initiatives to stabilize the country. However, as our experimental results suggest that times of crisis lead to more polarized attitudes, a decrease of social cohesion and, consequently, an erosion of social norms seems inevitable. If this is the case, designing and implementing measures that are backed by democratic majorities will become even harder, forcing governments to devote valuable resources for legal enforcement instead of relying on social contracts. On a positive note, however, economically challenging times seem to most strongly influence the attitude of inequality-concerned individuals. Leverage the heightened dedication of those citizens might be a promising strategy to deal with migratory challenges in the future. We hope that our paper inspires more research in this direction.

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Appendix A. Descriptive Statistics and Robustness Checks

Table 2: Descriptive statistics of the participant pool.

		Frequency (%)	Mean (std. dev.)
Age			32.49 (8.99)
Male		79 (40.31%)	
Employed		167 (85.20%)	
Married		124 (63.26%)	
Education			
	Never attended school	0 (0.00%)	
	High school and below	7 (3.57%)	
	University College	26 (13.27%)	
	University degree	143 (72.96%)	
	Master's degree	17 (8.67%)	
	PhD	3 (1.53 %)	
Household Income			
	1001 – 2000 RMB	2 (1.02%)	
	2001 – 5000 RMB	2 (1.02%)	
	5001 – 10 000 RMB	11 (5.61%)	
	10 001 – 20 000 RMB	58 (29.59%)	
	20 001 – 30 000 RMB	38 (19.39%)	
	30 001 – 50 000 RMB	16 (8.16%)	
	50 001 – 100 000 RMB	15 (7.65%)	
	100 001 – 200 000 RMB	27 (3.78%)	
	200 001 – 500 000 RMB	18 (9.18%)	
	Above 500 001 RMB	7 (3.57%)	
	Don't know / refuse to answer	2 (1.02%)	

Notes: Age is an integer variable representing participants' age in years; Gender encodes the gender of the participants; Employed and Married are binary variables indicating whether the participant is employed or married; Education level and Income level are categorical variables as detailed above.

To check the robustness of our results, we perform several regression analyses. In Table 4, we run a multi-level mixed effects regression with decision-makers as a level of hierarchy. We apply a mixed effects model because the observations of social distance scores as well as monetary allocations to several recipients come from the same participant which needs to be accounted for in the model. The dependent variables are the social distance (Model 1 and 2) and recipient's final earnings (Models 3 and 4). The main independent variables in the regressions are a dummy variable indicating out-group members (*Out-group*), a dummy variable for ***LOSS***, and the interaction of the two variables.[23] Models 2 and 4 also include control variables. The results confirm that the decision-makers perceived social distance is larger toward out-groups than in-group members (Model 1 and 2). The coefficient of the variable *Out-group* is positive and highly statistically significant (p-value<0.001 in both models). This is in line with our manipulation checks reported in the main text. Also, as the interaction effect is not statistically significant (p-value=0.611 in both models), our treatment assignment did not affect the perceived social distance. Models 3 and 4 show that, in ***GAIN***, out-group recipients receive less money than in-group recipients (p-value<0.001 for the *Out-group* variable in both models). This in-group bias decreases in ***LOSS*** (p-value<0.05 for the interaction effect in both models). Finally, changing the reference category for the domain from ***GAIN*** to ***LOSS*** reveals that, in ***LOSS***, the difference between in-group and out-group categories vanishes (untabulated Model 3: p-value=0.536; untabulated Model 4: p-value=0.536). Overall, this confirms Result 1.

[23] Initially, we regressed the recipient's final earnings variable on three types of social groups, the *LOSS* dummy, and the respective interactions. Because a Wald test showed no statistically significant difference between the coefficients for the close and far out-groups (χ^2=0.02, p-value=0.883), we consolidate them into one out-group category (even though we still find pronounced differences when we regress social distance on the two types of out-groups; χ^2=22.68, p-value<0.001). This allows us to enhance the interpretability of our results without losing much information.

Table 3: Regression results (Multilevel mixed-effects linear regressions).

