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The Self-Serving Veil of Justice: Egocentric Bias Fosters Zero-Sum Thinking Despite Fair Settings

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Abstract

This study delves into the enduring influence of egocentric bias within negotiation contexts despite fair settings. We investigate how individuals navigate the interplay between egocentric bias, justice mechanisms (i.e., procedural and retributive justice), and their impact on zero-sum thinking. Across three studies encompassing 947 participants from Japan and the UK, we explored these dynamics through simulated negotiation scenarios like car-trade deals and international environmental negotiations. Our findings reveal a robust egocentric bias, dominating judgments even when justice mechanisms are introduced. Negotiators tend to view personal gains as independent of losses incurred by others, hindering collaborative outcomes. Procedural fairness demonstrates a moderating effect, fostering perceptions of fairness and reducing zero-sum thinking in specific scenarios (car-trade). However, its influence diminishes in complex international contexts. Interestingly, retributive justice, intended to discourage non-cooperative behavior, backfires by intensifying punitive sentiments. Thus, it might have a non-desirable effect in some situations. This research offers valuable insights for academics and practitioners alike. It underscores the pervasiveness of egocentric bias in zero-sum thinking despite the presence of justice mechanisms. By highlighting these dynamics, the study paves the way for developing more effective negotiation strategies that promote cooperation and foster successful conflict resolution in real-world settings.

Keywords Zero-sum thinking · Justice mechanism · Procedural justice · Retributive justice · Egocentric bias

A well-grounded understanding of judgment processes considers that biased thinking blocks individuals from forecasting their future utility properly (Kahneman & Thaler, 2006). Notably, bias extends its influence to the realm of conflict resolution and consensus-building (Tsay & Bazerman, 2009). Bazerman et al. (1999) pinpoints a key reason for negotiators' struggle to identify mutually beneficial solutions: the

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belief that their interests directly oppose those of the other party. Termed zero-sum thinking (Johnson et al., 2021), this perception, while prevalent in conflictual negotiations, is often a misrepresentation of reality. Drawing from game theory, zero-sum situation involve one party's gain necessarily leading to another's loss. However, individuals' biased cognition can lead them to interpret non-zero-sum scenarios through a zero-sum lens (Roberts & Davidai, 2021). Consequently, zero-sum thinking acts as a significant barrier to identifying mutually beneficial outcomes in negotiation, thereby exacerbating conflict (Tsay & Bazerman, 2009).

Overcoming zero-sum thinking is critical for solving global problems. Institutions and individuals worldwide need to prioritize collective well-being and long-term benefits over short-term individual gains (Dovidio et al., 2017). Environmental protection exemplifies this. Nations may prioritize immediate economic benefits over environmental protection, fearing exploitation by free-riders (Adebowale, 2008; Bazerman & Moore, 2012). Zero-sum thinking's impact extends beyond the environment, shaping global challenges like political conflict (Davidai & Ongis, 2019; Rubin, 2018), intergroup competition (Kuchynka et al., 2018), refugee crises (Piotrowski et al., 2019), and gender discrimination (Ruthig et al., 2017). Studies suggest in-group bias hinders recognizing potential mutual gains in negotiations between different groups (Baron et al., 2006). People might generalize past experiences, viewing cooperation with outsiders as win-lose despite potential benefits. For example, Piotrowski et al. (2019) found dominant groups might see immigrants as competitors even when there are workforce needs. Similarly, men might fear discrimination if they advocate for women's equality (Ruthig et al., 2017), leading to workplace bias (Ruthig et al., 2021). Consequently, zero-sum thinking undermines the veil of justice in contemporary society by fostering biased perspectives that justify conflicts, while framing them as inevitable consequences of group affiliation.

Egocentric Bias and Asymmetric Zero-sum Thinking

Recent studies suggest people view situations as zero-sum when others gain at their expense, but not vice versa (Roberts & Davidai, 2021). This is substantially explained by the existence of an egocentric perception (Bazerman & Moore, 2012), where individuals tend to think of them as protagonists in social settings (Gilovich & Savitsky, 1999), particularly rejecting their responsibility for the negative outcomes of other individuals, attributing to others the causes for their failures (Duval & Silvia, 2002), and/or considering their beliefs as more socially accepted than they are (Ross et al., 1977). However, this egocentric perception serves as a psychological barrier for individuals to consider alternative cooperative and consensus-building approaches, since it involves no consideration of the needs and importance of other parties involved. However, negotiations exist because we depend on agreements with these other parties to achieve intangible goals if tried to achieve alone (Lewicki, et al., 2016). Thus, strategies to reduce egocentric bias are needed for consensus building. For that, we examined the role of justice mechanisms.

Justice Mechanisms

Zero-sum thinking is common across social issues, often linked to perceived injustice across the world (Ongis & Davidai, 2022). For example, people who feel disadvantaged relative to others are more likely to view economic success as a zero-sum game (Power et al., 2020; Tyler et al., 2019). Thus, when caring about justice, people are attentive to how fair decisions are made (i.e., procedural fairness), and how rule-breakers are being dealt with (i.e., retributive justice).

Procedural fairness refers to how fair people perceive the process of making decisions (Leventhal, 1980). Research shows that fair procedures can increase people's commitment, satisfaction, and cooperation with decisions, even if the outcome isn't ideal (Tyler et al., 2019). Examples of fair procedures include having a voice in decisions, receiving unbiased information, and having consistent rules applied to everyone. Studies suggest that these procedures can be more important to people than the final decision itself (Tyler, 2000). Thus, procedural fairness, regardless of the parties or conflict, promotes positive relationships and social cohesion (Tyler et al., 2019). It also minimizes win-lose thinking by focusing on mutual gains in negotiations (Hollander-Blumoff & Tyler, 2008). Furthermore, it might counteract asymmetric zero-sum thinking because even if outcomes aren't ideal, a fair process can lead to satisfaction, and then acceptance of decisions ((Lind & Van den Bos, 2002; Tyler et al., 2019). We hypothesize that a fair process can influence how cognitive biases impact zero-sum interpretations.

While fairness fosters cooperation, some scenarios might benefit from exploring retributive justice (Tyler, 2012), which can resemble zero-sum thinking, aiming to control transgressors who might gain at our expense. Punitive sentiment tackles free riders, potentially stabilizing cooperation once they're punished (Price et al., 2002; Weber et al., 2018). Thus, expecting zero-sum outcomes in cooperation scenarios might stem from the need to control potential free riders through coercion. Environmental negotiations exemplify this debate. Many argue that legally binding systems with penalties are the only way to ensure cooperation in reducing CO2 emissions (Luqman et al., 2022). This research explores the potential of retributive justice as a tool to promote cooperation, particularly in scenarios susceptible to free-riding.

Research Overview

This research investigates two under-examined factors influencing zero-sum thinking in negotiations: justice mechanisms and egocentric bias. Three scenario-based studies were conducted. The first examined how buyers perceive sellers' motives (self-gain vs. buyer's gain) in a car-trade scenario, considering procedural fairness and egocentric bias. The second study replicated this in Japan and the UK using a bilateral environmental agreement scenario. The third study examined the impact of retributive justice (punishment) on zero-sum thinking in

the same environmental agreement scenario with coercive mechanisms, while again considering egocentric bias. Thus, we aimed to examine the following questions:

RQ1: Does the procedural fairness manipulation in negotiation scenarios have a significant effect on perceived fairness?
RQ2: Does procedural fairness in negotiation scenarios decrease zero-sum thinking?
RQ3: Does egocentric bias generate asymmetry in zero-sum thinking scenarios with procedural fair mechanisms?
RQ4: Is retributive justice perceived as fair in negotiation scenarios?
RQ5: Does retributive justice in negotiation scenarios decrease zero-sum thinking?
RQ6: Does egocentric bias generate asymmetry in zero-sum thinking scenarios with retributive justice mechanisms?
RQ7: Do agreements with retributive justice increase punitive sentiments?
RQ8: Are the intentions for retributive justice asymmetrical?

Study 1

Study 1 is an experiment designed to assess zero-sum thinking in a voluntary common negotiation. The study is used to answer the research questions 1–3. The study adapted the car trade negotiation scenarios from Roberts and Davidai (2021), where participants, as buyers, were asked to state if they perceived themselves in a zero-sum relationship with a seller despite the fact that voluntary exchanges should benefit both parties (Johnson et al., 2021). To see how procedural fairness affects zero-sum thinking and the perception of fairness, we added information to the scenario about whether or not the seller acted fairly in the negotiation.

