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## ARTICLE

# The effects of social exclusion on distributive fairness judgements and cooperative behaviour

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## Abstract

In this article, we investigate how being socially excluded (vs. included) affects people's distributive fairness judgements and their willingness to cooperate with others in subsequent interactions. For this purpose, we conducted three experiments in which we assessed individual differences in having experienced being socially excluded (Experiment 1,  $N = 164$ ), and manipulated social exclusion (Experiment 2,  $N = 120$ ; Experiment 3,  $N = 492$ ). We studied how this impacted fairness judgements of three different outcome distributions (disadvantageous inequality, advantageous inequality, and equality) both within-participants (Experiments 1 and 2) and between-participants (Experiment 3). To assess behavioural consequences, we then also assessed participants' cooperation in a social dilemma game. Across the three experiments, we consistently found that social exclusion impacted fairness judgements. Compared to inclusion, excluded participants judged disadvantageous inequality as more unfair and advantageous inequality as less unfair. Moreover, compared to socially included participants, socially excluded participants were more willing to cooperate after experiencing advantageous rather than disadvantageous inequality, and feelings of acceptance served as a mediator in these associations.

## KEYWORDS

cooperative behaviour, distributive fairness, fairness judgements, social exclusion

## INTRODUCTION

As social creatures, people strive to be included by groups and maintain social connections. Social exclusion occurs when people are isolated or rejected during social interactions (Walasek et al., 2019; Wesselmann et al., 2012; Williams, 2007). Being excluded is painful and generally has negative

consequences for the excluded individual (Buelow et al., 2015; Walasek et al., 2019). In particular, it has been demonstrated to negatively impact people's fundamental needs, lead to depression, and invite negative behaviours like aggression (see for overviews, e.g., Ren et al., 2018; Wesselmann & Williams, 2017; Williams, 2007, 2009).

A less explored effect is that social exclusion may affect how people subsequently perceive their social environment. For example, Sacco et al. (2011) showed that exclusion may exacerbate perceptions of social categories with inclusionary implications such that socially excluded individuals discriminated more between happy and angry facial expressions, and between racial categories than socially included individuals (see also e.g., Bernstein et al., 2008). A recent review from Syrjämäki and Hietanen (2019) noted that exclusion can result in both more positive (e.g., perceiving others as nicer or more attractive; Maner et al., 2007) and more negative perceptions (e.g., perceiving actions of others as more hostile; DeWall et al., 2009).

In the current study we add to this emerging line of research by investigating whether the experience of having been socially excluded (vs. included) impacts how fair people subsequently perceive their social environment to be; that is, whether it affects people's judgements about how fair or unfair outcomes are in unrelated interaction. Fairness is a core ethical value that strongly guides human behaviour in social decision making (Camerer, 2011; Camerer & Fehr, 2006). Within the field of social decision making, it has been documented that people react negatively (e.g., with anger or retribution) when learning that outcomes are distributed unfairly (Stouten et al., 2005, 2006), and that people behave less cooperatively after having received unfair outcomes (e.g., Wang et al., 2019; Zhang, 2017; Zhang & Zhou, 2018). If exclusion would affect fairness judgements, this could then have profound effects not only for those who are excluded, but also for others with whom they subsequently interact.

## Social exclusion and reactions to inequality

Theorizing on distributive fairness generally distinguishes between three types of distributions: equality (i.e., receiving an equal share as others), disadvantageous inequality (i.e., receiving less than others), and advantageous inequality (i.e., receiving more than others) (Fehr & Schmidt, 1999; McAuliffe et al., 2017). Past research has yielded two major findings. The first is that people are typically inequality averse (e.g., Adams, 1965; Fehr & Schmidt, 1999) such that people perceive not only disadvantageous but also advantageous inequality as less fair than equality (Bechtel et al., 2018; McAuliffe et al., 2017). The second is that fairness judgements of inequality are to some extent egocentrically biased towards one's own needs and interests (e.g., Leung et al., 2004; Thompson & Loewenstein, 1992), as people consider receiving less than an equal share as more unfair than receiving more than an equal share (e.g., Loseman et al., 2009; Sun et al., 2019).

The question we raise here is whether the individual experience of having been socially excluded impacts how people judge receiving less versus more than others; that is, how socially excluded people react to disadvantageous versus advantageous inequality compared to socially included people. We are especially interested in this question because we conjecture that social exclusion may fuel people's tendency to perceive inequality in terms of consequences for the self, and in particular in terms of whether they are accepted as a person. In this respect, it is relevant to note that the concept of fairness is linked to people's need to belong and to be accepted. In his outline of fairness heuristic theory, Lind (2001), for example, referred to the importance of being valued by others as 'the most important part of what people mean by fairness' (p. 58), and described fairness as an 'indicator of safety from exclusion' (p. 83). The notion that feeling socially valued is a key aspect of fairness judgements is also an integral part of related insights in the domain of fairness that draw attention to the relational information that procedures and outcomes may signal, such as the group-value theory (Lind & Tyler, 1988), and the group-engagement model (Blader & Tyler, 2009; Tyler & Blader, 2003). In more recent work, this notion was incorporated in uncertainty management theory (e.g., Lind & Van den Bos, 2022). One of its premises is that people

use fairness related information to manage personal uncertainty, and that in this process people ‘use feelings of social connectedness to manage their insecurity’ (Lind & Van den Bos, 2022, p. 10).

What these theories have in common is that they all assume that relational concerns are at the basis of why and how people value and attend to fairness information. Importantly, these insights also imply that such information may especially be relevant for those people who are socially excluded. This proposition would fit not only with previous findings that social exclusion makes people more attentive to social cues that indicate whether others accept them or not (Bernstein et al., 2008; Böckler et al., 2014; DeWall et al., 2009). It would also fit with the notion that attending to fairness information may be a means to deal with personal uncertainty (e.g., Lind & Van den Bos, 2022), as exclusion being an important source of personal uncertainty (see e.g., Chen et al., 2010; Güzel & Şahin, 2018).

These insights also provide a basis to predict how people react to inequality. More specifically, we reasoned that, socially excluded persons—more than socially included persons—may interpret a situation in which others provide them with less than an equal share as a sign that they are not socially accepted by these others. They may thus perceive disadvantageous inequality as more unfair than socially included persons. In contrast, learning that others provide them with more than an equal share may be appreciated and interpreted as a sign that they are accepted. They may therefore judge advantageous inequality as less unfair. If true, this heightened tendency to evaluate inequality by its consequences for the self would lead socially excluded people—compared to socially included people—to judge disadvantageous inequality as more unfair, and advantageous inequality as less unfair.

The focus of our research is not only on how unfair socially excluded individuals (vs. socially included individuals) judge inequality, but also on behavioural reactions that follow. More specifically, we argue that the moderating effect of social exclusion may also be observed in the individuals' willingness to cooperate with the person who distributes outcomes unequally. This link between receiving distributive outcomes from a person in one interaction and the willingness to subsequently cooperate with that person in another interaction can be explained by the inclination for reciprocity (Fehr et al., 2002; Gray et al., 2014; Van Dijk & De Dreu, 2021). When receiving less than an equal share from another person, people tend to negatively reciprocate such disadvantageous inequality by being less willing to help that other person in subsequent interactions compared to when they receive an equal share (Wang et al., 2019). When receiving more than an equal share, people also experience inequality (Bechtel et al., 2018; McAuliffe et al., 2017), but this may not have a similar negative effect on subsequent cooperation. Instead, it is likely that people reciprocate such advantageous inequality less negatively, or even positively, by being more willing to help that person in subsequent interactions compared to when they experience disadvantageous inequality.

If socially excluded persons are indeed—as we hypothesized above—more attentive to social cues than socially included people, this may amplify the effects of inequality on cooperative behaviour. Socially excluded people (compared to socially included people) may be less willing to cooperate with others who provided them with less than an equal share (disadvantageous inequality), and more willing to cooperate with others who provided them with more than an equal share (advantageous inequality).

## Social exclusion and reactions to equality

While our main focus is on how people react to inequality, our experimental setup also allows us to address reactions to equality among both socially excluded and included individuals. Here, our expectations are more tentative and our analyses are more exploratory, because it is less clear whether people interpret receiving an equal share of distributed outcomes as a strong signal of acceptance. On the one hand, one might reason that they might see receiving an equal share as an impartial allocation of material resources that symbolizes recognition and respect (Blader & Tyler, 2009; De Cremer, 2002) and thereby as a sign of being accepted. If true, individuals who have been socially excluded (vs. included) may judge equality as fairer and be more willing to subsequently reciprocate receiving equal outcomes with cooperation, even if this is personally costly.

However, there are also reasons to argue that receiving an equal share is not that informative of one's personal acceptance. This can be derived from attribution theories (Jones & Davis, 1965; Kanouse & Hanson, 1972), stating that behaviours that are not exceptionable, or just generally desirable, are not that informative about people's intentions. Since equality, is a widely shared social norm to which most people adhere, and often used as a heuristic in social decision making without much consideration of its consequences (e.g., Bazerman et al., 1995; Dawes et al., 2007; Deutsch, 1975; Messick & Schell, 1992; Van Dijk et al., 2010), seeing someone distribute outcomes equally may not be that informative about the underlying intention. A recent fMRI study supports this view. Comparing the activation of brain regions in reactions to equal and advantageous unequal outcome distributions, Haesevoets et al. (2022) showed that the mentalizing network was less activated when receiving equal rather than advantageous unequal outcomes. For the current purposes, this could imply that receiving an equal share may not serve as a strong signal of whether or not one is accepted, and therefore not necessarily be more valued by socially excluded individuals than by socially included individuals. Thus, there might also be reasons to anticipate only a small or even absent effect of social exclusion on fairness judgements of equality, and/or subsequent cooperation.