	(1)	(2)	(3)	(4)
Dep. variable	*Social distance*	*Social distance*	*Recip. fin. earn.*	*Recip. fin. earn.*
Out-group	1.125***	1.125***	-1.514***	-1.514***
	(0.102)	(0.102)	(0.397)	(0.397)
LOSS	0.0815	0.0652	-0.836*	-0.836*
	(0.148)	(0.147)	(0.473)	(0.474)
Out-group X	-0.0761	-0.0761	1.254**	1.254**
LOSS	(0.149)	(0.149)	(0.579)	(0.579)
Controls	No	Yes	No	Yes
Constant	1.625***	0.831**	11.01***	11.01**
	(0.101)	(0.394)	(0.324)	(1.025)
Observations	588	588	588	588
Prob > χ^2	p < 0.001	p < 0.001	p < 0.001	p < 0.001

Notes: The social distance measure (Models 1 and 2) and recipients' final earnings (Models 3 and 4) are regressed on dummy variables indicating the out-group status (subsuming the close and the far out-group), the ***LOSS*** *treatment, and the interaction of the two. Additional control variables in Model 2 and 4 include participant age, gender, education and income levels. Standard errors are indicated in parentheses, *p<0.1, **p<0.05, and ***p<0.01.*

In Table 5, we again run multi-level mixed effects regressions with decision-makers as a level of hierarchy. We run the regressions for the two allocation types *In-group favoring* (Models 1 and 2) and *Out-group favoring* (Models 2 and 3) separately. In all models, the dependent variable is recipients' final earnings. The main independent variables are the dummy variable for ***LOSS,*** two dummy variables for the close and far out-group, respectively, and the two interactions of ***LOSS*** and an out-group dummy. The regression models with and without controls confirm Result 2. As the coefficients of both interaction terms are not statistically significant (p-value>0.742 in both models), *In-group favoring* participants do not reduce their in-group bias in ***LOSS*** compared to ***GAIN***. For the Out-group favoring participants, in contrast, the *Close out-group* X ***LOSS*** interaction effect is positive and highly statistically significant (p-value=0.002 in both models). This implies that those participants increase their out-group favoring behavior toward the close out-group in ***LOSS*** compared to ***GAIN***.

Table 5: Regression results (Multilevel mixed-effects linear regressions).

	In-group Favoring	In-group Favoring	Out-group Favoring	Out-group Favoring
	(1)	(2)	(3)	(4)
Dep. variable	*Recip. fin. earn.*	*Recip. fin. earn.*	*Recip. fin. earn.*	*Recip. fin. earn.*
Close out-group	-6.862***	-6.862***	4.272***	4.272***
	(0.728)	(0.728)	(0.972)	(0.972)
Far out-group	-8.655***	-8.655***	9.909***	9.909***
	(0.728)	(0.728)	(0.972)	(0.972)
LOSS	0.191	0.191	-1.536*	-1.536*
	(0.784)	(0.784)	(0.863)	(0.894)
Close out-group X	-0.365	-0.365	3.701***	3.701***
LOSS	(1.109)	(1.109)	(1.221)	(1.221)
Far out-group X	-0.208	-0.208	0.907	0.907
LOSS	(1.109)	(1.109)	(1.221)	(1.221)
Controls	No	Yes	No	Yes
Constant	15.17***	15.17***	5.27***	5.27***
	(0.515)	(1.866)	(0.687)	(2.008)
Observations	153	153	90	90
Prob > χ^2	p < 0.001	p < 0.001	p < 0.001	p < 0.001

*Notes: The recipients' final earnings are regressed on dummy variables indicating the out-group status (close out-group and far out-group), the **LOSS** treatment, and the respective interactions. Models 1 and 2 (3 and 4) restrict observations to decision-makers classified as In-group favoring (Out-group favoring). Additional control variables in Model 2 and 4 include participant age, gender, education and income levels. Standard errors are indicated in parentheses, *p<0.1, **p<0.05, and ***p<0.01.*

Appendix B. Experimental instructions (Translated from Chinese)

This is the experimenter's copy of the instructions. Note that the decision-makers see the same instructions with two exceptions. First, they do not see the headers **GAIN** or **LOSS**, and they only see the instructions for their respective treatment. Second, on their screens, the correct answers to the control questions are not underlined. Text within one frame is displayed on one screen.

Brief background

Welcome to our scientific study!

We are conducting academic research to understand how individuals make decisions in various contexts. We highly appreciate your participation in this study.