Method

Sampling Procedure and Participants

We recruited 214 student participants for the experiment at private universities in Japan in the first semester of 2023. Fourteen participants were excluded from the data as they provided the same responses ('flat lining') across all items ($n = 13$) or did not provide any answers at all ($n = 1$). Then, in the first semester of 2024, we collected more than 42 responses from students at a national public university in Japan. This resulted in a final sample of 242 participants, of which 181 were male (74.8%) and 60 were female (24.8%). One respondent did not provide their gender. The mean age was 20 years old ($SD = 1.22$). The student participants were from majors in economics and management (75.2%), law (6.6%), engineering (6.6%), design (2.5%), literature (2.1%), and others (2.9%).

For all subsequent studies, in order to control error type II, sampling was determined based on power analysis taking 1- β of 0.80, $\alpha = 0.05$, a medium effect size while considering 6 groups, giving an intended sample size of 210 participants.

Research Ethics

All procedures performed in the studies of this manuscript were in accordance with the ethical standards of the institutional and national research committee and with the 1964 Helsinki declaration and its later amendment. All participation in this study was consent and voluntary. In addition, the participants were told that they could leave the survey at any moment according to their will and after answering the questionnaire, the participants received a debriefing about the study. The research was approved by the research ethics committee (IRB number 2022-9 Graduate School of International Cultural Studies, Tohoku University) and registered in Open Science Framework (Identifier: DOI https://doi.org/10.17605/OSF.IO/D9B7P).

Materials and Procedures

We recruited participants from a Japanese university with their lecturers' permission. All studies in this manuscript were conducted by a voluntary survey, taking about 5 min to complete, which was administered before classes. Students were informed of their right to withdraw at any time and participate entirely on a voluntary basis.

Participants were randomly assigned to one of the six conditions of a 2×3 experimental design, with (a) *asymmetric statements* having two levels (i.e., the seller/buyer will gain at the expense of the buyer/seller) and (b) p*rocedural fairness* having three levels (i.e., control, procedural fairness present, and no procedural fairness).

Participants read a scenario that was adapted from Roberts and Davidai (2021). They were asked to: "(…) imagine a negotiation where you decide to buy a car and want to negotiate a deal with a seller on the personal trade on the internet like eBay**.** You don't know why the seller wants to sell his car. You also do not know how much he will try to convince you to accept their deal.".

Participants were then presented with additional text to manipulate procedural fairness. In this text, procedural fairness or no procedural fairness was indicated by changing the words that are shown in bold below. This was done to give the impression that the seller did or did not provide accurate and trustworthy information along with respect and voice to new proposals (i.e., listen to new proposals from the buyer) ("Now, during the negotiation process, the **seller provided/did not provide** information on why he is offering his own deal. In addition, he **accepted/rejected** to provide accurate and trustworthy documents showing the car's condition (the vehicle inspection certificate and a maintenance note, etc.). Also, the seller **gave you/did not give** you respect and a voice to consider your proposals showing a **polite/haughty** attitude".) Participants who were assigned to the control group did not receive the additional text.

After reading the scenario and the manipulation of procedural fairness, participants were asked to what extent they agreed or disagreed with a number of statements on a scale ranging from 1 = Strongly disagree to 7 = Strongly agree. Perceived fairness was measured with two statements ($r_{kk} = 0.87$): (a) "The behavior of the seller in the negotiation is fair''; and (b) "The seller`s behavior in the negotiation is trustworthy". Zero-sum forecasting was measured with four statements ($\alpha = 0.79$): (a) "It is much more likely that a good deal for **the seller/me** would mean a bad deal for **me/the seller**"; (b) "In this situation, it is much more likely that **the seller`s/my** gains will come at **my/the seller**'s expense"; (c) "It is much more likely that the better terms the **seller/I** get out of this deal, the worse off **I/the seller** will be''; and (4) "It is much more likely that the more money **I/the seller** pay(s) the seller/me, the worse off **I/the seller** will be". Asymmetry was manipulated by changing the words that are shown in bold, which modifies the frame of who gains and wins in the statements (i.e., the seller/buer will gain at the expense of the buyer/seller). Participants also completed a simple attention checklist and were asked to provide some demographic details.

Results

First, a one-way ANOVA showed that the procedural fairness manipulation had a significant impact on perceived fairness ($F[2,239] = 100.48$, $p < 0.000$, *partial* $\eta 2 = 0.457$). A post-hoc Bonferroni test demonstrated that there were significant

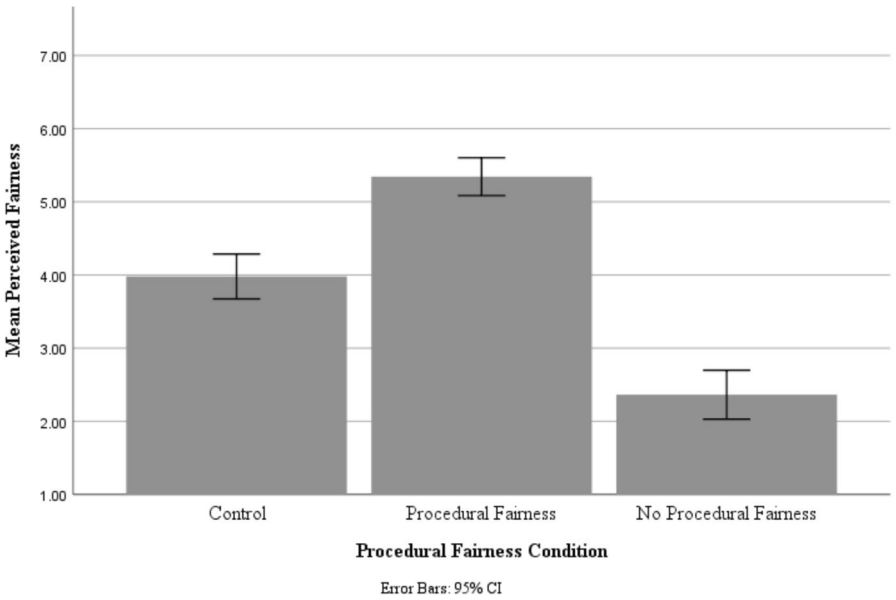

Fig. 1 Mean perceived fairness scores for the different procedural fairness conditions. *Note.* Control $n = 74$, procedural fairness $n = 83$, and no procedural fairness $n = 85$

differences between all groups ($p < 0.001$; Fig. 1). The procedural fairness condition had the highest perceived fairness scores ($M = 5.34$, $SD = 1.18$, $n = 83$, BCa 95% [CI] = 5.08, 5.6), and the no procedural fairness condition had the lowest perceived fairness scores ($M = 2.36$, $SD = 1.55$, $n = 85$, BCa 95% [CI] = 2.03, 2.69). The control condition had perceived fairness scores in between the other conditions ($M = 3.98$, $SD = 1.32$, $n = 74$, BCa 95% [CI] = 3.67, 4.29).

Second, a two-way ANOVA showed that zero-sum thinking could be explained by both the presence of procedural fairness ($F[2,236] = 6.441$, $p = 0.002$, *partial* $\eta 2 = 0.052$) and the asymmetric condition ($F[1,236] = 14.880$, $p < 0.000$, *partial* $\eta 2 = 0.059$), but not by the interaction between these two factors ($F[2,236] = 1.509$, $p = 0.223$). This and subsequent analysis from other studies used bootstrapping procedures (1000 re-samples, 95% IC BCa) to achieve higher reliability of the results, to correct deviations from the normality of the sample distribution and differences between the sizes of the groups, and also to present a 95% confidence interval for the differences between the means (Haukoos & Lewis, 2005). A post-hoc Bonferroni test demonstrated a significant difference between buyer and seller groups for the procedural fairness ($Mdif = 0.825$, $SE = 0.269$, $p = 0.002$, BCa 95% [CI] = −1.354, −0.295) and no procedural fairness ($Mdif = 0.783$, $SE = 0.265$, $p = 0.004$, BCa 95% [CI] = −1.306, −0.260) conditions. However, the difference between the two groups was non-significant for the control condition ($p = 0.452$). Furthermore, when participants were asked if the buyer is gaining at the expense of the seller, there was a significant difference in zero-sum thinking between the procedural fairness and no procedural fairness conditions ($Mdif = -0.696$, $SE = 0.259$, $p = 0.005$, BCa 95% [CI] = −1.228, −0.140), but not between the control group and no procedural fairness condition ($p = 0.699$) and also between control group and procedural condition ($p = 0.067$). Also, when participants were asked if the seller is gaining at the expense of the buyer, there was a significant difference between the procedural fairness and no procedural fairness conditions ($Mdif = -0.654$, $SE = 0.272$, $p = 0.019$, BCa 95% [CI] = −1.184,-0.141) and also between the control and the no procedural fairness condition ($Mdif = -0.675$, $SE = 0.309$, $p = 0.030$, BCa 95% [CI] = −1.307, −0.104), showing that when the seller is not fair in the scenario it enhances participants' zero-sum thinking against the seller (i.e., the seller will gain at their expense for not being fair)(Fig. 2).