## The present research

We investigated our reasoning in three experimental studies. In Experiment 1, we measured individual differences in the experience of social exclusion using the Social Exclusion Questionnaire for Undergraduates (Wu et al., 2013), in which a higher score denotes having experienced a higher level of social exclusion in daily life. In Experiments 2 and 3, we manipulated social exclusion in a Cyberball game (e.g., Walasek et al., 2019; Williams et al., 2000; Williams & Jarvis, 2006), in which a smaller number of ball tosses that participants receive denotes a higher level of social exclusion. In all three experiments, participants faced a two-person economic decision task with multiple rounds (in Experiments 1 and 2). Within each round, we first presented participants with an outcome distribution that was made by another person, which we used to manipulate the three types of outcome distributions (i.e., disadvantageous inequality, advantageous inequality, and equality) and measured their fairness judgements (Camerer, 2011; Wang et al., 2019). Next, we presented participants with a mixed-motive decision (i.e., a chicken game; De Heus et al., 2010; Fort & Viola, 2004; Sun et al., 2022) in which they could choose whether or not to cooperate with this person. In addition to these measures of fairness judgements and cooperative behaviour, we used Experiment 3 to further explore the underlying psychological process by including measurements of potential mediators (i.e., the feeling of being accepted, and entitlement).

## EXPERIMENT 1

### Method

#### Participants and design

We recruited 164 undergraduates ( $N_{\text{female}} = 87$ ;  $M_{\text{age}} = 20.67$ ,  $SD = 1.79$ , range from 18 to 24 years) via advertisements within the university community. Undergraduates from the faculties of Psychology and Economics were a priori excluded from participation. This step was implemented to guarantee that the study participants possessed no prior knowledge or familiarity with the concepts being investigated, as such familiarity could potentially compromise the validity of the findings. In the absence of prior knowledge about which magnitude of effect sizes to expect for the moderating role of social exclusion, we decided to collect as many participants as possible in 4 weeks, with a minimum of 150 participants. We conducted a post hoc power analysis (based on 1000 simulations; Green & MacLeod, 2016) using the *simr* package (Version 1.0.5) in R (Version 4.0.5), which showed

that our sample size (i.e., 164) yielded a power of 99.90% (95% CI [99.44, 100.00]) to detect a small effect size (equivalent to a Cohen's  $d$  of 0.10) for the moderating effect of social exclusion on fairness judgements.

A mixed design was employed. Outcome distribution (disadvantageous inequality vs. advantageous inequality vs. equality) was a within-subjects variable, and individual differences in the experience of social exclusion was a between-subjects variable.

## Procedure

All participants were invited for a study on 'social interaction'. Upon arrival, participants were first assigned to a cubicle and learned that the computer in the cubicle would be used to provide instructions and record their responses. Participants were then told that each player would receive a unique code to represent their identity during this experiment. Participants were informed that they would participate in different tasks—they would fill in an interaction experience scale and participate in a two-person decision task with multiple rounds. Participants learned that the payment for completing the scale was 10 CNY<sup>1</sup> and the payment for the two-person decision task would be calculated based on one round selected by the computer.

### The interaction experience scale

In this session, social exclusion was measured by using the Social Exclusion Questionnaire for Undergraduates (Wu et al., 2013), which consists of 19 items; 10 direct social exclusion statements and 9 indirect social exclusion statements. Participants were asked to report the extent to which they felt socially excluded during daily interactions with others (e.g., 'During the chat, no matter what topic I say, nobody gives me feedback.') on a 5-point Likert scale (1 = never, 5 = always). Participants' assessment across the items were averaged to yield a mean score, in which the higher participants score, the more social exclusion the participants had experienced (Wu et al., 2013). The internal consistency was high (Cronbach's  $\alpha = .85$ ).

### Two-person economic decision task

Participants were informed that the two-person decision task included 18 rounds in which two persons would make a decision. In each round, they would be connected to a different participant. Within each round, there would be two phases in which they and the other person would make their decisions, which would have monetary consequences. Participants learned that after completion of the 18 rounds, one round would be randomly selected to compute their final payment.

#### *Phase 1*

In this phase, participants learned that there would be 12 CNY available for the two persons, and that one of them would determine how these outcomes would be divided between them. All participants learned that in phase 1, it was the other person who would distribute the 12 CNY. The other participant could choose between allocating half of the money to each (i.e., equality; 6 CNY vs. 6 CNY), less than half of the money to the participant (i.e., disadvantageous inequality; 3 CNY vs. 9 CNY) or more than half of the money to the participant (i.e., advantageous inequality; 9 CNY vs. 3 CNY).

<sup>1</sup>The study was conducted in China. CNY is the Chinese currency (i.e., Chinese yuan). At the time of running the experiment, 1 CNY was approximately 0.12 British Pounds (GBP).

In 6 of the 18 rounds, participants received feedback that the other had chosen the 6–6 option, in 6 rounds they learned that the other had chosen the 3–9 option, and in the remaining 6 rounds that the other had chosen the 9–3 option. Trials were presented in a pseudo-random order (Figure 1a).

### Phase 2

In this phase, the chicken game was used to measure cooperative behaviour (De Heus et al., 2010; Fort & Viola, 2004; Sun et al., 2022). Participants learned that both they and the other person—the same person who made the distribution in phase 1—would independently choose either ‘Q’ or ‘P’, which would determine their outcomes. Participants were shown a payoff matrix (see Figure 1b), which models conflict between self-interest (choosing ‘P’) and collective interest (choosing ‘Q’). Specifically, mutual ‘Q’ choices maximize the collective (self + other) outcome, and mutual ‘P’ choices minimize the outcome for each person. If one person chooses ‘Q’ and the other chooses ‘P’, it maximizes the outcome of the person who chooses ‘P’.

All participants were informed that the final outcome for each round would consist of the outcomes they obtained in phase 1 plus the outcomes they obtained in phase 2. Before starting the 18 rounds, participants completed a comprehension questionnaire with six multiple-choice questions, in which we, for example, checked whether they correctly identified that their final outcome within a round would consist of the combined outcomes for phases 1 and 2 (vs. only phase 1 or only phase 2). Participants would subsequently proceed to the rounds once they answered this comprehension check successfully, which each participant did in one try.

In each round, the allocation selected for phase 1 was presented first. Then, participants rated the fairness of the selected allocation on a 5-point Likert scale from ‘very unfair’ (i.e., 1) to ‘very fair’ (i.e., 5). Then, in phase 2, participants made a choice between ‘Q’ and ‘P’ without knowing the other person’s choice. After this, the next round began in which participants interacted with a different person.

In between rounds, participants did not receive feedback on the cooperation decisions of the other in phase 2. After having completed the 18 rounds, participants were informed that the decisions for the other players in Phases 1 and 2 had been pre-collected. They were also provided with feedback regarding the choices made by the other player in Phase 2 for each round. Then, one round was randomly selected by the computer and based on the joint choices, participants were on average paid 6.64 CNY (i.e., 0.80 GBP) in the two-person task. Thus, combined with the fixed fee participants received for filling out the social exclusion questionnaire, the average final payment was 16.64 CNY (i.e., 2.00 GBP). Finally, participants were debriefed and thanked.

### Statistical analyses

We analysed the data by fitting mixed models using the *lme4* package (Version 1.1–26) in R. To account for the dependency in the data structure, we added one random intercept for each participant to our

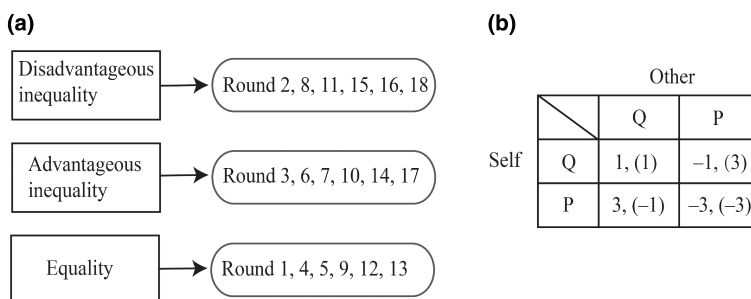


FIGURE 1 Presented order of rounds (Panel a) and the payoff matrix (Panel b).

models. Since the outcome distribution consisted of three conditions, we used a dummy-coding scheme with advantageous inequality condition as the reference level, resulting in a contrast for the comparison with the disadvantageous inequality condition (0 = Advantageous inequality, 1 = Disadvantageous inequality), and a contrast for the equality condition (0 = Advantageous inequality, 1 = Equality). We included these two contrasts and social exclusion (grand mean centred) as fixed effects in our models. Next, we ran the same models again, but this time also included the interaction between the contrasts and social exclusion.

