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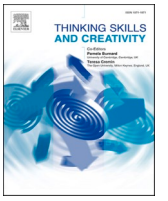

Unfairness brings malice: Malevolent creativity is modulated by perceived unfairness of others

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ABSTRACT

Creativity which is driven by negative intention can be termed as malevolent creativity (MC). Existing findings revealed that unfairness promoted regular antisocial behavior like aggression or lying. But the relationship between unfairness and creative antisocial behavior (i.e., MC) have not been investigated. Based on AMORAL theory, two studies were conducted to investigate the relationship between unfairness and MC from trait and state levels respectively. In Study 1, participants completed several questionaries about unfairness, MC, and other personality traits in online formats. Results showed that MC was significantly correlated with individuals' unfairness, aggression, and moral disengagement. Aggression and moral disengagement played mediating roles between unfairness and MC. In Study 2, the Ultimatum Game paradigm was used to activate participants' feelings of unfairness and they were further asked to solve MC problems in control or unfair conditions. Results showed that the experience of unfair condition enhanced individuals' MC performance. Anger and implicit aggression played mediating roles between unfairness and MC. These findings indicate that individuals' MC performance might be enhanced by unfairness and this effect could be related to individuals' moral disengagement, aggression and anger.

1. Introduction

Good things sometimes lead to bad results. Although creativity is generally considered as positive and prosocial ability to generate novel and useful ideas or products (Runco & Jaeger, 2012; Plucker et al., 2004), it can still be used for evil purposes. Such "evil creativity" which is named as malevolent creativity (MC), refers to the ability that generate creative ideas to intentionally cause damage (Cropley et al., 2008; Harris et al., 2013).

As the typical examples related to MC, criminals and terrorists use this ability to reap profit and wreak havoc (Eisenman, 2008, 2010; Gamman & Raein, 2010). Beyond the extreme population (e.g., criminals), researchers noticed that MC behavior appeared everywhere in the daily life of normal individuals (Hao et al., 2020; Perchtold-Stefan et al., 2021). The performances of malevolent creation are found to be influenced by varieties of social situations, personal traits, and emotions (James et al., 1999; Baas et al., 2008). Due to the innovation nature of these creative antisocial activities (i.e., randomness, surprise, and rule breaking features), they are

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challenging to be effectively predicted and prevented, which further result in serious negative impacts on society (Gill et al., 2013; Gino & Wiltermuth, 2014; Wang, 2019). Therefore, focusing on creativity in relation to malevolent purposes has great practical significance (Cropley, 2010; Cropley & Cropley, 2011; Hilton, 2010; Gill et al., 2013; Singer, 2010). Revealing the underlying mechanisms that various factors affect MC can provide inspiration for exploring effective strategies to reduce its potential harm (Lee & Dow, 2011).

The internal factors (e.g., personality) related to the emergence of MC were primarily focused by researchers (e.g., Chávez-Eakle et al., 2012). Previous studies have revealed that explicit and implicit aggressions were positively associated with MC performances (Harris & Reiter-Palmon, 2015; Lee & Dow, 2011). Another study from the perspective of pathological personality has found a significant positive correlation between the antisocial schizotypy and MC (Perchtold-Stefan et al., 2022b). According to Harris et al. (2013), those with lower emotional intelligence may tend to exhibit high MC performance because they are unaware of the inappropriateness of malevolent creative ideas. Additionally, the strength of the behavioral activation system (i.e., approach motivation) is positively connected to the tendency of norm violation, which may further foster high MC (Malevolent Creativity) potential (Hao et al., 2020). In the abovementioned studies, researchers aimed to identify stable individual factors that determined the manifestation of malevolent creativity.