Discussion

First, people perceive fair procedures as those involving accurate and truthful information from the seller. Second, procedural fairness and asymmetry independently influence zero-sum thinking but don't necessarily interact. Interestingly, participants perceived their own gains as less detrimental to the seller compared to how they viewed the seller's gains affecting themselves. This created an asymmetry in zero-sum thinking, regardless of whether procedural fairness was present. Thus, suggesting a self-protective bias, where people are less likely to see themselves harming others.

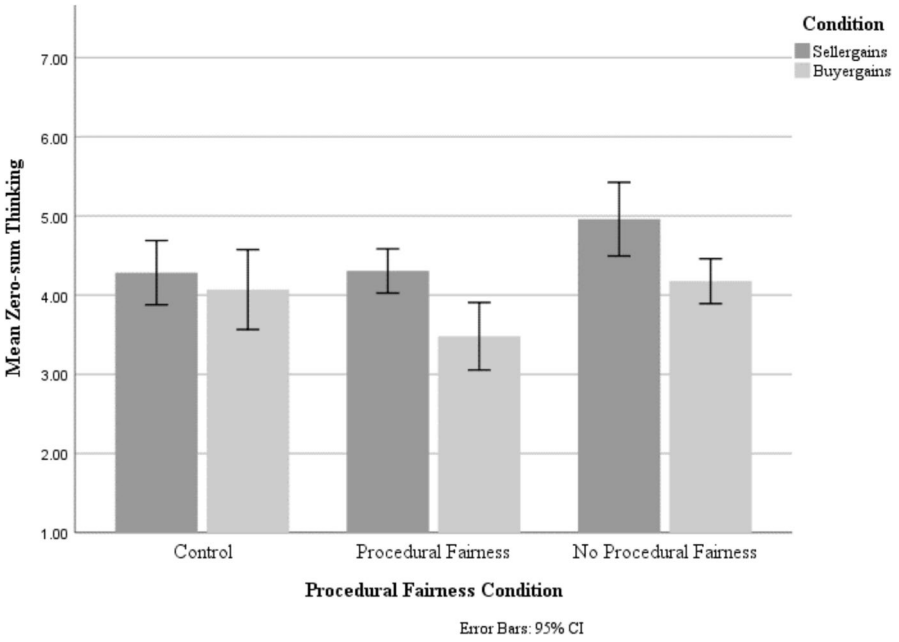

Fig. 2 Mean zero-sum thinking scores for the different procedural fairness and asymmetry conditions. *Note.* Control-seller gains` $n = 38$, control- buyer gains` $n = 36$, procedural fairness- seller gains` $n = 46$, procedural fairness- buyer gains` $n = 37$, no procedural fairness- seller gains` $n = 38$, and no procedural fairness- buyer gains` $n = 47$

Study 2a and 2b

Studies 2a and 2b were designed to assess people's forecasting of zero-sum outcomes based on asymmetric and procedural fairness in an international environmental agreement scenario. Like study 1, the studies were used to answer RQ 1 to RQ3. Past studies have shown that international relations topics elicit asymmetric zero-sum thinking in the general public, especially when dealing with competitive countries (Roberts & Davidai, 2021). International environmental agreements are a useful topic to test our questions, as they aim to provide benefits for all participating countries. However, it is often difficult to agree due to zero-sum thinking linked to each country's economic interests (Bazerman et al., 2002). The impact of fairness mechanisms on cooperative actions and beliefs is therefore explored in those scenarios when countries ensure the commitment of all parties through fair mechanisms (e.g., Nationally Determined Contributions) that aim to build consensus (Susskind & Ali, 2014).

Study 2a was conducted in Japan and focused on bilateral agreements between Japan and China. These parties were chosen due to their geopolitical, territorial, economic, security, and historical conflict dating back to the seventh century and potentialized mostly during the twentieth century, which led to a legacy of distrust between the countries (Hughes, 2009). Study 2b was conducted in the UK and focused on bilateral agreements between the UK and China.

Method

Participants

Study 2a consisted firstly of 282 participants from private universities in Japan during the first semester of 2023. Seventy-nine participants were excluded as they did not have a Japanese nationality (n = 9), provided the same responses ('flat lining') across all items (n = 7), did not provide any answers at all (n = 2), or did not pass the attention check (n = 66). Then, in the first semester of 2024, 54 more responses were collected, in which we excluded 7 for not having a Japanese Nationality (n = 1), did not pass the attention check (n = 5), or left the questionnaire blank (n = 1). This resulted in a final sample of 245 participants, of which 205 were male (83.7%) and 38 were female (15.5%). Two participants did not provide their gender 2 (0.8%). The mean age of participants was 20 years ($SE = 1.21$). The students were from engineering (55.5%), economics and management (19.6%), science (8.6%), agriculture (4.1%), law (2.9%), literature (1.6%) and other courses (5.1%). Their mean interest in international environmental issues was high (M = 5.75 [$SD = 1.22$] on a scale ranging from 1 to 7.

Study 2b consisted of 297 participants from an undergraduate course in psychology at a UK university during the first semester of 2023. Ninety-two participants were excluded as they did not have a UK nationality ($n = 26$), did not provide their nationality ($n = 3$), provided the same responses ('flat lining') across all items ($n = 2$), did not provide any answers ($n = 7$), or did not pass the attention check ($n = 54$). This resulted in a final sample of 205 participants, of which 31 were male (15.1%), and 165 were female (80.5%). Nine participants did not provide their gender (4.4%). The mean age of participants was 19.48 years ($SE = 0.08$). Their mean interest in international environmental issues was high (M = 5.72 [$SE = 0.08$] on a scale ranging from 1 to 7).

Materials and Procedures

Participants were university students at Japanese (Study 2a) and UK universities (Study 2b). Participants were randomly assigned to one of six conditions of a 2×3 experimental design similar to the one of Study 1. Study 2a was conducted in person (with a paper and pencil questionnaire). Study 2b was an online experiment hosted on the Qualtrics platform.

Participants read a scenario based on information from the UN about the Paris Agreement (UNFCCC, n.d.), with the following text: "Economic activity increases greenhouse gas emissions by the burning of fossil fuels in the industry. However, those emissions increased global temperatures and polluted the environment. Thus, some state that economic growth and the creation of jobs can negatively impact the global environment. The UK/Japan participates in an agreement with China to substantially reduce greenhouse gas emissions by 2030 to protect the environment. However, there's a lot of uncertainty if the UK/Japan and China will respect it due to their own interest in economic growth".

Participants were then presented with additional text to manipulate procedural fairness. In this, procedural and no procedural fairness conditions were manipulated by changing the words that are shown in bold below. This was done to give the impression that the agreement between the countries did or did not follow fair procedures listed in bullet points and similar to the ones held by the Paris Agreement ("According to the United Nations, in the agreement, The UK/Japan, and China publicly **accepted/rejected** the following points: (1) Communicate how they will reduce their Greenhouse Gas emissions every 5 years. (2) Report transparently on actions taken and progress in preventing global warming. (3) Submit all information above to a technical expert review and neutral actors to verify its accuracy and credibility. Thus, in the Japan/UK-China agreement, the credibility of their information **can/canno**t be ensured in a fair process".) The control group did not receive this additional text.