- This study consists of a task and a brief questionnaire.
- You and other participants can earn real money based on the choices you make in the task.
- Your identity is anonymous for other study participants. In the same way, the identity of other study participants is not known to you.
- You will get the money earned in the task, if you complete the task and answer to the questionnaire. If you complete the task, but do not answer the questionnaire, you will be paid 0 RMB.
- The study is expected to take approximately 15 minutes to complete。
- Your participation is completely voluntary.
- Your data will remain confidential and will be treated anonymously.
- You must be 18 years or older to participate.
- You will get paid through Alipay. Therefore, we need you to provide your mobile phone number associated with your Alipay.
- If you have any questions, please contact us via email, email address:

[button] Agree and continue

[button] Leave the study (you will not get the payment we provide)

Do you have a Shanghai hukou? [yes/no]

Are you born in Shanghai? [yes/no]

[*GAIN*] [*LOSS*]

Instructions: Task	**Instructions: Task**
You are matched with three other study participants: [random order] • Participant 1 is a local Shanghai resident • Participant 2 is an immigrant from a rural area around Shanghai • Participant 3 is an immigrant from a rural area around Urumqi Study Description: • **You start the study with 20 RMBs, while each of the three participants starts the study with 0 RMBs.** • In the beginning of the study, you and the three participants will take part in a lottery which has two outcomes. • In the lottery you and the three participants cannot lose money, but you and the three participants can win money. o **Lottery Outcome 1: Nobody wins.** o The initial amount of money you have does not change. As a result, you get 20 RMBs, while the other three participants get 0 RMBs each. o The study is over. o **Lottery Outcome 2: Everyone wins.** o As a result, you win additional 10 RMBs (thus, you have 30 RMBs) and the other	You are matched with three other study participants: [random order] • Participant 1 is a local Shanghai resident • Participant 2 is an immigrant from a rural area around Shanghai • Participant 3 is an immigrant from a rural area around Urumqi Study Description: • **You start the study with 40 RMBs, while each of the three participants starts the study with 20 RMBs.** • In the beginning of the study, you and the three participants will take part in a lottery which has two outcomes. • In the lottery you and the three participants cannot win money, but you and the three participants can lose money. o **Lottery Outcome 1: Nobody loses.** o The initial amount of money you have does not change. As a result, you get 40 RMBs, while the other three participants get 20 RMBs each. o The study is over. o **Lottery Outcome 2: Everyone loses.** o As a result, you lose 10 RMBs (thus, you are left with 30 RMBs) and the

three participants win additional 30 RMBs in total. o You are asked to decide how much of the 30 RMB gain to allocate to each of the three participants. o You can allocate as much gain to a participant as you would like to. The only three restrictions are: a) After your decision, no other participant can have less than 0 RMBs. b) After your decision, no other participant can have more than 20 RMBs. c) The sum of allocated gain to the three participants should be equal to the money they gained, i.e., 30 RMBs. o Note that for each of the three other participants the final payoff <u>after your allocation decision</u> is calculated in the following way: <u>Another participant's final payoff = 0 + the gain that you allocated to the participant.</u> o Your final payoff <u>after your allocation decision</u> (irrespective of which allocation decision you take) is calculated in the following way: <u>Your final payoff = 20 + 10 = 30</u>	other three participants lose 30 RMBs in total. o You are asked to decide how much of the 30 RMB loss to allocate to each of the three participants. o You can allocate as much loss to a participant as you would like to. The only three restrictions are: a) After your decision, no other participant can have less than 0 RMBs. b) After your decision, no other participant can have more than 20 RMBs. c) The sum of allocated loss to the three participants should be equal to the money they lost, i.e., 30 RMBs. o Note that for each of the three other participants the final payoff <u>after your allocation decision</u> is calculated in the following way: <u>Another participant's final payoff = 20- the loss that you allocated to the participant.</u> o Your final payoff <u>after your allocation decision</u> (irrespective of which allocation decision you take) is calculated in the following way: <u>Your final payoff = 40 - 10 = 30</u>
Control Questions	**Control Questions**

o Before starting the task, we will ask you several questions to make sure you understood the instructions. o As soon as you have answered all control questions correctly, you can begin the task. o If you are not sure that you understood the instructions, please feel encouraged to read the instructions again. You can scroll up to do that. [In case of a wrong answer to a question, a message pops-up inviting the participant to read the instructions once more] **Imagine the lottery does not result in a gain. Does your initial endowment and the other three participants' endowments change?** o Yes o <u>No</u> **Imagine the lottery results in a gain. How many RMBs will you receive as a result of completing the task?** o 10 RMB o 20 RMB o <u>30 RMB</u> o 40 RMB **Imagine the lottery results in a gain. How much is the total monetary amount of the**	Before starting the task, we will ask you several questions to make sure you understood the instructions. As soon as you have answered all control questions correctly, you can begin the task. If you are not sure that you understood the instructions, please feel encouraged to read the instructions again. You can scroll up to do that. [In case of a wrong answer to a question, a message pops-up inviting the participant to read the instructions once more] **Imagine the lottery does not result in a loss. Does your initial endowment and the other three participants' endowments change?** o Yes o <u>No</u> **Imagine the lottery results in a loss. How many RMBs will you receive as a result of completing the task?** o 10 RMB o 20 RMB o <u>30 RMB</u> o 40 RMB **Imagine the lottery results in a loss. How much is the total monetary amount of the**