However, malevolent creativity is not a stable capability but fluctuates with changes in the environment. Cropley et al. (2008) noted that the novelty of criminals' malevolent behaviors tended to increase as external pressures rose (e.g., surveillance by law enforcement agencies). Individual and environmental factors also exhibit an interactive effect on the MC performance (Cropley, 2010). Therefore, AMORAL model provides a comprehensive framework for understanding the trajectory of malevolent creativity, encompassing its Antecedents, individual Mechanisms, environmental Operants, Realization, Aftereffects, and Legacy (namely AMORAL; Kapoor & Kaufman, 2022). This model highlights the interplay between individual characteristics and environmental factors, illustrating how they collectively contribute to the genesis and execution of malevolent creative actions. Consistent with the AMORAL model, various external environmental factors (particularly negative ones) have been found to facilitate the MC performance. Gill et al. (2013) indicated that individual dissatisfaction with the current social environment was the direct cause of MC. When individuals experinece higher level of social exclusion, their MC performances will increase (Perchtold-Stefan et al., 2022a). Baas et al. (2019) also found that compared with individuals in a low social threat state, individuals in high social threat state proposed a larger number of malevolent crative ideas. Within the framework of the AMORAL model, inequities in assets and power are considered factors that facilitate malevolent creativity (Kapoor & Kaufman, 2022). In summary, the disadvantageous environment or status may be key factors that stimulate malevolent idea generation.

Unfairness, particularly in the form of distributive injustice (i.e., the fairness of outcomes received by individuals in distribution; Adams, 1965; Folger & Cropanzano, 2001), represents a pervasive issue across various societies, stemming from disadvantageous statuses. A study based on macroeconomic data from 34 countries showed that national economic growth did not always accompany an increase of national happiness, because the positive effect of economic growth was often offset by unfair distribution of resources (Oishi & Kesebir, 2015). Moreover, a recent meta-analysis included more than 2.5 million participants demonstrated a negative correlation between economic inequality and prosocial behavior (Yang & Konrath, 2023). Unfairness will reduce individuals' job satisfaction and interpersonal trust (Kifle, 2013; Barone & Mocetti, 2016). Additionally, the inferior parties in unfair situation are less willing to cooperate (Côtéa et al., 2015; Nishi et al., 2015) or share their resources with others (Melita et al., 2021; Delhey & Dragolov, 2014). These findings implicate that unfairness may hamper individuals' prosocial tendency.

Except making things less good, unfairness will make it worse. Fehr and Schmidt (1999) proposed that unfairness elicits negative reactions, such as excessive resistance. Aligned with this proposition, research has demonstrated that perceptions of unfairness amplify antisocial behaviors, including aggression, retaliation, rejection, and deception (Cohen-Charash & Mueller, 2007; Brüne et al., 2013; Ding et al., 2022; Valle & Ploner, 2017; Wang, 2022). Individuals exposed to unfair treatment are more inclined to believe that their experiences of unfairness entitle them to act selfishly and rationalize their unethical behavior (Zitek et al., 2010). When unfair person is being punished, the activity in empathic-related brain regions decreases among observers (Singer et al., 2006). As for trait-related factors, the level of Honesty-Humility (which contains facets of fairness) negatively correlated with violent behavior (Book et al., 2012; Pailing et al., 2014) and MC potential (Fu & Zhang, 2023). Given that the core feature of MC is causing damage deliberately (Cropley et al., 2008; Hao et al., 2016; Harris et al., 2013), there may be a potential positive connection between perceived unfairness and MC. Clark and James (1999) have found that individuals who suffered unfair treatment in organization generate more negative creative ideas. It provided preliminary evidence that unfairness may be linked to negative creation. However, this study did not accurately measure the MC performance in a direct way and it also did not explain the underlying mechanisms. Therefore, the relationship between unfairness and MC still needs to be further explored by empirical research. Currently, MC can be observed at both trait and behavioral levels (e.g., Hao et al., 2016; Gao et al., 2022; Perchtold-Stefan et al., 2021; Xu et al., 2021). The trait level refers to the potential for malevolent creation, assessed by the frequency of an individual's malevolent actions in life (Hao et al., 2016). On the behavioral level, MC refers to the performance of generate intentionally harmful ideas, measured by the originality and harmfulness of the produced malevolent ideas (e.g., Qiao et al., 2022). The potential for malevolent creativity is relatively stable, whereas manifestations of malevolent creativity can fluctuate (e.g., Hao et al., 2020). Although the potential for malevolent creativity can be transformed into actual malevolent creative acts (Hao et al., 2016), individuals only put these malevolent ideas into practice under specific circumstances (Xu et al., 2021). Investigating MC on both trait and behavioral levels allows a more comprehensive understanding of its attributes. Based on existing findings and assumption of AMORAL model, we primarily assumed that sense of unfairness positively predicts MC potential (trait level) while unfairness situation enhanced MC performances (behavior level; e.g., Hao et al., 2016; Kapoor & Kaufman, 2022; Valle & Ploner, 2017).