After reading the scenario and the manipulation of procedural fairness, participants were asked to what extent they agreed or disagreed with a number of statements on a scale ranging from 1 = Strongly disagree to 7 = Strongly agree. Perceived fairness (Japan $r_{kk} = 0.78$, the UK $r_{kk} = 0.77$) was measured with two statements: (a) "The behavior of China and the UK/Japan in the agreement is fair"; and (b) "The agreement is operating fairly". Zero-sum forecasting (Japan $\alpha = 0.67$, UK $\alpha = 0.74$) was measured with four statements: (a) "The UK`s(Japanese)/Chinese reduction of greenhouse gas emissions will only benefit China/UK(Japan)"; (b) "China/UK(Japan) will not comply with the agreement, while UK(Japan)/China will comply"; (c) "China/The UK(Japan) will prioritize their economy, while UK(Japan)/China will prioritize the environment"; and (d) "China/UK(Japan) will defend its economic interest, while UK/China will defend the global environment". Asymmetry was manipulated by changing the words in bold in the zero-sum forecast items, which will modify the frame of who gains and wins in the statements (i.e., Japan/the UK will gain at the expense of China or China will gain at the expense of the UK/Japan).

Prior zero-sum beliefs against China and the perceived dichotomy between environmental protection and economic development were controlled to verify how much they influenced response since they are not context-specifice. Prior zero-sum belief against China (Japan $r_{kk} = 0.86$, UK $r_{kk} = 0.81$) was measured with two statements: (a) "A stronger Chinese economy means a weaker Japanese/UK economy"; and (b) "As China's power increases, Japanese/UK's power decreases". Perceived dichotomy between environment and economy (Japan $r_{kk} = 0.64$, UK $r_{kk} = 0.72$) with two items: (1) Protecting the environment should be given priority, even if it causes slower economic growth and some loss of jobs; (2) Economic growth and creating jobs should be the top priority, even if the environment suffers to some extent. All of the statements were measured on a scale of 7 points from (1) Completely disagree to (7) Completely agree.

Participants also completed a simple attention check and were asked about sociodemographics and their political orientation on a scale from 0 (left) to 10 (right). Finally, their interest in international environmental issues was assessed to what extent they agreed or disagreed with the statement "Knowing more about international environmental issues is important to me".

Results

A one-way ANOVA was used to examine whether the perceived fairness manipulation has a significant effect on perceived fairness (RQ1). A two-way ANCOVA was then conducted to test the effect of procedural fairness and asymmetric conditions on zero-sum thinking (RQ2 and RQ3, respectively) while controlling political views, prior zero-sum beliefs, and the perceived dichotomy between environment protection and economic development.

Study 2a

First, the one-way ANOVA demonstrated that procedural fairness manipulation has a significant effect on perceived fairness ($F[2,245] = 9{,}236$, $p < 0.001$, *partial* $\eta 2 = 0.071$. Post-hoc Bonferroni tests showed that the difference of perceived fairness between the procedural fairness and no procedural fairness conditions was significant ($Mdif = 0.82$, $SE = 0.19$, $p < 0.001$, BCa 95% [CI] = 0.36, 1.28), and also between control and no procedural fairness conditions ($Mdif = 0.46$, $SE = 0.19$, $p = 0.052$, BCa 95% [CI] = −0.003, 0.93), where the perceived fairness scores were highest in the procedural fairness condition ($M = 3.52$, $SE = 0.139$, $n = 80$, BCa 95% [CI] = 3.218, 3.837), followed by the control condition ($M = 3.16$, $SE = 0.141$, $n = 77$, BCa 95% [CI] = 2.9, 3.43), and lowest in the no procedural fairness condition ($M = 2.7$, $SE = 0.132$, $n = 88$, BCa 95% [CI] = 2.45, 2.94) (Fig. 3).

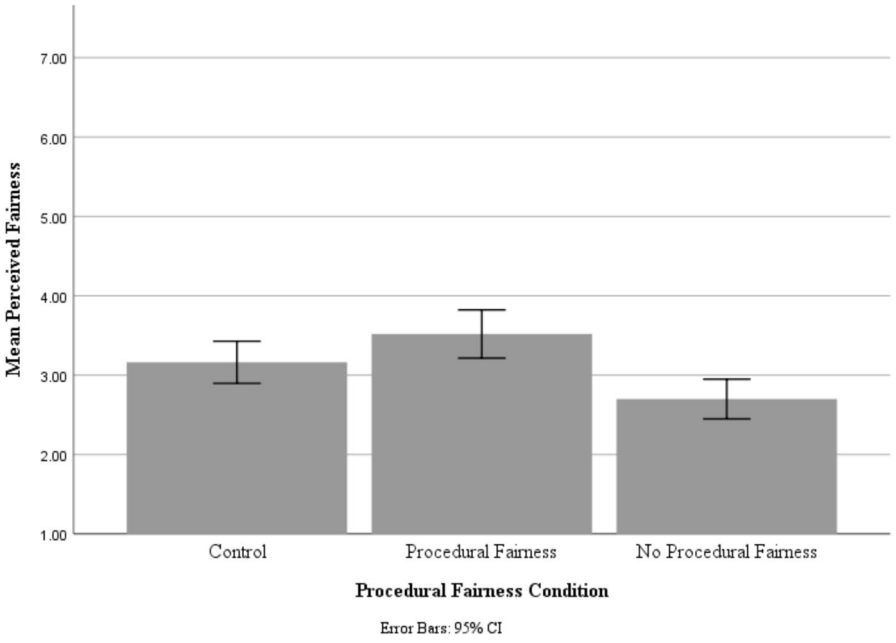

Fig. 3 Mean perceived fairness scores for the different procedural fairness conditions (Study 2a). *Note.* Control $n = 77$, procedural fairness $n = 80$, and no procedural fairness $n = 88$

Second, the two-way ANCOVA showed that zero-sum thinking differs between the two asymmetry conditions ($F[1, 245] = 143.064$, $p < 0.000$, *partial* $\eta 2 = 0.378$), but not between the different procedural fairness conditions ($F[2, 245] = 1.459$, $p = 0.235$) The interaction between the asymmetry and procedural fairness factors was non-significant ($F[2, 245] = 1.035$, $p = 0.357$). In terms of the covariates, only the prior zero-sum judgment of China and Japan's relationship was significant ($F[1, 245] = 12.151$, $p < 0.001$, *partial* $\eta 2 = 0.049$). Post-hoc Bonferroni tests demonstrated that there were significant differences between the two asymmetry conditions (i.e., Japan gains over China or China gains over Japan) for all procedural fairness conditions, i.e., control group ($Mdif = -1.328$ $SE = 0.222$, $p = 0.001$, BCa 95% [CI] = −1.803, −0.918), procedural fairness condition ($Mdif = -1.527$, $SE = 0.245$, $p = 0.001$, BCa 95% [CI] = −1.994, −1.031), and no procedural fairness conditions ($Mdif = -1.68$, $SE = 0.191$, $p = 0.001$, BCa 95% [CI] = −2.044, −1.3). However, differences in zero-sum thinking between the different procedural conditions were non-significant for both asymmetry conditions, i.e., China gains at the expense of Japan or Japan gains at the expense of China (Fig. 4).