To analyse the impact of outcome distributions and social exclusion on fairness judgements (1 = very unfair, 5 = very fair), we conducted a linear mixed model (LMM; using the Satterthwaite's method; Kuznetsova et al., 2017). To analyse the impact of outcome distributions and social exclusion on cooperative behaviour (0 = non-cooperation, 1 = cooperation), we conducted a generalized linear mixed model (GLMM) with a logit link function (using the Laplace approximation; Raudenbush et al., 2000).

Since advantageous inequality is the reference level in our models, these analyses provide us with the simple effect of social exclusion within the advantageous inequality condition. To also obtain the simple effects within the disadvantageous inequality and equality conditions, we employed two additional models, either with the disadvantageous inequality or with the equality condition as the reference level, for the analyses of both fairness judgements and cooperative behaviour.

Results

Fairness judgements

The LMM on fairness judgements (see Table 1, column 1) yielded two significant contrasts of outcome distribution. The disadvantageous inequality-advantageous inequality contrast showed that fairness was judged to be lower in the disadvantageous inequality condition ( $M=1.63$ ,  $SD=1.01$ ) than in the advantageous inequality condition ( $M=3.19$ ,  $SD=1.21$ ). The equality-advantageous inequality contrast showed that fairness was, in turn, judged to be higher in the equality condition ( $M=4.71$ ,  $SD=0.87$ ) than in the advantageous inequality condition.

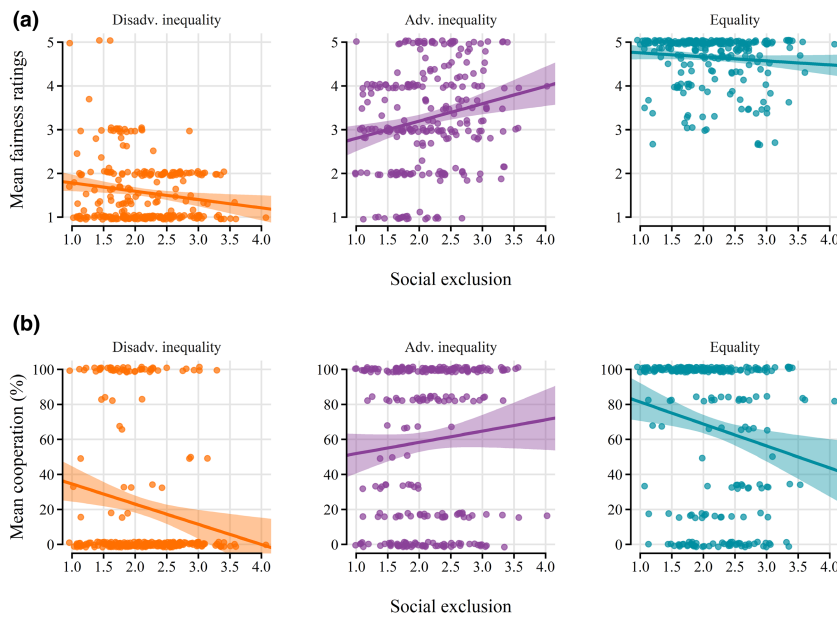
Moreover, results showed that social exclusion was associated with an increased difference in fairness ratings for disadvantageous inequality (compared to advantageous inequality), which is in line with our hypothesis. Furthermore, social exclusion was associated with a decreased difference in fairness ratings for equality

TABLE 1 Estimation results in Experiment 1.

|                                             | Fairness judgements |                  | Cooperative behaviour |                  |
|---------------------------------------------|---------------------|------------------|-----------------------|------------------|
|                                             | (1)                 | (2)              | (1)                   | (2)              |
| Intercept                                   | 3.186*** (0.05)     | 3.186*** (0.05)  | 0.421* (0.18)         | 0.456* (0.18)    |
| Disadv. Inequality<br>(vs. Adv. Inequality) | -1.553*** (0.04)    | -1.553*** (0.04) | -2.019*** (0.13)      | -2.122*** (0.13) |
| Equality<br>(vs. Adv. Inequality)           | 1.520*** (0.04)     | 1.520*** (0.04)  | 0.914*** (0.12)       | 0.918*** (0.13)  |
| Social Exclusion                            | 0.048 (0.08)        | 0.572*** (0.09)  | -0.648* (0.32)        | 0.542 (0.36)     |
| Disadv. Inequality × Social Exclusion       |                     | -0.810*** (0.08) |                       | -1.886*** (0.27) |
| Equality × Social Exclusion                 |                     | -0.761*** (0.08) |                       | -1.910*** (0.25) |
| Random intercept individual variance        | 0.214               | 0.215            | 3.984                 | 4.15             |
| Residual                                    | 0.761               | 0.724            |                       |                  |

Note: This table shows the estimation results from the LMM fitting fairness judgements (column 1) and the GLMM fitting cooperative behaviour (column 2). SEs are shown in parentheses.

\* $p < .05$ . \*\*\* $p < .001$ .



**FIGURE 2** The moderating effect of social exclusion across the outcome distribution conditions in Experiment 1. (Panel a) Participants' mean score of fairness perceptions (i.e., each dot represents one participant) and the fitted regression line (with 95% CIs) as a function of distributive fairness and social exclusion. (Panel b) Participants' relative frequency of cooperative behaviour (i.e., each dot represents one participant) and the fitted regression line (with 95% CIs) as a function of outcome distribution and social exclusion. To avoid overplotting, and to increase the readability and interpretability of Figure 2, a small amount of random noise (i.e., jitter) was added to the plots.

(compared to advantageous inequality). See Figure 2a for participants' mean fairness rating scores as a function of outcome distribution and the individual experience of having been socially excluded. Simple effects showed that when the individual experience of having been social excluded increased by 1, fairness ratings increased by an average of 0.572 in the advantageous inequality condition (see statistics in Table 1, column 1), whereas they decreased by an average of 0.238 in the disadvantageous inequality condition ( $B = -0.238$ ,  $SE = 0.09$ ,  $p = .008$ ) and by an average of 0.189 in the equality condition ( $B = -0.189$ ,  $SE = 0.09$ ,  $p = .035$ ).

## Cooperative behaviour

Results from the GLMM on cooperation behaviour (see Table 1, column 2) yielded two significant contrasts of outcome distribution. The disadvantageous inequality-advantageous inequality contrast showed that participants in the disadvantageous inequality condition cooperated less frequently ( $M_{\%} = 26.32$ ,  $SD_{\%} = 47.92$ ) than participants in the advantageous inequality condition ( $M_{\%} = 57.62$ ,  $SD_{\%} = 47.20$ ; Odds Ratio = 0.120, CI [0.09, 0.16]). The equality-advantageous inequality contrast showed that, in turn, participants in the equality condition cooperated more frequently ( $M_{\%} = 70.83$ ,  $SD_{\%} = 42.12$ ) than participants in the advantageous inequality condition (Odds Ratio = 2.505, CI [1.96, 3.20]).

Moreover, results showed that social exclusion, in line with our hypothesis, was associated with an increased difference in cooperation after experiencing disadvantageous inequality (compared to advantageous inequality). Furthermore, social exclusion was associated with a decreased difference in cooperation after experiencing equality (compared to advantageous inequality). See Figure 2b for participants' mean frequency of cooperative behaviour as a function of outcome distribution and the individual experience of having been socially excluded. Simple effects showed that when experienced social

exclusion increased by 1, no significant effect emerged in the advantageous inequality condition (Odds Ratio = 1.719, CI [0.85, 3.47]; see statistics in Table 1, column 2), whereas the frequency of cooperative behaviour was 3.83 times lower in the disadvantageous inequality condition ( $B = -1.343$ ,  $SE = 0.37$ ,  $p < .001$ , Odds Ratio = 0.261, CI [0.13, 0.54]) and 3.94 times lower in the equality condition ( $B = -1.369$ ,  $SE = 0.37$ ,  $p < .001$ , Odds Ratio = 0.254, CI [0.12, 0.52]).

## Discussion

In line with previous research (e.g., Leung et al., 2004; Thompson & Loewenstein, 1992), fairness judgements appeared to be egocentrically biased. Whereas an equal distribution of outcomes was generally considered the fairest, participants also felt that advantageous inequality was relatively less unfair than disadvantageous inequality. Importantly, the results also fit the idea that information that outcomes are distributed unequally, has a greater impact on socially excluded than on included individuals. Individuals with more experience of being socially excluded rated advantageous inequality fairer, and disadvantageous inequality unfairer.

Individual differences in having been socially excluded were also associated with the willingness to cooperate with the person who had offered them these distributive outcomes. Although participants most frequently cooperated after having received an equal outcome, the results also showed participants cooperated more often in response to advantageous rather than disadvantageous inequality, a relation that was stronger among participants with more experiences of being socially excluded. This again fits with the notion that information that outcomes are distributed unequally, has a greater impact on socially excluded individuals than on socially included individuals. This moderating effect of social exclusion, however, emerged after experiencing disadvantageous inequality, and not after experiencing advantageous inequality.

We also explored reactions to equality among both socially excluded and included individuals. The results showed that the more experiences individuals had with being socially excluded, the less fair they rated equal outcomes and the less willing they were to subsequently cooperate with others who offered them an equal share. While these findings fit with the idea that being offered an equal share may not be viewed as a strong sign of one's personal acceptance, we had not anticipated that socially excluded individuals would consider equality as less fair than socially included individuals. In the absence of a strong signal of acceptance, other factors might come into play. For example, socially excluded individuals might then mitigate their social exclusion (e.g., Cristofori et al., 2015) with monetary rewards and/or just feel being entitled to more than others (e.g., Poon et al., 2013) —this could maybe make equality seem less fair, and less of a reason to cooperate.