There are several factors may act as mediators between unfairness and MC. Zitek et al. (2010) suggested that experience of unfair

events might make individuals to justify their subsequent immoral behavior. This cognitive tendency to justify immoral behavior is termed as moral disengagement (Bandura et al., 1996). Xu et al. (2021) found that individuals with low level of moral disengagement would be less likely to engage in MC behavior. In addition, unfairness can increase individuals' aggressive behavior (Brüne et al., 2013; Valle & Ploner, 2017). Higher levels of explicit and implicit aggressions were positively associated with MC performances (Harris & Reiter-Palmon, 2015; Lee & Dow, 2011). Moreover, unfairness can increase individuals' anger (Gummerum et al., 2016; Seip et al., 2014). As a highly arousable negative emotion, anger can affect people's cognitive process and promote individual's MC performance (Russell, 2003; Baas et al., 2008). Cheng et al. (2021) demonstrated that anger boost MC performance through implicit aggression. Thus, we proposed that moral disengagement, anger, and aggression (i.e., explicit and implicit aggression) may play the important roles in the relation between unfairness and MC.

In the present study, the core question is "How does the sense of unfairness affects individual's malevolent creativity". Based on the abovementioned studies, we hypothesized that (H1) there is a correlation between individuals' perception of unfairness in daily life and MC; (H2) the MC performances are enhanced when perceived unfairness is activated; (H3) moral disengagement, emotional state and aggression (i.e., implicit and explicit aggression) significantly mediate the relationship between unfairness and MC. Two studies were conducted to examine three hypotheses. In Study 1, the relationship between perceived unfairness and MC potential was explored at trait level. In Study 2, perceived unfairness was activated by the Ultimatum game, while MC performance was measured by the malevolent creativity task (i.e., participants were required to generate creative approaches to causing damage). We examined whether MC performance was enhanced by feelings of unfairness. In both studies, the mediating roles of moral disengagement, emotional state and aggression (i.e., implicit and explicit aggression) in unfairness-MC relation were explored.

2. Study 1

2.1. Research procedure and participants

Study 1 implemented an online survey methodology. The survey was created on the online survey website of Sojump (www.sojump.com) which also generated a corresponding QR code. This QR code was disseminated via social media channels (the campus WeChat groups). By scanning the QR code, participants were able to register and verify their identity before completing the survey. A total of 355 undergraduate students were successfully recruited for this study. 23 data set were excluded because they selected the same options for all items on some scales or did not give valid responses to specific questions.

The final sample comprised 332 participants (mean age = 22.44 ± 2.35, 192 male). The protocol of the study was approved by the University Committee on Human Research Protection (UCHRP) of East China Normal University (Code: HR2-0023-2022). The whole online survey took about 15 min to complete and afterwards, participants received ¥5 as compensation for their participation.