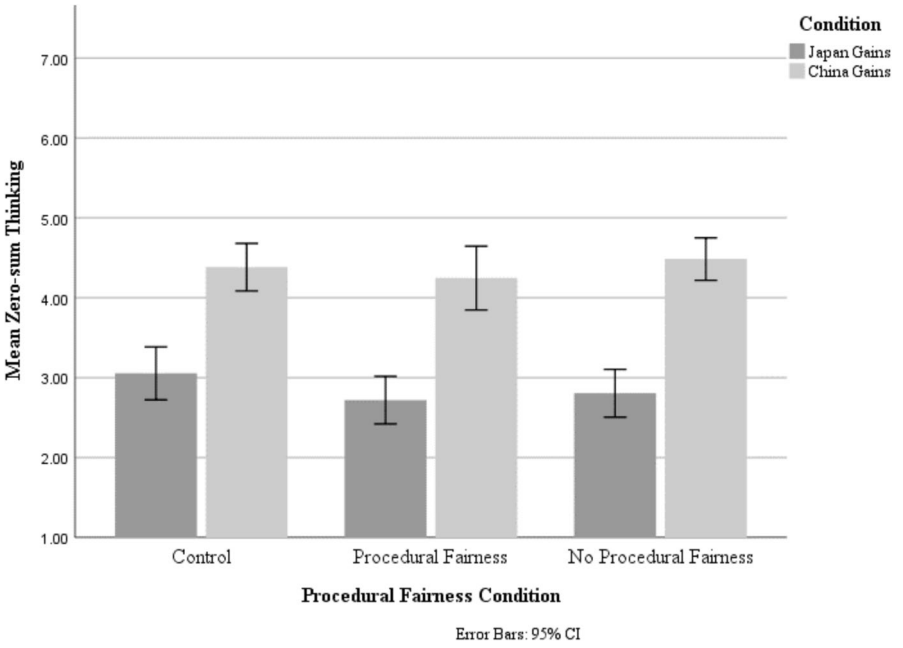

Fig. 4 Mean zero-sum thinking scores for the different procedural fairness and asymmetry conditions (Study 2a). *Note.* Control—Japan gains ($n = 39$), control—China gains ($n = 38$), procedural fairness—Japan gains ($n = 40$), procedural fairness—China gains ($n = 40$), no procedural fairness—Japan gains ($n = 41$), and no procedural fairness—China gains ($n = 47$)

Study 2b

First, the one-way ANOVA demonstrated that procedural fairness presented a significant effect on the model of perceived fairness ($F[2,204] = 17.440$, $p < 0.001$, *partial* $\eta 2 = 0.147$). From control ($M = 3.45$, $SE = 0.116$, $n = 84$, BCa 95% [CI] = 3.22, 3.68), procedural fairness ($M = 3.73$, $SE = 0.128$, $n = 128$, BCa 95% [CI] = 3.49, 3.97), and no procedural fairness ($M = 2.65$, $SE = 0.118$, $n = 54$, BCa 95% [CI] = 2.41, 2.88), Bonferroni post hoc demonstrated significant differences between control and no procedural fairness ($Mdif = 0.798$, $SE = 0.168$, $p < 0.001$, BCa 95% [CI] = 0.458, 1.143), and between procedural and no procedural fairness ($Mdif = 1.083$, $SE = 0.173$, $p < 0.001$, BCa 95% [CI] = 0.738, 1.431) (Fig. 5).

Second, the two-way ANCOVA demonstrated zero-sum thinking differs between the two asymmetric conditions ($F[1, 204] = 15.709$, $p < 0.001$, *partial* $\eta 2 = 0.074$), and between the different procedural fairness conditions ($F[2, 204] = 3.166$, $p = 0.044$, *partial* $\eta 2 = 0.031$). The interaction between the asymmetry and procedural fairness factors was non-significant ($F[2, 204] = 0.336$, $p = 0.715$). In terms of the covariates, only the prior zero-sum judgment of China and the UK`s relationship was significant ($F[1, 204] = 25.771$, $p < 0.001$, *partial* $\eta 2 = 0.116$). Post-hoc Bonferroni tests demonstrated that the difference between the asymmetric conditions (i.e., The UK/China gains over China/the UK) was only significant in the control group ($Mdif = -0.686$, $SE = 0.207$, $p = 0.001$, BCa 95% [CI] = −1.113, −0.254) (Fig. 6).

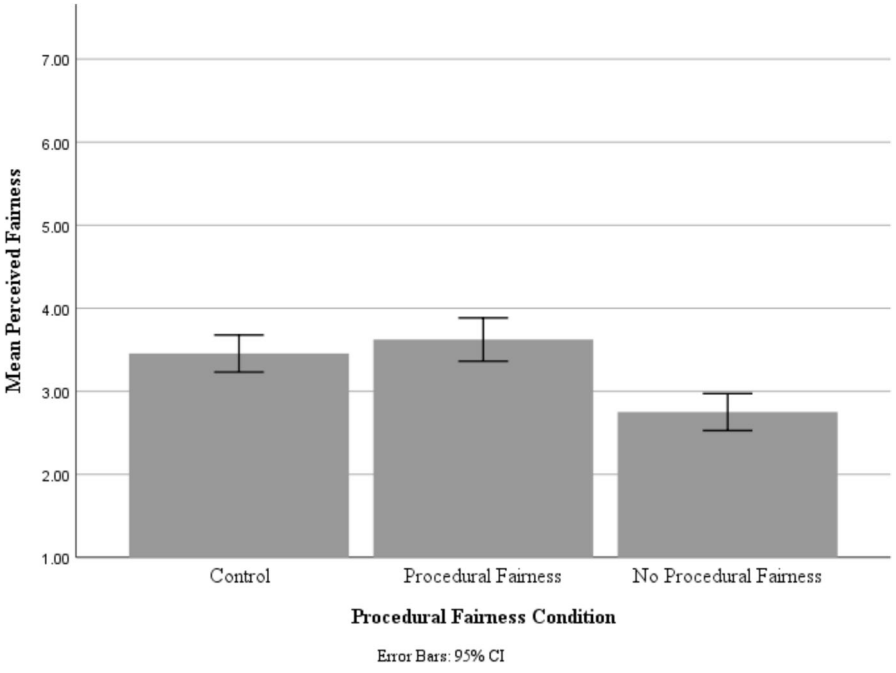

Fig. 5 Mean perceived fairness scores for the different procedural fairness conditions (Study 2b). *Note.* Control $n = 83$, procedural fairness $n = 68$, and no procedural fairness $n = 54$

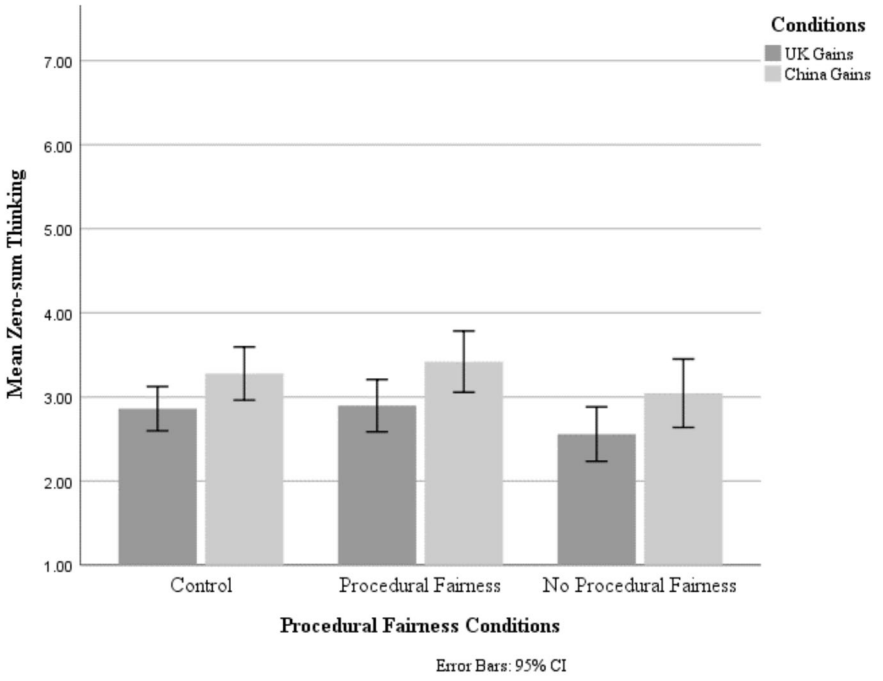

Fig. 6 Mean zero-sum thinking scores for the different procedural fairness and asymmetry conditions (Study 2b). *Note.* Control—the UK gains ($n = 47$), control—China gains ($n = 37$), procedural fairness—the UK gains ($n = 36$), procedural fairness—China gains ($n = 31$), no procedural fairness—the UK gains ($n = 30$), and no procedural fairness—China gains ($n = 24$)

Discussion

In Japan, procedural fairness had a small effect on perceived fairness, and procedural fairness differed only between the conditions with and without procedural fairness. In the UK however, the effect was much larger (partial $\eta 2 = 0.147$) than in Japan (partial $\eta 2 = 0.071$). This substantial difference in the UK occurs due to a large difference between the control condition and the no procedural fairness condition compared to Japan. This suggests that procedural fairness was a more important component for the participants in the UK than in Japan.