To further test the robustness of these findings that we obtained by asking participants to self-report on their past social exclusion experiences, we designed a second experiment, in which we manipulated social exclusion directly via the Cyberball game. The manipulation of social exclusion also allowed us to provide stronger evidence for a causal link between the experience of social exclusion, outcome distribution, and subsequent cooperation.

## EXPERIMENT 2

### Method

#### Participants and design

We recruited 120 undergraduates (64 females;  $M_{\text{age}} = 21.04$ ,  $SD = 2.01$ , range from 18 to 24 years) via advertisement within the university community. Similar to Experiment 1, undergraduates from the faculties of Psychology and Economics were a priori excluded from this experiment. None of the

participants took part in Experiment 1. Because we used a different operationalization of social exclusion by manipulating it rather than asking participants about their individual experiences, we could not rely on the findings and effect sizes of Experiment 1 to determine how many participants to invite. Therefore, we decided to collect as many participants as possible in 4 weeks, with a minimum of 60 participants per social exclusion condition. A post hoc power analysis (based on 1000 simulations) showed that our sample size (i.e., 120) yielded a power of 99.70% (95% CI [99.13, 99.94]) to detect an effect size equivalent to a Cohen's  $d$  of 0.10 for the moderating effect of social exclusion on fairness judgements.

A 3 (Outcome distribution: disadvantageous inequality vs. advantageous inequality vs. equality)  $\times$  2 (Social exclusion: excluded vs. included) mixed design was employed, where outcome distribution was a within-subjects variable, and social exclusion was a between-subjects variable.

## Procedure

Participants played a Cyberball game before the 18 rounds two-person economic decision task. Participants learned that the payment of completing the Cyberball game was 10 CNY and the payment for completing the decision task would be calculated based on one round selected by the computer.

### *Cyberball game*

Similar to previous research (e.g., Walasek et al., 2019; Williams et al., 2000), participants played a virtual ball toss game, that was described as a training tool for visual imagination. Participants were instructed that three characters, one (i.e., Player 2) controlled by themselves, would toss a ball with each other by clicking on the avatar. This game was programmed by using Cyberball software (Version 5.6.1.0, Empirisoft).

Before starting the Cyberball game, participants were asked several questions to make sure that they perceived this game as intended. For example, 'what is the most important thing when playing this game? —A. *vivid imagination*, B. the number of ball tosses,' (The correct answer is presented here in *italic*). After correctly answering the questions, participants were informed to click the link to log in to the game interface (Figure 3) and wait to be connected to the other players. All participants answered the questions correctly in one try. Participants also learned that the payment for participating in this game is 10 CNY.

The ball tossing proceeded for 2 min with 30 ball tosses in total. Excluded participants received no ball tosses except for two tosses at the beginning of the game; included participants received approximately 10 ball tosses throughout the game.

After the Cyberball game, similar to past research (Zadro et al., 2006), participants were asked to assess the perceived exclusion levels on a 5-point Likert Scale (1 to 5) with higher scores indicating higher perceived exclusion levels. In addition, participants were required to rate their feelings of unpleasantness on a 5-point Likert Scale (1 = not at all, 5 = completely) with higher scores denoting higher levels of unpleasantness.

### *Two-person economic decision task*

Participants learned that each round, they would be paired with a different player, with a different identification code, and that these players were not the same as in the Cyberball game. The task was identical to the task used in Experiment 1, with 18 rounds and two phases. Outcome distribution was manipulated in phase 1, and subsequent cooperation was assessed in phase 2.

As in Experiment 1, one round was randomly selected by the computer and based on the joint choices. On average, participants were paid 6.82 CNY (i.e., 0.82 GBP) in the two-person task. The total participation fees thus on average amounted to 16.82 CNY (i.e., 2.02 GBP). Finally, participants were debriefed and thanked.

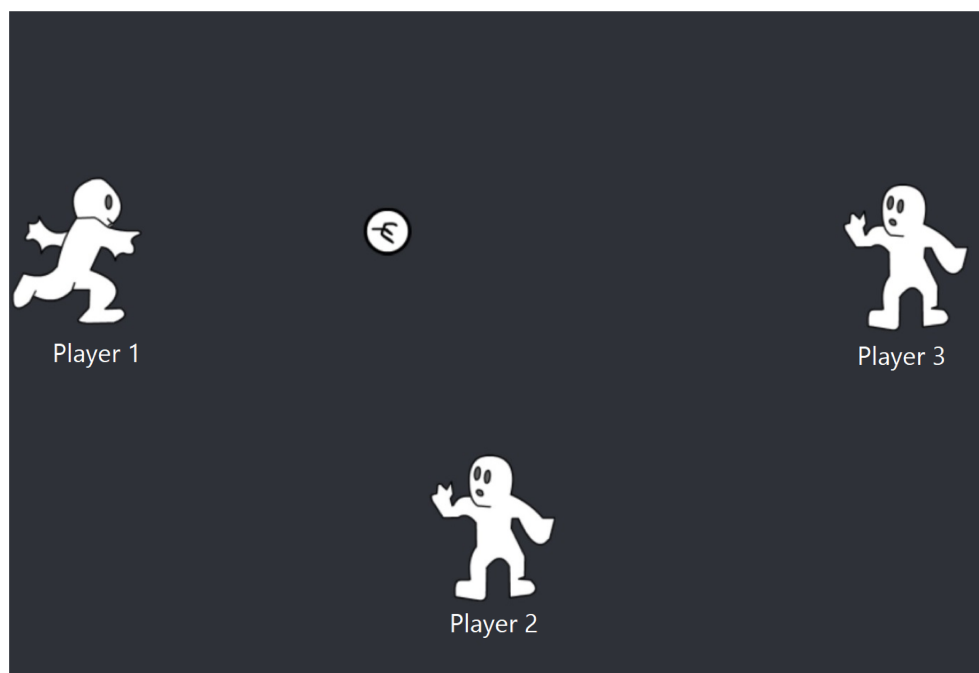


FIGURE 3 Screenshot of the Cyberball game.

## Statistical analyses

In Experiment 2, we fitted the same mixed models as in Experiment 1 with the only exception that this time social exclusion was a categorical predictor (contrast-coded:  $-0.5$  = inclusion,  $0.5$  = exclusion). Additionally, to check the effectiveness of our social exclusion manipulation, we also conducted independent  $t$ -tests for the social exclusion ratings and unpleasantness ratings.

## Results

### Manipulation checks of social exclusion

For social exclusion ratings, participants in the socially excluded condition ( $M=4.07$ ,  $SD=1.10$ ) reported higher levels of perceived exclusion than those in the socially included condition ( $M=2.27$ ,  $SD=1.08$ ),  $t(118)=9.00$ ,  $p<.001$ , Cohen's  $d=1.66$ , 95% CI =  $[1.40, 2.20]$ .

For unpleasantness ratings, participants in the socially excluded condition ( $M=3.32$ ,  $SD=1.13$ ) reported a higher level of unpleasantness than those in the socially included condition ( $M=1.88$ ,  $SD=0.98$ ),  $t(118)=7.45$ ,  $p<.001$ , Cohen's  $d=1.37$ , 95% CI =  $[1.05, 1.82]$ . These results are in line with previous studies (Zadro et al., 2006), suggesting that the manipulation of social exclusion was effective.

### Fairness judgements

The LMM on fairness judgements (see Table 2, column 1) yielded two significant contrasts of outcome distribution. The disadvantageous inequality-advantageous inequality contrast showed that fairness was

TABLE 2 Estimation results in Experiment 2.

|                                          | Fairness judgements |                  | Cooperative behaviour |                  |
|------------------------------------------|---------------------|------------------|-----------------------|------------------|
|                                          | (1)                 | (2)              | (1)                   | (2)              |
| Intercept                                | 2.700*** (0.04)     | 2.700*** (0.04)  | 0.337* (0.16)         | 0.331* (0.17)    |
| Disadv. Inequality (vs. Adv. Inequality) | -1.130*** (0.04)    | -1.131*** (0.04) | -2.306*** (0.15)      | -2.421*** (0.16) |
| Equality (vs. Adv. Inequality)           | 2.054*** (0.04)     | 2.05*** (0.04)   | 0.909*** (0.13)       | 0.987*** (0.14)  |
| Social Exclusion                         | 0.058 (0.07)        | 0.533*** (0.08)  | -0.248 (0.29)         | 1.004** (0.33)   |
| Disadv. Inequality × Social Exclusion    |                     | -0.811*** (0.07) |                       | -2.243*** (0.31) |
| Equality × Social Exclusion              |                     | -0.614*** (0.07) |                       | -1.974*** (0.27) |
| Random intercept individual variance     | 0.126               | 0.127            | 2.09                  | 2.28             |
| Residual                                 | 0.492               | 0.462            |                       |                  |

Note: This table shows the estimation results from the LMM fitting fairness judgements (column 1) and the GLMM fitting cooperative behaviour (column 2). *SEs* are shown in parentheses.  
\**p* < .05. \*\**p* < .01. \*\*\**p* < .001.