gain that you need to allocate to the three participants? o 20 RMB o <u>30 RMB</u> o 60 RMB o 90 RMB	**loss that you need to allocate to the three participants?** o 20 RMB o <u>30 RMB</u> o 60 RMB o 90 RMB
Imagine the lottery results in a gain. Furthermore, imagine you allocate 20 RMBs gain to one of the three participants. How much money does he or she earn in the study? o 0 RMB o 7 RMB o <u>20 RMB</u> o 39 RMB	**Imagine the lottery results in a loss. Furthermore, imagine you allocate 0 RMBs loss to one of the three participants. How much money does he or she earn in the study?** o 0 RMB o 7 RMB o <u>20 RMB</u> o 39 RMB
Imagine the lottery results in a gain. Furthermore, imagine you allocate 0 RMBs gain to one of the three participants. How much money does he or she earn in the study? o <u>0 RMB</u> o 7 RMB o 20 RMB o 39 RMB	**Imagine the lottery results in a loss. Furthermore, imagine you allocate 20 RMBs loss to one of the three participants. How much money does he or she earn in the study?** o <u>0 RMB</u> o 7 RMB o 20 RMB o 39 RMB
Imagine the lottery results in a gain. Is the following decision possible according to the rules of the study? • You allocate to participant 1 a gain of: 7 RMB	**Imagine the lottery results in a loss. Is the following decision possible according to the rules of the study?** • You allocate to participant 1 a loss of: 7 RMB

- You allocate to participant 2 a gain of: 3 RMB
- You allocate to participant 3 a gain of: 22 RMB

o Yes
o No

Imagine the lottery results in a gain. Is the following decision possible according to the rules of the study?

- You allocate to participant 1 a gain of: 18 RMB
- You allocate to participant 2 a gain of: 2 RMB
- You allocate to participant 3 a gain of: 10 RMB

o Yes
o No

Imagine the lottery results in a gain. Is the following decision possible according to the rules of the study?

- You allocate to participant 1 a gain of: 8 RMB
- You allocate to participant 2 a gain of: 14 RMB
- You allocate to participant 3 a gain of: 8 RMB

o Yes

- You allocate to participant 2 a loss of: 3 RMB
- You allocate to participant 3 a loss of: 22 RMB

o Yes
o No

Imagine the lottery results in a loss. Is the following decision possible according to the rules of the study?

- You allocate to participant 1 a loss of: 18 RMB
- You allocate to participant 2 a loss of: 2 RMB
- You allocate to participant 3 a loss of: 10 RMB

o Yes
o No

Imagine the lottery results in a loss. Is the following decision possible according to the rules of the study?

- You allocate to participant 1 a loss of: 8 RMB
- You allocate to participant 2 a loss of: 14 RMB
- You allocate to participant 3 a loss of: 8 RMB

o Yes

o No **Note: If you click 'Next', the Task will start immediately, and you will not be able to return to these instructions.**	o No **Note: If you click 'Next', the Task will start immediately, and you will not be able to return to these instructions.**

Lottery	**Lottery**
Now, we proceed with the task. Please click the „Participate in the Lottery"-Button to participate in the lottery. [button] Participate in the Lottery	Now, we proceed with the task. Please click the „Participate in the Lottery"-Button to participate in the lottery. [button] Participate in the Lottery

Thank you for participating in this study. **Unfortunately, nobody won.** The initial amount of money you have does not change. As a result, you get 20 RMBs, while the other three participants get 0 RMBs each. You have completed the study.	**Thank you for participating in this study.** **Unfortunately, nobody lost.** The initial amount of money you have does not change. As a result, you get 40 RMBs, while the other three participants get 20 RMBs each. You have completed the study.

Everyone won. As a result, **you won additional 10 RMBs (thus, you have 30 RMBs)** and **the other three participants won additional 30 RMBs in total**. **Reminder:**	**Everyone lost.** As a result, **you lost 10 RMBs (thus, you are left with 30 RMBs)** and **the other three participants lost 30 RMBs in total**. **Reminder:**

- You are asked to decide how much of the 30 RMB gain to allocate to each of the three participants.