We found that procedural fairness mechanisms did not affect zero-sum thinking in either the UK or Japan. Egocentric bias, however, had a significant impact, particularly in Japan, where participants exhibited a stronger asymmetry in zero-sum thinking compared to the UK. Interestingly, in the UK, the control group (without fairness interventions) displayed the most asymmetry. Additionally, pre-existing zero-sum beliefs about a specific country's relationship (e.g., Japan–China) influenced participants' forecasts about agreement outcomes. Overall, procedural fairness in this context appears insufficient to overcome existing biases and promote cooperative mindsets.

Study 3

Study 3 was designed to answer questions 4–8 by exploring what mechanisms could explain the effects seen in Study 2a and 2b, in particular, whether retributive justice can be perceived as fair, and influence zero-sum thinking. We investigated whether retributive justice is a better explanatory factor in zero-sum thinking and the perception of fairness than procedural fairness. This is reasoned by the fact that substantial groups defend strict environmental regulations legally bound through imposing measures to detain non-sustainable actions, thus minimizing outcomes to be zero-sum (Susskind & Ali, 2014). Thus, the study was designed to evaluate whether retributive justice (i.e., punishment as proportional retribution for perceived wrongdoing) is related to asymmetric zero-sum beliefs.

Method

Participants

Two hundred and twenty-nine ($N = 229$) participants were recruited from a national university in Japan during the first semester of 2023. Twenty-eight participants were excluded because they did not state their nationality ($n = 4$), did not pass the attention check ($n = 22$), or did not answer any questions ($n = 1$). Then, 58 students were recruited in the first semester of 2024. Five participants were excluded because they did not state their nationality ($n = 1$), did not pass the attention check ($n = 3$), or were of no Japanese nationality ($n = 1$). This resulted in a final sample of 255 participants, of which 103 were male (40.4%) and 150 were female (58.8%). One participant did not provide their gender (0.4%). The mean age was 18 years old ($SD = 1.09$), with one missing value (0.5%). The student participants were from majors in literature (16.5%), engineering (9.0%), science (4.7%), education (3.5%), medicine (3.1%), pharmacy (2.7%), agriculture (2.7%), law (2.4%), economics and management (2.4%), and other courses (52.9%). Their mean interest in international environmental issues was high (M = 5.85 [$SD = 1.09$] on a scale ranging from 1 to 7).

Materials and Procedures

Participants were students at a Japanese university who were permitted by their lecturers to participate in the survey before classes. Participants were randomly assigned to one of the six conditions of a 2×3 experimental design similar to the previous studies, but then instead of procedural fairness, we tested conditions with and without retributive justice. Participants read a scenario based on mechanisms of legal binding that can be viewed as part of retribution for noncooperative countries (Keen et al., 2022; Luqman et al., 2022): "Economic activity increases emissions of greenhouse gasses such as CO2 through the burning of fossil fuels in the industry. However, those emissions increased global temperatures and polluted the environment. Thus, some state that economic growth and the creation of jobs can negatively

impact the global environment. Japan participates in an agreement with China to substantially reduce greenhouse gas emissions by 2030 to protect the environment. However, there's a lot of uncertainty if Japan and China will respect it due to their own interest in economic growth.

Participants were then presented with additional text to manipulate retributive justice. In this text, retributive and no retributive justice conditions were manipulated by changing the words that are shown in bold below. This was done to give the impression that the agreement by the countries did (not) follow fair procedures: "According to the United Nations, China and Japan have **accepted/rejected** all the following penalties if they don't reduce the targeted greenhouse gas emissions. This would be imposed on the non-cooperative country (1) Financial penalties: Fines that can potentially reduce government revenue, thus impacting citizens' quality of life by limiting funding for public welfare services like healthcare, education, and social support. (2) Trade sanctions: Restrictions on trade that would limit citizens' access to a variety of products and services, reducing choices in the market. (3) Carbon border adjustment measures: Taxes on imports or exports products based on their carbon footprint, affecting citizens' purchasing power in daily life. Thus, **with/without** those penalties, the agreement **can/cannot** serve as a serious deterrent and **can/cannot** increase public pressure for countries to comply with the agreement". Participants who were assigned to the control group did not receive the additional text.

After reading the scenario and the manipulation of retributive justice, participants were asked to what extent they agreed or disagreed with a number of statements on a scale ranging from 1 = Strongly disagree to 7 = Strongly agree. The statements were the same as in Studies 2a and 2b, to assess zero-sum forecast ($\alpha = 0.83$), perceived fairness ($r_{kk} = 0.57$), prior zero-sum belief against China ($r_{kk} = 0.58$), and the perceived dichotomy between environment and economy ($r_{kk} = 0.73$). Retributive justice intention was measured with two items ($r_{kk} = 0.8$): (a) "If ***China/Japan*** does not reduce the targeted greenhouse gas emissions, they should be punished strictly", and (b) "Even with justifications, ***China/Japan*** must suffer penalties and sanctions if it does not meet its commitment". Participants' prior retributive justice beliefs for control were also measured with two items (Japan $r_{kk} = 0.74$) s: (a) "To encourage cooperation with environmental agreements, we should penalize countries that don't cooperate, not just ask them to report and disclose information about their actions in reducing C02"; and (b) "To guarantee cooperation with environmental agreements, I think imposing penalties for noncooperative countries is the fairest solution". Participants also completed an attention checklist and were asked about their demographics.

Results

A one-way ANOVA was used to test whether there are differences in the levels of perceived fairness by the retributive justice conditions. A two-way ANCOVA was used to test the effect of retributive justice and asymmetric conditions on zero-sum thinking while controlling political views, prior zero-sum beliefs, and the perceived dichotomy between the environment and the economy. The same was conducted

to verify the effect of retributive justice and asymmetric conditions on retributive intentions while controlling the same variables, plus prior retributive intentions.

First, the results demonstrated that retributive justice has a significant effect on the model of perceived fairness (F[2,255] = 15.528, $p < 0.001$, *partial* $\eta 2 = 0.078$). Perceived fairness was highest in the retributive justice condition ($M = 3.927$, $SE = 0.144$, $n = 89$, BCa 95% [CI] = 3.63, 4.2), and lowest in the no retributive justice condition ($M = 3.16$, $SE = 0.12$, $n = 89$, BCa 95% [CI] = 2.98, 3.39). The control condition had scores close to the retributive justice ($M = 3.84$, $SE = 0.125$, $n = 77$, BCa 95% [CI] = 3.6, 4.08). A post-hoc Bonferroni test demonstrated a significant difference between the condition with and without retributive justice ($Mdif = 0.77$, $SE = 0.181$, $p < 0.001$, BCa 95% [CI] = 0.334, 1.206), and control and no retributive justice ($Mdif = 0.68$, $SE = 0.199$, $p = 0.001$, BCa 95% [CI] = 0.228, 1.13) (Fig. 7).

Second, zero-sum thinking could be explained by asymmetric conditions (F[1, 250] = 180.813, $p < 0.001$, *partial* $\eta 2 = 0.368$), and by retributive justice (F[2, 250] = 4.277, $p = 0.038$, *partial* $\eta 2 = 0.027$), but not by the interaction between the two factors (F[2, 250] = 0.481, $p = 0.619$). From the covariates, the prior retribution intentions were significant (F[1, 250] = 4.79, $p = 0.03$, *partial* $\eta 2 = 0.02$), along with the political view (F[1, 250] = 13.87, $p = 0.001$, *partial* $\eta 2 = 0.043$). Bonferroni post hoc demonstrated that there is a significant difference between the asymmetric conditions (i.e., Japan/China gains over China/Japan) in all retributive justice conditions: Control ($Mdif = -1.582$, $SE = 0.263$, $p < 0.001$, BCa 95% [CI] = −2.01, −1.065), retributive justice ($Mdif = -1.728$, $SE = 0.248$, $p < 0.001$, BCa 95% [CI] = −2.216,