2.2. Measures

The unfairness questionnaire was used to evaluate participants' perceived unfairness in their daily lives. Due to the lack of a composite scale that can directly measure individuals' perception of unfair situations in daily life, three scales that have been used to explore the relationship between trait unfairness and violent behavior or MC potential were selected in Study 1 (e.g., Fu & Zhang, 2023; Pailing et al., 2014; Wang, 2022). The selected scales included: HEXACO personality scale (Lee & Ashton, 2004), the emotional response to unfairness scale (ERUS; Bizer, 2020), and the organizational justice scale (ORG; Colquitt, 2001). All of them have satisfactory reliability and validity to measure individuals' perception of unfairness from the trait level. The fairness subscale of Honesty-Humility dimension in HEXACO was used in unfairness questionnaire (the internal consistency reliability [Cronbach's α = 0.85] was satisfactory in this study). This scale measures a specific aspect of participants' personalities by asking them to make behavioral choices in hypothetical real-life situations. Respondents were asked to choose from 1 to 5 (1 = totally disagree, 5 = totally agree) according to the given contexts (e.g., "If I am sure I will not be caught, I will be tempted to use fake money"). Four items in the emotional response to unfairness scale were used in this study after eliminating the items with low reliability and validity (the internal consistency reliability [Cronbach's α = 0.78] was satisfactory in this study). This scale measures the potential emotional responses of individuals when confronted with situations of unfairness, thereby reflecting the individual's attitude towards the perception of unfairness. Participants were asked to choose from 1 to 5 based on the given context (1 = totally disagree, 5 = totally agree, e.g., "I get really frustrated when the world is unfair"). Twenty items from the organizational justice scale were used in this study (Colquitt, 2001). Participants are instructed to rate each item using a 5-point scale (from 1 = strongly disagree to 5 = strongly agree). Since the participants in this study were college students, the context of employees' working environment in the original scale was replaced with the school environment (e.g., "In terms of my academic achievements, the rewards I have received are fair", the internal consistency reliability [Cronbach's α = 0.94] was satisfactory in this study). The AMORAL model highlighted the impact of personal factors and environmental factors. These three scales precisely measure individuals' perceptions of unfairness from the perspectives of personal traits (HEXACO), subjective emotions (ERUS), and the environmental level (ORG), reflecting individuals' sensitivity to the sense of unfairness at the trait level.

The Runco Ideational Behavior Scale (RIBS) was used to assess the participants' individual creative potential (Runco & Acar, 2012). The scale focuses on ideation that may occur in daily life. The short form of the Runco Ideational Behavior Scale was adopted in this study. It contains 19 items and asks participants to choose a number from 0 to 4 which range from 'never' to 'just about every day', according to frequency of each item in daily life. (e.g., "When I see clouds, shadows, and similar fuzzy images, I imagine what the images actually look like") The sum of the 19 items is the creativity ideation score. The reliability of the Runco Ideational Behavior

Scale in the present investigation was satisfactory (Cronbach's α = 0.90).

The Malevolent Creative Behavior Scale (MCBS; Hao et al., 2016) was used to assess the participants' individual MC potential. It contains 13 items divided into three dimensions: hurting people (e.g., "How often do you think about ideas to take revenge when being unfairly treated"), lying (e.g., "How often do you fabricate lies to simplify a problem situation"), and playing tricks (e.g., "How often do you have ideas about how to pull pranks on others"). Respondents were asked to choose from 1 to 5 (1 = never, 2 = few times, 3 = sometimes, 4 = often, 5 = always) according to the frequency of each item in their own daily lives. The sum of 13 items equals the score on the MC Behavior Scale; a higher score is indicative of higher MC potential. The internal consistency reliability of the MC Behavior Scale (Cronbach's α = 0.93) was satisfactory in this study.

The Buss-Perry Aggression Questionnaire (BPAQ; Buss & Perry, 1992) was used assess individuals' aggression in everyday situation. Participants need to rate 22 items using a 5-point scale (from 1 = very inappropriate to 5 = very appropriate, e.g., "I get into fights a little more than the average person"). The total score was taken, with higher scores indicating a higher level of aggression. The internal consistency reliability of the scale in this study was satisfactory (Cronbach's α = 0.92).