- You can allocate as much gain to a participant as you would like to. The only three restrictions are:
  a) After your decision, no other participant can end up with less than 0 RMBs.
  b) After your decision, no other participant can end up with more than 20 RMBs.
  c) The sum of allocated gain to the three participants should be equal to the money they gained, i.e., 30 RMBs.

- Note that for each of the three other participants the final payoff <u>after your allocation decision</u> is calculated in the following way:

<u>Another participant's final payoff = 0 + the gain that you allocated to the participant</u>

- Your final payoff <u>after your allocation decision</u> (irrespective of which allocation decision you take) is calculated in the following way:

  <u>Your final payoff = 20 + 10 = 30</u>

In the boxes below, please indicate how much gain (in RMBs) out of 30 RMBs you would like to allocate to each participant.

Participant 1: „Local Shanghai resident"

- You are asked to decide how much of the 30 RMB loss to allocate to each of the three participants.

- You can allocate as much loss to a participant as you would like to. The only three restrictions are:
  a) After your decision, no other participant can end up with less than 0 RMBs.
  b) After your decision, no other participant can end up with more than 20 RMBs.
  c) The sum of allocated loss to the three participants should be equal to the money they lost, i.e., 30 RMBs.

- Note that for each of the three other participants the final payoff <u>after your allocation decision</u> is calculated in the following way:

<u>Another participant's final payoff = 20- the loss that you allocated to the participant</u>

- Your final payoff <u>after your allocation decision</u> (irrespective of which allocation decision you take) is calculated in the following way:

  <u>Your final payoff = 40 - 10 = 30</u>

In the boxes below, please indicate how much loss (in RMBs) out of 30 RMBs you would like to allocate to each participant.

Participant 1: „Local Shanghai resident"

Participant 2: „Immigrant from a rural region around Shanghai”	Participant 2: „Immigrant from a rural region around Shanghai”

Questionnaire

Please click ‘Next’ to begin the questionnaire.
The answers you provide in the questionnaire do not influence your payment. The answers are important to us for scientific reasons. Once you have finished answering the questions, you will be redirected to Ancademy to receive your payment.

Questionnaire (part 1/2)

Select the option that best describes your feeling towards the mentioned group of people on the basis of the following statements.
Selecting (agreeing with) a statement means agreeing also to statements which follow the selected statement.
„Local Shanghai residents”

- Would you be willing to marry a member of this group?
- Would you be willing to have a member of this group as your close personal friend?
- Would you be willing to have a member of this group as your neighbour?
- Would you be willing to have a member of this group as your colleague at work?

“Immigrants from a rural area around Shanghai”
[same questions]
“Immigrants from a rural area around Urumqi”
[same questions]

Questionnaire (part 2/2)

What is your gender?
○ Male
○ Female
What is the year of your birth?
In which province were you born?
In which town/city/village were you born?
What is the highest level of schooling you have completed? If currently enrolled, mark the highest degree received.

○ High school graduate

○ Some college

○ Associate degree (finished community college)

○ Bachelor's degree

○ Master's degree

○ Doctorate or professional degree

○ No schooling

What is your employment status? (multiple answers possible)

□ Full-Time

□ Part-Time

□ Not in paid work (e.g. homemaker, retired, or disabled)

□ Student

□ Unemployed (and job seeking)

□ Other

What is your household monthly income after taxes? Please consider all sources of income your household has.

○ More than 500 001 RMB

○ 200 001 - 500 000 RMB

○ 100 001 - 200 000 RMB

○ 50 001 - 100 000 RMB

○ 30 001 - 50 000 RMB

○ 20 001 - 30 000 RMB

○ 10 001 - 20 000 RMB

○ 5 001 - 10 000 RMB

○ 2 001 - 5 000 RMB

○ 1 001 - 2 000 RMB

○ Up to 1 000 RMB

○ Do not know/Refuse to Answer

How many adults live in your household?

What is your marital status?

○ Never married

○ Married

○ Divorced

○ Widow/Widower

○ Other

Thank you for participating in this study.

You have completed the study.

Your payment from the experiment is: 30 RMB

You will get paid through Alipay.

Please enter your phone number that is associated with Alipay.