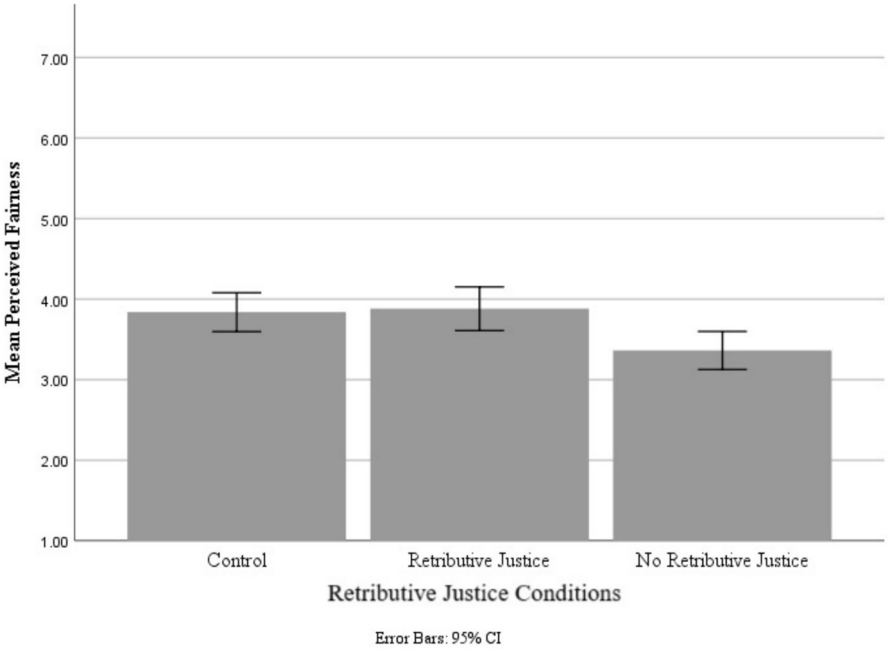

Fig. 7 Mean perceived fairness scores for the different retributive justice conditions. *Note.* Control $n = 76$, retributive justice $n = 86$, and no retributive justice $n = 88$

−1.240), and no retributive justice (*Mdif* = −1.93, *SE* = 0.248, $p < 0.001$, BCa 95% [CI] = −2.24, −1.441). Also, it was observed significant differences in zero-sum thinking across the retributive conditions only between control and no retributive justice when Japan is framed as gaining over China (*Mdif* = −0.617, *SE* = 0.252, $p = 0.046$, BCa 95% [CI] = −1.226, −0.009) (Fig. 8).

Third, retributive intentions could be explained by asymmetric ($F[1, 250] = 13.49$, $p < 0.001$, *partial* $\eta 2 = 0.053$) and retributive justice conditions ($F[2, 250] = 5.88$, $p = 0.003$, *partial* $\eta 2 = 0.047$), but not by the interaction between the two factors ($F[2, 250] = 1.424$, $p = 0.243$). From the covariates, the general retributive justice attitude was significant ($F[1, 250] = 84.414$, $p < 0.001$, *partial* $\eta 2 = 0.168$), along with perceived dichotomy between environment and economy ($F[1, 250] = 5.832$, $p = 0.016$, *partial* $\eta 2 = 0.024$). Bonferroni post hoc demonstrated that there is a significant difference in retributive intentions between the asymmetric conditions (i.e., Japan/China should be punished) only in the condition with retributive justice (*Mdif* = −1.028, *SE* = 0.287, $p < 0.001$, BCa 95% [CI] = −1.594, −0.462). Also, it was observed significant differences in retributive intentions across the retributive conditions between control and retributive justice conditions (*Mdif* = −0.986, *SE* = 0.274, $p = 0.002$, BCa 95% [CI] = −1.46, −0.495), and between no retributive justice and retributive justice conditions (*Mdif* = −0.816, *SE* = 0.314, $p = 0.012$, BCa 95% [CI] = −1.417, −0.196) when China is framed to be punished (Fig. 9).

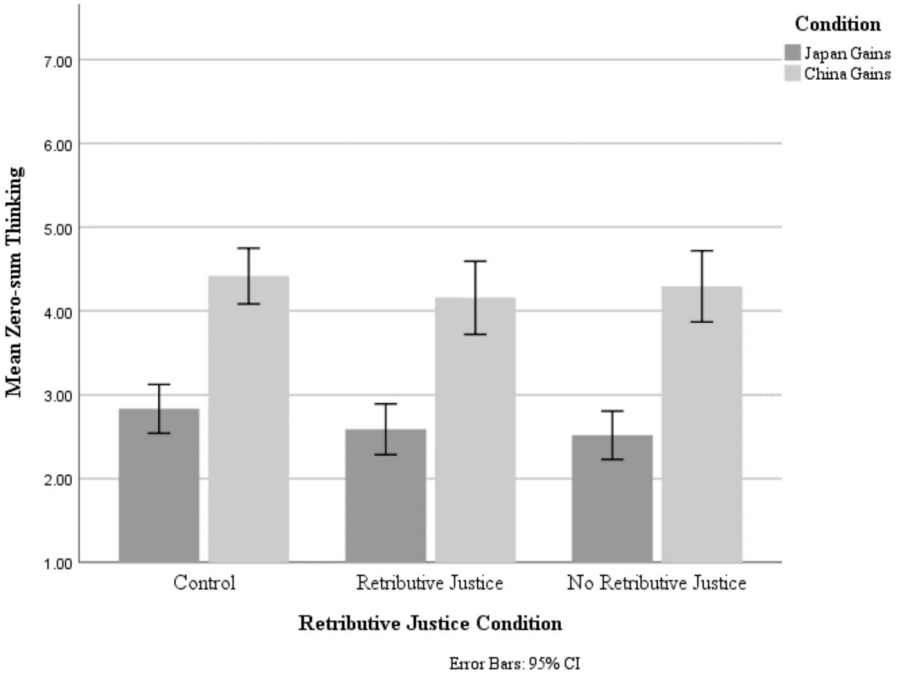

Fig. 8 Mean zero-sum thinking scores for the different retributive justice and asymmetric conditions. *Note.* Control—Japan gains ($n = 39$), control—China gains ($n = 37$), retributive justice—Japan gains ($n = 46$), retributive justice—China gains ($n = 40$), no retributive justice—Japan gains ($n = 44$), and no retributive justice—China gains ($n = 44$)

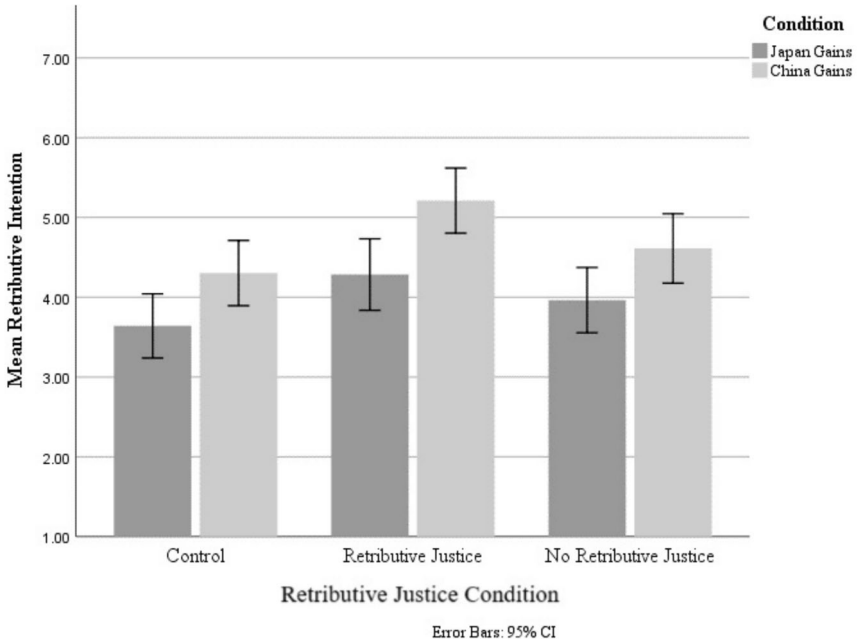

Fig. 9 Mean retributive intention scores for the different retributive justice and asymmetric conditions

Discussion

Retributive justice had a significant effect on perceived fairness. The results showed that the condition with no retributive justice was perceived as less fair than the others suggesting that the absence of penalty can influence the evaluation of international environmental agreements.