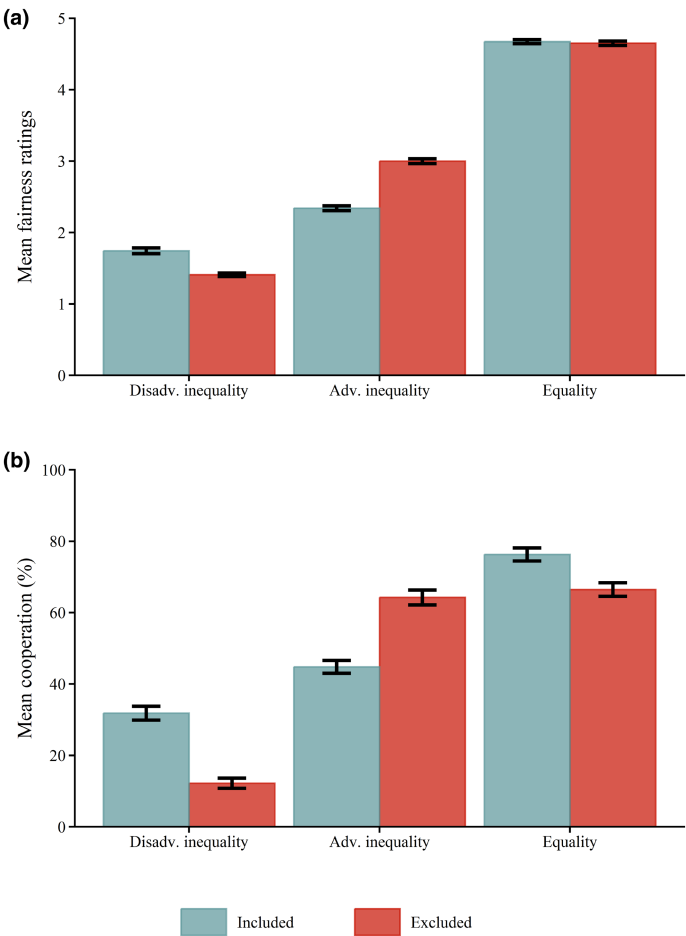
judged to be lower in the disadvantageous inequality condition ( $M=1.57$ ,  $SD=0.84$ ) than in the advantageous inequality condition ( $M=2.70$ ,  $SD=0.94$ ). The equality-advantageous inequality contrast showed that fairness was, in turn, judged to be higher in the equality condition ( $M=4.75$ ,  $SD=0.71$ ) than in the advantageous inequality condition.

Moreover, supporting our reasoning, results showed that social exclusion (vs. inclusion) increased the difference in fairness ratings for disadvantageous inequality compared to advantageous inequality, and decreased the difference in fairness ratings for equality compared to advantageous inequality. See Figure 4a for participants' mean fairness judgements as a function of outcome distribution and social exclusion. Simple effects showed that compared to socially included participants, the fairness ratings of socially excluded participants were significantly higher by an average of 0.533 in the advantageous inequality condition (see statistics in Table 2, column 1), whereas they were significantly lower by an average of 0.278 in the disadvantageous inequality condition ( $B=-0.278$ ,  $SE=0.08$ ,  $p=.001$ ). The simple effect of social exclusion in the equality condition was not significant ( $B=-0.081$ ,  $SE=0.08$ ,  $p=.330$ ).

Cooperative behaviour

The GLMM on cooperative behaviour (see Table 2, column 2) yielded two significant contrasts of outcome distribution. The disadvantageous inequality-advantageous inequality contrast showed that participants in the disadvantageous inequality condition cooperated less frequently ( $M_{\%}=18.47$ ,  $SD_{\%}=43.14$ ) than participants in the advantageous inequality condition ( $M_{\%}=56.11$ ,  $SD_{\%}=52.03$ ; Odds Ratio = 0.120, CI [0.09, 0.16]). The equality-advantageous inequality contrast showed that, in turn, participants in the equality condition ( $M_{\%}=71.67$ ,  $SD_{\%}=46.29$ ) cooperated more frequently than participants in the advantageous inequality condition (Odds Ratio = 2.683, CI [2.05, 3.51]).

Moreover, results showed that social exclusion (vs. inclusion) increased the difference in cooperation after experiencing advantageous inequality compared to disadvantageous inequality, and decreased the difference in cooperation after experiencing equality compared to advantageous inequality. See Figure 4b for participants' mean frequency of cooperative behaviour as a function of outcome distributions and social exclusion. Simple effects showed that the frequency of cooperative behaviour for socially excluded participants, as compared to socially included participants, was 2.73 times higher in the advantageous inequality condition (Odds Ratio = 2.73, CI [1.43, 5.23]; see statistics in Table 2, column 2), whereas the frequency of cooperative behaviour was 3.45 times lower in the disadvantageous



**FIGURE 4** The moderating effect of social exclusion across the outcome distribution conditions in Experiment 2. (Panel a) The mean score of fairness perceptions ( $\pm SE$ ) as a function of outcome distribution and social exclusion. (Panel b) The mean relative frequency of cooperative behaviour ( $\pm SE$ ) as a function of distributive fairness and social exclusion.

inequality condition ( $B = -1.239$ ,  $SE = 0.37$ ,  $p < .001$ , Odds Ratio = 0.290, CI [0.14, 0.60]) and 2.64 times lower in the equality condition ( $B = -0.970$ ,  $SE = 0.34$ ,  $p = .0048$ , Odds Ratio = 0.379, CI [0.19, 0.74]).

## Discussion

The results of Experiment 2 replicated the main findings of Experiment 1 in a setting where we manipulated social exclusion. We again observed that an equal share was generally considered the fairest, and that participants also felt that advantageous inequality was relatively less unfair than disadvantageous inequality. Moreover, we also again observed that these differential judgements of inequality were moderated by whether or not individuals had experienced being socially excluded. Thus, the experience of social exclusion (vs. inclusion) led participants to rate advantageous inequality as fairer, and disadvantageous inequality as unfairer. In a similar vein, compared to socially included individuals, socially excluded participants cooperated more in response to advantageous inequality, and less in response to disadvantageous inequality. Together, these results corroborate our reasoning that information that outcomes are unequal has a greater impact on socially excluded people than on socially included people.

In Experiment 2, we again explored reactions to equality and found that our manipulation of social exclusion did not lead to differences in how fair participants rated equality. It may be noted that this differs from the lower fairness ratings for equality we observed in Experiment 1 among those individuals with more experiences of social exclusion. Similar to Experiment 1, we again observed that socially excluded participants cooperated less in response to equality compared to socially included participants, a finding that may fit the notion that being offered an equal share may not be considered a strong signal of acceptance.

Being informed by the data of Experiments 1 and 2, we conducted a third study that allowed us to not only test the robustness of our findings, but also remedy some of its limitations. In Experiments 1 and 2, we manipulated the outcome distributions (advantageous inequality, disadvantageous inequality, and equality) as a within-participants factor. While this allowed us to compare reactions to these different distributions, one might wonder whether being presented with all these distributions, could have induced some demand characteristics, or could have alerted participants to consider the different distributions as an important factor. To alleviate these concerns, we changed the manipulation to a between-participants factor in Experiment 3.

Furthermore, we used the opportunity to collect data that could speak to the process underlying the effects of social exclusion. For this purpose, we included measurements of feelings of acceptance, and feelings of entitlement. We assessed feelings of acceptance because—as we already pointed out in the General Introduction—socially excluded people may interpret their social environment more in terms of cues that could signal acceptance. The measurement of entitlement was added because one might also argue that socially excluded people feel more entitled to monetary outcomes to compensate for their exclusion (see also Poon et al., 2013).

## EXPERIMENT 3

### Method

#### Participants and design

A total of 492 university students ( $N_{\text{female}} = 266$ ;  $M_{\text{age}} = 20.60$ ,  $SD = 2.09$ , range from 18 to 26 years) were randomly assigned to conditions in a 3 (Outcome distribution: disadvantageous inequality vs. advantageous inequality vs. equality)  $\times$  2 (Social exclusion: excluded vs. included) between-subjects design. To ensure a diverse sample, we recruited participants through advertisements via WeChat, which is a popular social networking platform. Similar to the previous experiments, undergraduates from the faculties of Psychology and Economics were *a priori* excluded. None of the participants took part in Experiments 1 and 2.

A *a priori* power analysis (Cohen, 2013) yielded a required sample size of 251 participants when assuming a medium effect size (equivalent to a Cohen's  $d$  of 0.50), and a required sample size of 1548 participants when assuming a small effect size (equivalent to a Cohen's  $d$  of 0.20), both with a power of 0.95 (Cohen, 2013). Given financial and time constraints, we decided to recruit a minimum of 480 participants (i.e., 80 participants per condition). A sensitivity power analysis showed that our obtained sample size (i.e., 492) allowed us to detect a small-to-medium effect size equivalent to a Cohen's  $d$  of 0.36 with a power of 0.95.

#### Procedure

As in Experiment 2, participants played a Cyberball game before proceeding to the two-person economic decision task, which consisted of two phases. Similar to Experiment 2, the payment for completing the

Cyberball game was 10 CNY and the payment for completing the decision task would be calculated based on one round selected by the computer.