Yang et al. (2010) Civil Moral Disengagement Questionnaire (CMDQ) was used to assess the participants' moral disengagement. The 32-item scale comprises eight dimensions: moral defence (e.g., "It is alright to fight to protect your friend"), euphemistic label (e.g., "Slapping and shoving someone is just a way of joking"), favourable comparison (e.g., "It is okey to insult a classmate because beating him/her is worse"), responsibility transfer (e.g., "Kids cannot be blamed for using bad words when all their friends do it"), decentralization of responsibility (e.g., "It is unfair to blame a child who had only a small part in the harm caused by a group"), distortion of results (e.g., "It is okey to tell small lies because they do not really do any harm"), blame attribution (e.g., "Kids who get mistreated usually do things that deserve it"), and dehumanization (e.g., "Some people deserve to be treated like animals"). Participants are instructed to rate each item using a 5-point scale (from 1 = strongly disagree to 5 = strongly agree). The average score of the 32 items was taken, with higher scores indicating a higher level of moral disengagement. In the current study, the internal consistency reliability of the scale was satisfactory (Cronbach's α = 0.96).

2.3. Statistical analysis

Due to the restriction set on the online survey platform used in this study, which requires "all questions to be completed before successful submission", there were no messing values. After converting and aggregating the scores of each scale separately, the data were analysed using SPSS 23.0 software. First, a correlation analysis was conducted to provide preliminary results for the relationship among all variables. Subsequently, in accordance with the hypotheses proposed above, hierarchical regression was used to investigate the mediating effect of moral disengagement and aggression. All variables were standardized in the path analyses.

2.4. Results

2.4.1. Description and correlation analysis

The results of the Probability-Probability Plot showed that the scores of all variables conformed to normal distribution. Therefore, we conducted a Pearson correlation analysis on all variables. The correlations between MC potential, creative potential, aggression, moral disengagement and unfairness with three sub-dimensions of HEXA, ERUS, ORG are shown in Table 1. MC potential was positively correlated with the score of creative potential significantly ($p < .001$). Besides, unfairness as well as three sub-dimensions of unfairness were also significantly correlated with MC potential negatively ($p < .001$). Additionally, MC potential was negatively correlated with aggression and moral disengagement ($p < .001$).

2.4.2. Mediating role of aggression and moral disengagement

Hayes' (2013) SPSS macro program PROCESS (model 4) was used to analyse the mediating effect of aggression and moral disengagement between unfairness and MC potential. As shown in Fig. 1, unfairness significantly and negatively predicted aggression ($b = -0.42$, $SE = 0.07$, $p < 0.001$), aggression significantly and positively predicted MC potential ($b = 0.29$, $SE = 0.05$, $p < 0.001$). In addition, Unfairness significantly and negatively predicted moral disengagement ($b = -0.84$, $c = 0.07$, $p < 0.001$), moral disengagement significantly and positively predicted MC potential ($b = 0.40$, $SE = 0.05$, $p < 0.001$). Furthermore, the relationship between Unfairness and MC potential was indirectly mediated by aggression ($b = -0.12$, $SE = 0.03$, 95 % CI [−0.07, −0.18]) and moral

Table 1
Description statistics and correlations analysis.

Variable	$M \pm SD$	1	2	3	4	5	6	7	8
1. MC potential	1.95 ± 0.73	1							
2. Creative potential	3.05 ± 0.68	0.24**	1						
3. Unfairness	3.77 ± 0.53	−0.44**	0.13*	1					
4. HEXA	3.82 ± 0.92	−0.49**	−0.04	0.79**	1				
5. ERUS	3.61 ± 0.66	−0.12*	0.09	0.64**	0.19**	1			
6. ORG	3.89 ± 0.61	−0.27**	0.29**	0.72**	0.34**	0.32**	1		
7. Aggression	2.75 ± 0.73	0.56**	0.16**	−0.31**	−0.47**	0.07	−0.16**	1	
8. MD	2.09 ± 0.78	0.65**	0.11*	−0.57**	−0.58**	−0.23**	−0.35**	0.55**	1

Note. MD indicates moral disengagement; M = mean value; SD = standard deviation, *$p < .05$, **$p < .01$.