Further, it is indicated that people's forecast outcomes of this agreement depend on the asymmetry of the situation and retributive conditions. This means that zero-sum thinking is higher when China is perceived to be gaining at Japan`s expense, and this can vary whether there is retributive justice or not. The results also show that zero-sum thinking is influenced by the prior retribution beliefs and the political views of the participants. These factors may reflect the existing attitudes and beliefs of the participants toward the intergroup conflict.

Finally, the results suggest that retributive intentions are influenced by both the asymmetry and the retributive justice of the situation, as well as by the prior retributive justice beliefs of the participants and if they see the environment as a trade-off with the economy.

General Discussion

Zero-sum thinking, where negotiators focus only on their own gains, can hinder consensus building. We explored how fairness mechanisms and egocentric bias influence these forecasts in negotiations. Through experiments, we identified limitations and opportunities for understanding these biases and fairness across cultures and scenarios. We then applied this knowledge to real-world negotiations highlighting the importance of perspective-taking and cultural factors in building consensus on climate agreements. Finally, we discuss our research questions in more detail.

RQ1: Is procedural fairness perceived as fair in negotiation scenarios?

Procedural fairness is perceived as a fair mechanism, especially in a common voluntary trade. However, the results are less clear for international environmental agreement scenarios, which might be perceived as far removed from their day-to-day negotiations (Gifford, 2011; Gifford et al., 2018), making it difficult to evaluate. Second, fairness might not be the most important aspect of the agreement, but the party whom the participants are interacting with.

RQ2: Does procedural fairness in negotiation scenarios decrease zero-sum thinking?

Our findings on fairness mechanisms were mixed. In a car-trade scenario, unfairness increased zero-sum thinking against the seller, but fair procedures didn't necessarily reduce it. Interestingly, fairness did reduce zero-sum thinking when the buyer gained – suggesting egocentric bias (focusing on oneself). International environmental agreements showed no impact of fairness on zero-sum thinking, suggesting it might not be effective in these complex scenarios.

RQ3: Does egocentric bias generate asymmetry in zero-sum thinking scenarios with procedural fairness?

As also found in Roberts and Davidai (2021), egocentric bias generates asymmetry in zero-sum thinking. But, we can see a more robust effect, especially in the international environmental scenario between Japan and China, which resembles their conflicted relationships and lack of trustworthiness. The results are not found in the UK. Meanwhile, in the car trade scenario, people tend to have asymmetry only in fair and unfair settings, where they might tend to think as benevolent actors (i.e., reducing beliefs that they are not gaining at the expense of the seller, but not the contrary) when there is procedural fairness. However, when there are unfair procedures, they will have a negative belief towards the seller.

RQ4: Is retributive justice perceived as fair in negotiation scenarios?

The presence of retributive justice does not change perceived fairness compared to the control group, however, when retributive justice is rejected, people will perceive the scenario as unfair. Thus, in this research, framing a mechanism as unfair in terms of retributive mechanism will impact people's perception of fairness over the agreement.

RQ5: Does retributive justice in negotiation scenarios decrease zero-sum thinking?

We could not confirm that retributive justice in negotiation scenarios decreases zero-sum thinking, which shows that substituting procedural fairness with retributive justice does not satisfy less biased forecasting of an agreement outcome.

RQ6: Does egocentric bias generate asymmetry in zero-sum thinking scenarios with retributive justice mechanisms?

Participants showed a tendency to forecast China getting better off at the expense of Japan, but not vice versa. Especially, Japanese people tend to defend their country's image much more than enhancing hostile beliefs against China. These results might have roots in nationalism and political views, which was a significant covariate.

RQ7: Do agreements with retributive justice increase punitive sentiments?

Our findings confirm that the presence of retributive justice might affect retributive intentions, especially toward China. In that sense, if the countries agree with potential penalties for non-cooperative countries, people would be willing to punish China compared to a control group, which this difference is not seen for punishing Japan.

RQ8: Are the intentions for retributive justice asymmetrical?

Our findings suggest that retributive justice could be explained both by asymmetric conditions, but post hoc analysis presented a low explanation for it, where this asymmetry is significant only in the condition with retributive justice, which shows that when there is a clear statement of agreement for this kind of justice, participants feel more that China should be punished if it does not cooperate compared to Japan if this list does not cooperate.

Conclusions

This research challenges the universal effectiveness of fairness mechanisms in mitigating intergroup conflict. While the literature points out that procedural fairness fosters cooperation (Hollander-Blumoff & Tyler, 2008; Tyler et al., 2019), our findings suggest limitations. Deeply held beliefs about zero-sum outcomes may resist

fairness interventions. Procedural fairness might be more effective in uncertain scenarios where "free rider" anxieties are lower. However, historical context can shape these anxieties. For example, the China-Japan relationship, marked by historical imbalances, could lead to a biased perception of future cooperation (Lind & Van den Bos, 2002). Pre-existing distrust and perceived imbalances, potentially contingent on nationality, can further hinder cooperation. Interestingly, the rise of negotiation studies coincided with periods of intense ideological tensions (Pruitt & Kimmel, 1977). These parallels necessitate renewed exploration of novel designs for contemporary conflict resolution.

Our findings also shed light on the limitations of instrumental rationality in negotiation, aligning with goal expectation theory (Pruitt & Kimmel, 1977). This suggests that strategic reasoning is significantly influenced by prior expectations about the other party's cooperativeness, even when cooperation appears to be the optimal choice (Yamagishi, 1988). These expectations, potentially intertwined with egocentric biases, can exacerbate zero-sum thinking. Consequently, the effectiveness of fairness mechanisms in promoting cooperation might be obscured by such cognitive factors. This proposition is bolstered by research demonstrating the particular efficacy of procedural fairness in uncertain situations where expectations regarding the other party's behavior and outcomes are less well-defined (Van den Bos et al., 1997). Thus, we advance the understanding of how fairness interventions might be hindered by pre-existing expectations and egocentric biases within negotiation contexts.

Implications

Power imbalances can exacerbate zero-sum thinking in international relations. Weaker economies may justify non-cooperative actions by emphasizing their disadvantaged position (Bazerman et al., 2002; Jotzo et al., 2018; Williams, 2005). To bridge this gap, negotiation processes must address underlying mindsets and identify how seemingly disparate interests can converge toward mutually beneficial goals (Bazerman et al., 1999; Wade-Benzoni et al., 2002). This shift from competition to cooperation is essential for fostering international collaboration.

Global agreements face challenges due to diverse viewpoints (Susskind & Ali, 2014). Idealists prioritize strict environmental retributive standards, while pragmatists favor consensus and practical solutions through procedural fairness. Our research suggests zero-sum thinking persists even with fairness mechanisms, highlighting the need for improved communication and perspective-taking (Ku et al., 2015). Especially because egocentric bias remains a hurdle to consensus building.

Limitations

Samples from both Japan (primarily male) and the UK (primarily female) consisted of university students, limiting generalizability to the broader population. Future research should target more representative demographics. Additionally, the scenario themes may not directly reflect participants' daily experiences, potentially impacting

responses (Gifford et al., 2018). Future studies could explore topics closer to participants' lives and potentially utilize a multimethod approach beyond scenario-based research. Finally, it is necessary to point out that this study did not measure cooperation directly, but assumed zero-sum thinking as a non-cooperative belief. Thus, the reliance on indirect indicators may have led us to an overstated discussion of cooperation in this research. Because of that, it is necessary to extend these findings to research that could directly measure cooperation, for example, through behavioral observations (e.g., in setting tasks that can only be completed through collaborative efforts), self-reporting, and other alternatives especially found in social psychology, psychometrics, behavioral economics, and experimental economics.

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Data Availability All data, questionnaires, and other supplementary material are available publicly at the following Open Science Framework link: https://osf.io/d9b7p/.

Declarations

Conflict of interest None.

Permission to Reproduce Material from Other Sources Not applied.

Consent Statement and Ethics This research was approved by the ethics committee of the first and second authors' universities (IRB 2022-9). All procedures performed in studies involving human participants follow the ethical standards of the institutional and national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. All participation in the studies was consent and voluntary with no payment. In addition, it was told to the participants that the participants could leave the study at any moment according to their will. To ensure privacy, no information that could individually identify the participant was collected. The information provided was held anonymously, so it will be impossible to trace this information back to you individually. The anonymous data was deposited at a recognized and secure repository (UK Data Service) and a safe room at the first and second author`s laboratory.

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