### *Cyberball game*

The materials and procedure were identical to those in Experiment 2.

### *Two-person economic decision task*

The task resembled the one that was used in Experiments 1 and 2, but now participants played Phase 1 only once with another participant (not the same as in the Cyberball game) and then they played Phase 2 together for 6 rounds.

*Phase 1.* The instructions were similar to those in Experiments 1 and 2. Again, participants learned that it was the other person who would distribute the 12 CNY and that this other person had three distribution options (the same as in the previous experiments). The main difference was that participants now learned that Phase 1 would only consist of one round. Depending on condition, participants either received the feedback that the other participants had chosen the 3–9 option (in the disadvantageous inequality condition), the 9–3 option (in the advantageous inequality condition), or the 6–6 option (in the equality condition).

After participants had received the feedback, we assessed feelings of entitlement and acceptance. For feelings of entitlement, participants indicated the degree to which they felt entitled to receive more than the other player in Phase 1 on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree), similar to past research (Campbell et al., 2004). For feelings of acceptance, participants indicated the extent to which they felt accepted by the other player in Phase 1 on a 5-point Likert scale (1 = not at all, 5 = extremely), similar to previous studies (e.g., De Cremer, 2002). These measures were followed by the same fairness judgement question as in Experiments 1 and 2.

*Phase 2.* The instructions were similar to those in Experiments 1 and 2, except now participants learned they would play six rounds of chicken game with the same player from phase 1 (for a similar measure of cooperation, see Sun et al., 2022). Cooperative behaviour was assessed by calculating the number of rounds in which a participant selected 'Q' (i.e., cooperation), now ranging from 0 to 6.

As in Experiments 1 and 2, one round was randomly selected by the computer and based on the joint choices. On average, participants were paid 6.82 CNY (i.e., 0.82 GBP) in the two-person task. The total participation fees thus on average amounted to 16.76 CNY (i.e., 2.01 GBP). Finally, participants were debriefed and thanked.

## Statistical analyses

As in Experiment 2, we used independent *t*-tests to check the effectiveness of the social exclusion manipulation. To analyse the effects of outcome distribution (advantageous inequality as the reference condition) and social exclusion on feelings of acceptance, feelings of entitlement, fairness judgements, and cooperative behaviour, we fitted linear regression models (LM). Furthermore, we tested whether feelings of acceptance and entitlement statistically mediated the effects of social exclusion on reactions to the different outcome distributions. To achieve this, we utilized a bootstrapping procedure with 1000 re-samples to calculate a debiased 95% confidence interval (CI). Specifically, we applied Model 8 for parallel multiple moderated mediation using the *bruceR* package (version 2023.9; Bao, 2022), which allowed us to evaluate and compare the mediating effects of these two psychological mechanisms.

## Results

### Manipulation checks of social exclusion

For social exclusion ratings, participants in the socially excluded condition ( $M=3.67$ ,  $SD=1.18$ ) reported higher levels of perceived exclusion than those in the socially included condition ( $M=1.93$ ,  $SD=1.01$ ),  $t(490)=17.63$ ,  $p<.001$ , Cohen's  $d=1.59$ , 95% CI = [1.55, 1.94].

For unpleasantness ratings, participants in the socially excluded condition ( $M=3.11$ ,  $SD=1.29$ ) reported a higher level of unpleasantness than those in the socially included condition ( $M=1.97$ ,  $SD=1.06$ ),  $t(490)=10.72$ ,  $p<.001$ , Cohen's  $d=0.97$ , 95% CI = [0.93, 1.35].

These effects replicated the findings of Experiment 2, and again suggest that the manipulation of social exclusion was effective.

### Feelings of acceptance

The measure assessed to what extent participants felt accepted by the person who had made the outcome distribution. The LM on this measure (see Table 3, column 1) yielded two significant contrasts of outcome distribution. The disadvantageous inequality-advantageous inequality contrast showed that participants felt less accepted in the disadvantageous inequality condition ( $M=1.89$ ,  $SD=0.85$ ) than in the advantageous inequality condition ( $M=2.96$ ,  $SD=0.97$ ). The equality-advantageous inequality contrast showed that participants, in turn, felt more accepted in the equality condition ( $M=3.18$ ,  $SD=0.78$ ) than in the advantageous inequality condition.

In line with our reasoning, results showed that social exclusion (vs. inclusion) increased the difference in felt acceptance for disadvantageous inequality compared to advantageous inequality, and decreased the difference in felt acceptance for equality compared to advantageous inequality. Simple effect analyses showed that, in the advantageous inequality condition, socially excluded participants ( $M=3.32$ ,  $SD=0.89$ ) felt significantly more accepted by the person who made the outcome distribution than did socially included participants ( $M=2.61$ ,  $SD=0.93$ ; see statistics in Table 3, column 1). In the disadvantageous inequality condition, socially excluded participants ( $M=1.44$ ,  $SD=0.74$ ) felt significantly less accepted by the person who made the outcome distribution than did socially included participants ( $M=2.34$ ,  $SD=0.71$ ;  $B=-0.902$ ,  $SE=0.13$ ,  $p<.001$ ). In the equality condition, no significant difference was observed between socially excluded ( $M=3.18$ ,  $SD=0.83$ ) and included participants ( $M=3.17$ ,  $SD=0.72$ ;  $B=0.012$ ,  $SE=0.13$ ,  $p=.923$ ).

### Feelings of entitlement

The measure assessed to what extent participants felt entitled to receive more than the person who had made the outcome distribution. The LM on this measure (see Table 3, column 2) yielded two non-significant contrasts of outcome distribution, but the main effect of social exclusion was significant: Socially excluded participants ( $M=3.77$ ,  $SD=0.70$ ) felt more entitled to receive a better outcome than socially included participants ( $M=2.17$ ,  $SD=0.79$ ).

The results also showed a significant interaction for the disadvantageous inequality-advantageous inequality contrast and social exclusion. Simple effects showed that socially included participants felt more entitled to receive a better outcome in the disadvantageous inequality condition ( $M=2.33$ ,  $SD=0.89$ ) than in the advantageous inequality condition ( $M=2.05$ ,  $SD=0.59$ ; see statistics in Table 3, column 2). Interestingly, feelings of entitlement of socially excluded participants did not significantly differ between the disadvantageous inequality condition ( $M=3.72$ ,  $SD=0.61$ ) and advantageous inequality condition ( $M=3.83$ ,  $SD=0.83$ ),  $B=-0.110$ ,  $SE=0.12$ ,  $p=.346$ .

TABLE 3 Estimation results from LM in Experiment 3.

|                                              | Feelings of acceptance |                  | Feelings of entitlement |                 | Fairness judgements |                  | Cooperative behaviour |                  |
|----------------------------------------------|------------------------|------------------|-------------------------|-----------------|---------------------|------------------|-----------------------|------------------|
|                                              | (1)                    | (2)              | (1)                     | (2)             | (1)                 | (2)              | (1)                   | (2)              |
| Intercept                                    | 2.963***<br>(0.07)     | 2.963*** (0.06)  | 2.138***<br>(0.07)      | 2.049*** (0.08) | 2.470***<br>(0.06)  | 2.470*** (0.05)  | 2.652***<br>(0.13)    | 2.652*** (0.13)  |
| Disadv. Inequality (vs. Adv. Inequality)     | -1.073***<br>(0.10)    | -1.073*** (0.09) | 0.085 (0.08)            | 0.280* (0.12)   | -0.970***<br>(0.08) | -0.970*** (0.07) | -1.037***<br>(0.19)   | -1.037*** (0.18) |
| Equality (vs. Adv. Inequality)               | 0.213* (0.10)          | 0.213* (0.09)    | 0.012 (0.08)            | 0.085 (0.12)    | 1.537***<br>(0.08)  | 1.537*** (0.07)  | 1.274***<br>(0.19)    | 1.274*** (0.18)  |
| Social Exclusion                             | -0.061<br>(0.08)       | 0.707*** (0.13)  | 1.602***<br>(0.07)      | 1.780*** (0.25) | -0.057<br>(0.07)    | 0.743*** (0.11)  | -0.276<br>(0.15)      | 0.573*<br>(0.25) |
| Disadv. Inequality $\times$ Social Exclusion |                        | -1.610*** (0.18) |                         | -0.390* (0.16)  |                     | -1.012*** (0.15) |                       | -1.220*** (0.37) |
| Equality $\times$ Social Exclusion           |                        | -0.695*** (0.18) |                         | -0.146 (0.16)   |                     | -1.390*** (0.15) |                       | -1.329*** (0.37) |