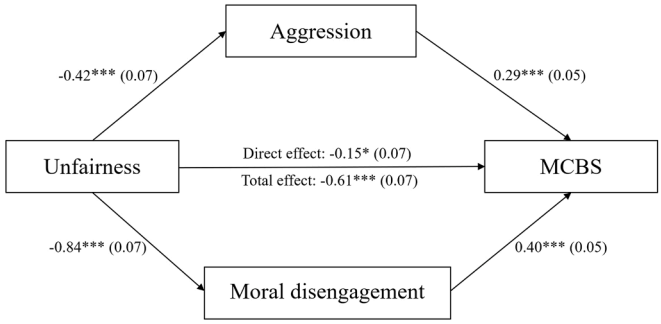

Fig. 1. The results of parallel mediation model. The coefficient is non-standard coefficient. Standard errors are given in parentheses. *$p < .05$, **$p < .01$, ***$p < .001$.

disengagement ($b = -0.33$, $SE = 0.03$, 95 % CI [−0.22, −0.45]) simultaneously. The direct effect between unfairness and MC potential was also significant ($b = -0.15$, $SE = 0.07$, $p = .03$). Therefore, aggression and moral disengagement both partly mediated the relationship between unfairness and MC potential.

2.5. Interim discussion

In this study, the results revealed a significant correlation between unfairness and MC in the trait level which was consistent with H1. Moreover, aggression and moral disengagement were positively correlated with MC respectively. These results indicated that individuals' perception of unfair situations in daily life are associated with MC. The mediation analysis revealed the mediating effect of moral disengagement and aggression on the relationship between unfairness and MC. The sense of unfairness may positively connect to MC potential by high aggression and the tendency of justifying immoral behavior.

3. Study 2

3.1. Participants

The sample size in Study 2 was estimated by G-Power (Faul et al., 2007). A sample size of 84 participants was required for a 90 % power to detect a medium main effect size of 0.4 ($\alpha = 0.05$). A total of 105 participants (mean age = 21.71 ± 2.09; 56 females; college students) were recruited in the Study 2. All participants were right-handed and had normal or corrected-to-normal visual acuity. None had a history of mental or neurological illness. Participants were randomly assigned to the control and unfair groups, in which there were 52 and 53 participants, respectively. Written informed consents were obtained from all participants before the experiment. Each participant received a compensation of ¥20. The study procedure was approved by the University Committee on Human Research Protection of East China Norma University (Code: HR2-0214-2022).

3.2. Instruments

The RIBS, MCBS, BPAQ and ERUS were also used in Study 2. These questionnaires had satisfactory internal consistency reliability for this study, $\alpha = 0.89$, $\alpha = 0.92$, $\alpha = 0.88$, $\alpha = 0.81$, respectively. The Positive and Negative Affect Schedule (PANAS) was used to assess individual's ten emotional level (Bradley & Lang, 1994; Watson et al., 1988). Individuals were asked to rate ten emotional states (i.e., anger) on a nine-point scale (1 = not at all, 9 = very much). The Self-Assessment Manikin (SAM; Bradley & Lang, 1994) was used to assess participant's emotional states at the assessment moment, in which the participants selected one of nine ratings (valence: 1 = very pleasant, 9 = very unpleasant; arousal: 1 = very exciting, 9 = not exciting at all) illustrated by five cartoon figures and the points between any two figures. The implicit aggression preference-phrase task was used to assess participant's implicit aggression (Zhu et al., 2006). The task consists of 25 trials. One detection Chinese character and three target Chinese characters will appear in each trial (one example in English version: The detection Character: "s_are"; the target characters: "t", "h", "c". Among "stare, share, scare", "scare" is kind of a negative one). The participant needs to choose one of the target characters to form a new word with the detection character. The three target characters can be combined with the detection character to form an aggressive word, a neutral word or an interference word respectively. The quantity of formed aggressive word indicate the level of implicit aggression. The moral identity scale was used to assess participant's self-moral identity (Aquino & Reed, 2002). Participants were asked to rate 10 items on a 5-point scale (from 1 = totally disagree to 5 = totally agree; e.g., "I strongly desire to have these characteristics: compassionate, fair, friendly, generous, hardworking, helpful, honest"). The internal consistency reliability of the scale in this study was satisfactory ($\alpha = 0.82$).