Please repeat the phone number

Appendix C. Conceptual Model

In this section, we briefly sketch a simple conceptual model that unifies and rationalizes the allocation decisions of both in-group favoring and out-group favoring decision-makers. It combines the "social utility model" including an absolute payoff component and a comparative payoff component (e.g., Blount, 1995) with the notion of social identity (Akerlof and Kranton, 2000; Charness and Chen, 2020). In the gain domain, decision-makers decide which share of a given resource pool to assign to the in-group, the close out-group, and the far out-group. Accordingly, we can think of decision-makers as maximizing their utility given by

$$u_I(s_I, s_C, s_F) = \sigma_I \cdot f_I\big(\Pi_I(s_I)\big) - \sigma_C \cdot f_C\big(\Delta_{IC}(s_I, s_C)\big) - \sigma_F \cdot f_F(\Delta_{IF}(s_I, s_F))$$

with respect to their allocation decisions captured by $s_i \geq 0$, with $\sum_i s_i = 1$ and $i \in \{I, C, F\}$ denoting the in-group, close out-group, and far out-group, respectively. u_I is additively separable in its different utility components. $f_I(\cdot)$ reflects the value of the in-group's outcome $\Pi_I(s_I)$, and $\sigma_I \geq 0$ is a parameter capturing the weight put on f_I, with $\partial\Pi_I/\partial s_I > 0$, $\partial f_I/\partial\Pi_I > 0$, and $\partial^2 f_I/\partial\Pi_I^2 \leq 0$. Moreover, $f_k(\cdot), k \in \{C, F\}$, reflects the comparative payoff component, which depends on the payoff differences between the in-group and the respective out-group, $\Delta_{Ik} = \Pi_I(s_I) - \Pi_k(s_k)$, as well as the parameter $\sigma_k \geq 0$ representing the respective weights on f_k, with $\partial\Pi_k/\partial s_k > 0$, $\partial f_k/\partial\Delta_{Ik} > 0$, and $\partial^2 f_k/\partial\Delta_{Ik}^2 \geq 0$. We assume that decision-makers maximize their utility with respect to s_i subject to the constraint that $|\Delta_{Ik}| \leq \overline{\Delta}$, with $\overline{\Delta} \leq 1$, i.e., there is an upper bound of the feasible inequality between the in-group and a given out-group.

Within this conceptual model, the in-group favoring participants are characterized by $\sigma_k = 0$ and $\sigma_I > 0$. Consequently, those decision-makers allocate as much as possible to the in-group under the constraints that $\Delta_{Ik} = \overline{\Delta}$, resulting in the typical in-group bias $\Pi_I > \Pi_k$ (see the blue bars in the left panel of Figure 4). However, some decision-makers might also care more about the equality between recipients, thus attaching a substantial weight on the comparative utility components. If they additionally consider the social context in China and the fact that the far out-groups in our framework are in general worse off than close out-groups (since Uyghurs are generally more disadvantaged in the Chinese society than Hans), while the latter are worse off than the in-groups, the parameters σ_i satisfy $\sigma_F > \sigma_C > \sigma_I \geq 0$. Such decision-makers may hence allocate relatively little to the in-group, more to the close out-group, and even more to the far out-group, i.e., $s_I < s_C < s_F$ (see the blue bars in the right panel of Figure 4).

As for the question of why allocation decisions of out-group favoring participants vary between the gain and the loss domain, we consider that decisions involving taking from a recipient are less socially appropriate (Krupka and Weber, 2013) and morally more costly (Korenok et al., 2018) than the decisions involving not giving to a recipient. The decision-makers' utility function in the loss domain then changes to

$$u_I' = u_I - \sum_i \sigma_i \cdot c_i(s_i),$$

with $\partial \Pi_i / \partial s_i < 0$, $\partial c_i / \partial s_i > 0$, $\partial^2 c_i / \partial s_i^2 \geq 0$. The fact that the moral costs $c_i(s_i)$ are weighted with σ_i accounts for the intuitive assumption that imposing a loss on a person is even more morally costly when there is a larger imbalance between the recipient and the decision-maker. Overall, the change in the utility function might not significantly affect the decisions of in-group favoring decision-makers in the loss compared to the gain domain as they are characterized by $\sigma_k = 0$. However, it might induce out-group favoring decision-makers to prefer even higher payoffs for the two out-groups than the in-group. To ex-post rationalize the behavior of out-group favoring decision-makers, Figure 4 (see the red bars) shows that the optimal allocation to the far out-group is already very high in the gain domain. Hence, the impact of the additional moral costs of taking cannot be significantly reflected in the decisions for the far out-group but only in the decisions for the close out-group and the in-group.[24]

[24] Introducing a loss aversion parameter (Kahneman and Tversky, 1979) instead of moral costs of taking can provide an equivalent rationalization for our experimental results.