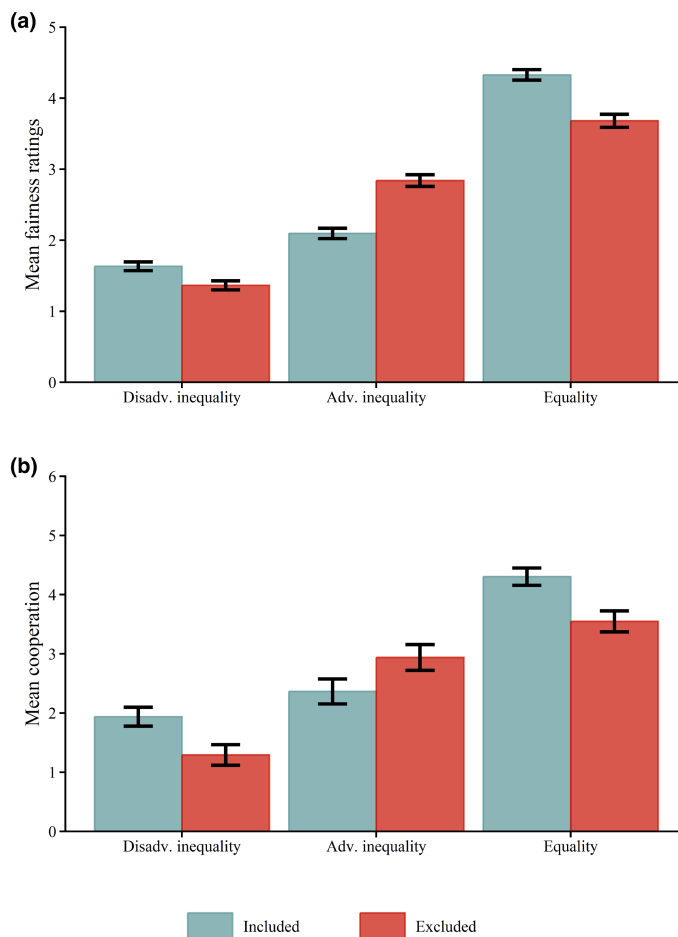
Note: This table shows the estimation results from the LM fitting feelings of acceptance (column 1), feelings of entitlement (column 2), fairness judgements (column 3), and cooperative behaviour (column 4). SEs are shown in parentheses.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

## Fairness judgements

Results of the LM on fairness judgements (see Table 3, column 3) showed, as expected, that social exclusion (vs. inclusion) increased the difference in fairness ratings for disadvantageous inequality compared to advantageous inequality, and decreased the difference in fairness ratings for equality compared to advantageous inequality. See Figure 5a for participants' mean fairness judgements as a function of outcome distribution and social exclusion. Simple effects showed that compared to socially included participants, the fairness ratings of socially excluded participants were significantly higher by an average of 0.744 in the advantageous inequality condition (see statistics in Table 4, column 1), whereas they were significantly lower by an average of 0.268 in the disadvantageous inequality condition ( $B = -0.268$ ,  $SE = 0.11$ ,  $p = .012$ ) and lower by an average of 0.646 in the equality condition ( $B = -0.646$ ,  $SE = 0.11$ ,  $p < .001$ ). These results replicated the findings of Experiments 1 and 2.

Next, we further explored whether feelings of acceptance and/or entitlement mediated the effects of social exclusion on fairness judgements of the different outcome distributions. The parallel multiple moderated mediation analysis yielded not only non-significant indirect effects for feelings of acceptance, but also for feelings of entitlement (see Table 4, column 1). This indicates that, we did not



**FIGURE 5** The moderating effect of social exclusion across the outcome distribution conditions in Experiment 3. (Panel a) The mean score of fairness perceptions ( $\pm SE$ ) as a function of outcome distribution and social exclusion. (Panel b) The mean relative frequency of cooperative behaviour ( $\pm SE$ ) as a function of distributive fairness and social exclusion.

TABLE 4 Estimation results from parallel multiple moderated mediation analyses in Experiment 3.

| Outcome distribution | Social exclusion on fairness judgements         |               |                                                  | Social exclusion on cooperative behaviour       |               |                                                  |
|----------------------|-------------------------------------------------|---------------|--------------------------------------------------|-------------------------------------------------|---------------|--------------------------------------------------|
|                      | Indirect effects through feelings of acceptance |               | Indirect effects through feelings of entitlement | Indirect effects through feelings of acceptance |               | Indirect effects through feelings of entitlement |
|                      | <i>B</i> (SE)                                   | 95% CI        | <i>B</i> (SE)                                    | 95% CI                                          | <i>B</i> (SE) | 95% CI                                           |
| Disadv. Inequality   | 0.018 (0.04)                                    | [−0.09, 0.06] | −0.004 (0.06)                                    | [−0.13, 0.12]                                   | −0.754 (0.04) | [−1.01, −0.54]                                   |
| Adv. Inequality      | 0.014 (0.03)                                    | [−0.04, 0.07] | −0.005 (0.07)                                    | [−0.16, 0.13]                                   | 0.591 (0.03)  | [0.34, 0.88]                                     |
| Equality             | 0.0001 (0.13)                                   | [−0.01, 0.01] | −0.005 (0.07)                                    | [−0.15, 0.12]                                   | 0.010 (0.10)  | [−0.20, 0.21]                                    |

N/A: This table shows the estimation results from the parallel multiple moderated mediation test regarding fairness judgements (column 1) and cooperative behaviour (column 2).

statistically demonstrate that the effects of social exclusion on fairness judgements were mediated by acceptance or entitlement.

## Cooperative behaviour

Results of the LM on cooperative behaviour (see Table 3, column 4) showed, also as expected, that social exclusion (vs. inclusion) increased the difference in cooperation after experiencing advantageous inequality compared to disadvantageous inequality, and decreased the difference in cooperation after experiencing equality compared to advantageous inequality. See Figure 5b for participants' mean frequency of cooperative behaviour as a function of outcome distributions and social exclusion. Simple effects showed that compared to socially included participants, the fairness ratings of socially excluded participants were significantly higher by an average of 0.573 in the advantageous inequality condition (see statistics in Table 4, column 2), whereas they were significantly lower by an average of 0.646 in the disadvantageous inequality condition ( $B = -0.646$ ,  $SE = 0.26$ ,  $p = .013$ ) and by an average of 0.756 in the equality condition ( $B = -0.756$ ,  $SE = 0.26$ ,  $p = .004$ ). These results are consistent with our reasoning.

Next, we further explored whether feelings of acceptance and/or entitlement mediated the effects of social exclusion on cooperative behaviour. The parallel multiple moderated mediation analysis yielded significant indirect effects of feelings of acceptance and non-significant indirect effects of entitlement (see Table 4, column 1). More specifically, social exclusion (vs. inclusion) increased cooperative behaviour in the advantageous inequality condition and reduced cooperative behaviour in the disadvantageous inequality condition through decreasing feelings of acceptance and not entitlement. In the equality condition, social exclusion (vs. inclusion) decreased cooperative behaviour but this was not mediated by feelings of acceptance or entitlement. These findings are in line with our reasoning.

## Discussion

The results of Experiment 3 replicated the main findings of Experiments 1 and 2. Again, an equal share was generally considered the fairest, and advantageous inequality was considered less unfair than disadvantageous inequality. Importantly, we again observed that socially excluded (vs. included) participants perceived disadvantageous inequality as more unfair and advantageous inequality as less unfair. At the behavioural level, socially excluded (vs. included) participants cooperated less in both disadvantageous inequality and equality conditions, and cooperated more in the advantageous inequality condition. Also consistent with Experiments 1 and 2, socially excluded participants were less cooperative in response to equality. The only exception was that we now observed that socially excluded (vs. included) participants viewed equality as less fair and exhibited less cooperative behaviour in response to equality, an effect that did not emerge in Experiment 2, where we used the same manipulation of social exclusion but a within-participants manipulation of outcome distribution.

Importantly, we did not observe a significant mediating effect of feelings of entitlement, but we did observe a significant pathway: 'social exclusion  $\rightarrow$  feelings of acceptance  $\rightarrow$  cooperative behaviour under inequality.' This pathway suggests that, compared to socially included participants, socially excluded participants interpret receiving more than an equal share as a sign of greater acceptance and receiving less as a sign of less acceptance, and thereby behave more cooperatively in response to advantageous inequality and behaved less cooperatively in response to disadvantageous inequality. These findings are in line with our reasoning and suggest that acceptance rather than entitlement plays a crucial role in understanding how socially excluded (vs. included) people perceive and behave in response to different outcomes. We will further elaborate on these findings in the General Discussion.

## GENERAL DISCUSSION

People have a strong need to be socially included by others (Williams, 2007, 2009). Prior research clearly identified negative effects for the socially excluded individual when this need is not fulfilled, such as lowered self-esteem, sense of belonging, feeling of being in control and sense of meaningful existence (e.g., Walasek et al., 2019; Williams, 2009). It is only recently that researchers have begun to explore how social exclusion affects people's social perceptions (e.g., Syrjämäki & Hietanen, 2019, 2020). The current work contributes to this line of research by exploring whether social exclusion can affect people's distributive fairness judgements and behavioural reactions that follow.

The current findings paint a consistent picture of how differently socially excluded individuals perceive inequality of outcomes compared to socially included individuals. Across three experiments, we observed that prior experiences of having been socially excluded moderated fairness judgements of unequal outcome distributions. Specifically, prior experiences of social exclusion, either assessed by individual differences in real-life experiences of social exclusion (Experiment 1) or exogenously induced in the Cyberball game (Experiments 2 and 3), amplified the differential judgements of disadvantageous and advantageous inequality. The experience of having been socially excluded induced our participants to perceive disadvantageous inequality as more unfair and advantageous inequality as less unfair. These results support our main proposition that outcome inequality has a greater impact on socially excluded individuals than on included individuals.