The Ultimatum game is a behavior economics exchange game which is played over multiple trials (Güth et al., 1982). In a standard Ultimatum game, there is an amount of money that can be split between two players, a proposer and a responder. Often a sum of 10 coins is used. The proposer is placed in control of the money and has to make an offer to the responder. If that offer is accepted, the proposer and the responder each receive his or her agreed upon amounts. If they do not agree and the responder rejects the proposer's

offer, then nobody receives any money. In this study, we use a revised Ultimatum game to manipulate unfair conditions. Every participant in this game was the responder and the proposer was actually the computer and all the offers were pre-set. But the participants were still told that they would finish this task with another real person. Participants in the control group would receive series faire offers (such as 5 / 5, 4 / 6, 6 / 4) while those in the unfair group would receive series unfair offers (such as 1 / 9, 2 / 8, 3 / 7). Each participant had five practice trials and fifteen formal trials. (see Fig. 2B)

The malevolent creativity task (MCT) is an open-ended scenario problem developed by Harris et al. (2013) to assess participants' malevolent creativity performance. In this study we used two problems which had already been proved effective in previous studies (Qiao et al., 2022; Perchtold-Stefan et al., 2023). The scenario is as follows: (1) Yang is always naughty in class with his classmates and the teacher severely criticizes him in public. He has strong self-esteem and does not obey the teacher's education. If you were him, how would you embarrass the teacher in front of the class. (2) Hong has a favorite crush but there is a rival. If you were her, how would you embarrass the rival in front of your cush. Participants were asked to generate as many creative ideas as possible in 5 min for either question. During the instruction, the following requirement was emphasized repeatedly: focus on generating creative ideas regardless of how immoral or unacceptable they may be.

3.3. Procedure

After the approval and consent of the Committee on Human Research Protection, this experiment disseminated recruitment information through campus social media group chats (WeChat groups), successfully enlisting participants for the study. The experimental process was facilitated and completed by participants under the guidance of trained experiment conductors.

Participants first completed the pre-test including PANAS, SAM, implicit aggression preference-phrase task, and they were asked to evaluate their feelings of fairness with a 9-point Likert scale. Then, they were asked to play the revised ultimatum game to activate their feelings of unfairness. After that they completed the post-test which was the same to the pre-test. Then, participants were asked to solve two MCT problems in ten minutes (5 min for either). They were encouraged to produce as many original solutions as possible and type them briefly into the text-entry box. Participants were told to focus on generating creative ideas regardless of how immoral or unacceptable they may be. Finally, participants submitted their responses and completed the RIBS, MCBS, BPAQ, ERUS and the moral identity scale. (see Fig. 2A)