Moreover, the moderating effect of social exclusion extends beyond fairness judgements and also affects subsequent cooperation. In three experiments, we found that the experience of having been socially excluded increased the differences in cooperation after disadvantageous versus advantageous inequality. Compared to advantageous inequality, social exclusion made participants even less willing to cooperate in response to disadvantageous inequality. In Experiments 2 and 3, we noted that after a single event of exclusion, socially excluded participants were also more willing to cooperate in response to advantageous inequality than socially included participants. Combined, these effects demonstrated that while being excluded generally leads to lower levels of cooperation, the behavioural effects can also be positive—in this case after having experienced a setting of advantageous inequality.

These findings both connect and contribute to the literature on social exclusion. The negative effects of social exclusion on cooperation—as we observed after disadvantageous inequality—match the prior literature on social exclusion that has shown negative behavioural consequences of being excluded (see e.g., Gao et al., 2022; Riva et al., 2015; Twenge et al., 2007; Williams, 2009). Interestingly, prior research and theorizing has also documented instances where exclusion could result in more cooperation, but then the main reasoning was that cooperation would offer socially excluded participants an opportunity to reconnect (e.g., Williams, 2009). However, to reconnect with others, socially excluded people may first want to know whether the other person actually accepts them and what the consequences may be for themselves when they would act cooperatively. In this respect, our findings also connect to the more recent research interest in how people's social perceptions are influenced by whether or not they are socially included. In particular, our research moves beyond prior literature by showing that receiving more than an equal share (i.e., advantageous inequality) can serve as a sign of acceptance, to which socially excluded individuals, therefore, react more positively than socially included individuals. Similarly, socially excluded individuals react more negatively to receiving less than an equal share (i.e., disadvantageous inequality) than socially included individuals, as this seems to signal less acceptance.

Note that these interpretations all assign—as we hypothesized in our Introduction—an important role to the importance of feeling accepted. At this point it is appropriate to also consider the results of the mediation analyses we presented in Experiment 3. We found that feelings of acceptance rather than entitlement served as mediator in relation between social exclusion and cooperative behaviour under inequality. Specifically, social exclusion (vs. inclusion) promoted cooperative behaviour in response to advantageous inequality by increasing feelings of acceptance, while it hindered cooperation in response to disadvantageous inequality by decreasing feelings of acceptance.

At the same time, we should also acknowledge that the data did not reveal a similar mediating path for fairness judgements. We therefore caution against overinterpretation, a consideration that may more generally apply when interpreting mediation analyses (see e.g., Bullock et al., 2010; Fiedler et al., 2011; Rohrer et al., 2022). A tentative post hoc explanation for the current patterns could be that the cooperation data—obtained over six trials—provided a more sensitive measure to test the mediating path than the fairness judgements data that were only collected once, but this explanation is admittedly speculative. Of course, we should not discard the possibility that the differential findings could also imply that social exclusion affects both measures via different mechanisms. In any case this is worthy of further investigation.

Although it was not our main focus, we did obtain some interesting insights about how fair socially excluded and included individuals judge receiving an equal share from another person, and how they subsequently react to such equality in terms of cooperation. In our study, participants who felt socially excluded (vs. included) perceived equality as less fair (Experiments 1 and 3) and cooperated less with the person who had offered them an equal share in the prior interaction (Experiments 1, 2, and 3). Socially excluded and included participants did not differ, however, in their feelings of being accepted by the person making the equal contribution. As we noted in our Introduction, this would fit insights from attribution theories (Jones & Davis, 1965; Kanouse & Hanson, 1972), suggesting that behaviours that are not exceptionable, or just generally desirable, are not that informative about people's intentions. It also fits the idea that equality can be seen as a decision heuristic that people may use without paying much attention to its consequences, or as Messick and Schell (1992, p. 313) put it 'equality acts as simple heuristic in tasks that involve the allocation of goods and bads (...) It is a short-cut that is often used without regard to other questions of deservingness or the goals of an allocation.' The current findings imply that in a similar vein, people may not see equality as something that should be taken into regard when considering whether one is accepted.

In this regard, it is worth noting that formulating general conclusions regarding absolute acceptance levels under equality versus inequality is difficult, if not impossible. After all, the notion that equality is not a strong signal to assess whether one is accepted, does not imply that people would then feel not accepted, just as it does not imply that they would feel accepted. In other words, while the notion of equality as a heuristic—may serve to explain why socially excluded and socially included respond in a similar way to equality, it does not dictate whether the absolute level of acceptance should be higher or lower under equality than under inequality. This is also something that should, for example, be kept in mind when considering the mean level of acceptance that socially excluded participants reported in Experiment 3 for equality and advantageous inequality. On average they reported a similar level of acceptance for these two particular cases, but we would be hesitant to interpret this as if it would mean that equality and advantageous inequality would serve similar functions in signalling acceptance. In effect, we feel that the real test in identifying the function of (advantageous) inequality and equality lies in comparing how socially excluded individuals and socially included individuals react—that is, in the comparisons that lie at the heart of the current article.

It is interesting, however, to see that, in general, our participants were more willing to cooperate after receiving an equal share than after having received more than an equal share. Apparently, generosity does not necessarily invite cooperation. A possible post hoc explanation for this intriguing finding could be that if people see that the other offers them more than half of a pie, they may infer that the other is not that interested in earning money and actually wants them to earn more in future interactions as well. People might thus take the issue of receiving more than half of the outcomes as a justification to not cooperate in the chicken game, and thereby create a new situation in which they would again obtain more than half should the other decide to cooperate. Future research could explore this possibility by studying cooperation in a setting where mutual cooperation would not result in an equal distribution but in an unequal distribution where the participant would obtain more than half. Such settings have, for example, been used in prior studies on effects of asymmetry of interests in public good dilemmas where some members profit more from a mutually provided good than others (e.g., Van Dijk & Wilke, 1993). Such a setup might be suited to see whether such a prospect could induce higher levels of cooperation

after having received more than an equal share—and thus whether under those conditions one would still find that people are more willing to cooperate after having received an equal share than after having received more than an equal share.

Furthermore, it is worth considering how the effects of social exclusion might differ when the fairness/unfairness experience is directly related to the exclusion experience. When the allocator is the same person as the one who excluded the individuals previously, they may judge advantageous inequality as the fairest allocation and be more inclined to cooperate with the excluder who offered them a more than equal share. This inclination may stem from socially excluded individuals perceiving a more than equal share as their entitled compensation (for a similar proposition, see Poon et al., 2013). Additionally, it has been found that people were more likely to exclude norm-violating individuals in cooperative contexts (e.g., Rudert et al., 2023). Thus, when reasons for being ostracized are related to the violation of fairness norms, the relation between social exclusion, fairness judgements, and cooperative behaviour may undergo modifications. These issues should be addressed in future research. Research along these lines could also be used to supplement the manipulation of exclusion and inclusion that we used in our Experiments 2 and 3 with a control group in which participants would not first play the Cyberball game. Such a setup could be informative to test whether the experience of exclusion or inclusion differs from people without such a prior experience.

Above, we concentrated on the theoretical implications of our studies. It may also be useful to consider the broader implications for real-life settings. We are aware of the limitations when it comes to generating from lab studies to the field, so we would like to formulate these in terms of possible paths for future research. One possible direction would be to connect our current insights to societal exclusion—i.e., the feeling of being excluded from society. Like feeling excluded from specific groups, feeling excluded from society can also induce threats to people's fundamental needs (Doolaard et al., 2022; Huxhold et al., 2022). It would be interesting to see whether these effects may (partly) be related to a differential perception of outcome distributions and other indicators of acceptance. Another approach could be to study social exclusion at the workplace to see whether those who are socially excluded may interpret outcomes such as bonuses, task assignments differently than those who are included more, and whether it may impact their willingness to cooperate within their organizations (see also Scott et al., 2013).

## CONCLUSION

In this article, we draw attention to the aftermath of being excluded for subsequent perceptions and behaviour. We found that although participants generally perceived less unfairness and behaved more cooperatively in response to advantageous (vs. disadvantageous) inequality, these differences became larger after participants had undergone social exclusion. We also found a similar pattern when comparing participants' judgmental and behavioural reactions to equality with advantageous inequality. These findings may suggest that the negative effect of social exclusion on social perceptions and cooperative behaviour may be alleviated in situations in which outcomes are to one's own advantage. Taken together, the present work creates new insights for future studies by demonstrating that social exclusion can have profound effects on people's future interactions.

## AUTHOR CONTRIBUTIONS

**Qian Sun:** Conceptualization; methodology; investigation; formal analysis; funding acquisition; writing – original draft; writing – review and editing. **Welmer E. Molenmaker:** Conceptualization; formal analysis; visualization; writing – original draft; writing – review and editing. **Yongfang Liu:** Conceptualization; methodology; supervision; funding acquisition; resources; writing – original draft. **Eric van Dijk:** Conceptualization; visualization; writing – original draft; writing – review and editing.

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## CONFLICT OF INTEREST STATEMENT

The authors declare that they have no conflicts of interest.

## DATA AVAILABILITY STATEMENT

All materials, raw data and the codebook are available on the Open Science Framework (<https://osf.io/84w3x/>).

## ETHICS STATEMENT

This study was approved by the ethics review board of East China Normal University (HR 396-2019) on 19 December 2019.

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