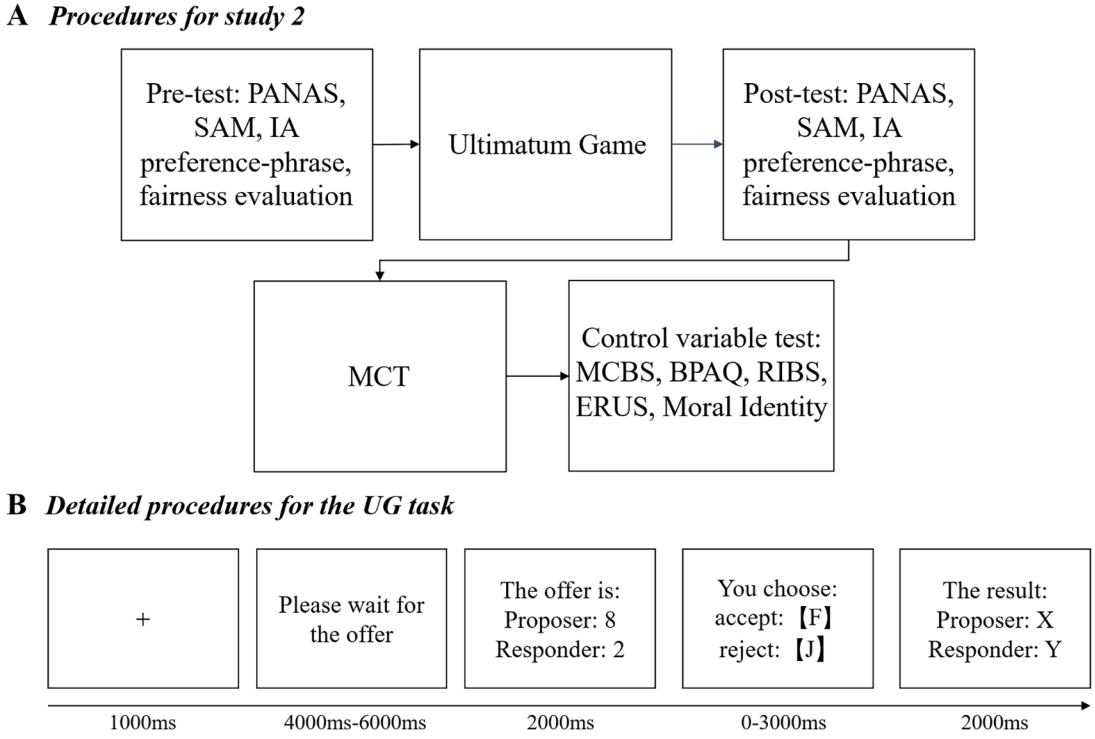

Fig. 2. Experimental procedure for study 2. (A) General procedures. Prticipants were instructed to complete the pre-test, the Ultimatum game, the post-test, malevolent creativity task and control variable test in sequence. PANAS = Positive and Negative Affect Schedule; SAM = Self-Assessment Manikin; IA = implicit aggression; MCBS = Malevolent Creativity Behavior Scale; RIBS = Runco Ideational Behavior Scale; BPAQ = Buss-Perry Aggression Questionnaire; ERUS: Emotional Response to Unfairness Scale. (B) Detailed procedure of one trial in UG. Each trial will start with a fixation. Participants have to wait for the screen to present the proposer's offer, and then decide to accept or reject it by pressing the keyboard. Once the selection is completed, the screen will display the results of the round.

3.4. Quantification of malevolent creativity performance

3.4.1. Standard MCT scoring

First, two raters collaborated to exclude the ideas that were not malevolent. Ideational fluency was scored as the average number of generated ideas in the two MC problems (James et al., 1999). Malevolence and originality scores are calculated as indicators of malevolent creativity performance by using 5-point Likert scales (from 1 = not at all original/malevolent to 5 = very original/ malevolent) for each answer. Three trained raters independently assessed the originality and malevolence of the MC performance for every participant. The inter-rater agreement (Internal Consistency Coefficient, ICC = 0.84) was satisfactory. Individual ratings for each participant from these three raters were averaged into single originality score and malevolence score for each participant. The total score of malevolent creativity was computed by summing up the number of malevolent ideas with an average originality rating of ≥ 3 (Perchtold-Stefan et al., 2023).

3.4.2. Content categorization of MCT answers

Since malevolent creativity ideas may involve different types of behavior and the effect of perceived fairness on different types may also be different. We classified participants' malevolent creativity based on the semantics of their answers. By referring to the classification paradigm of Perchtold-Stefan et al. (2023), we developed the following four categories: (1) physical aggression: ideas that involve causing physical harm to others (e.g., beating someone up, pushing someone down); (2) social aggression: ideas that involve social harm to others (e.g., slander, public humiliation); (3) property aggression: ideas that involve destroying the property of others (e.g., stealing others' books, damage to others' clothes); (4) tricks: ideas involves smaller deeds like tricks or pranks with minor physical, social, or property damage, (e.g., putting stickers on someone's back). Two independent raters classified the generated creative ideas and their interrater reliability was satisfactory for physical aggression (ICC = 0.94), social aggression (ICC = 0.91), property aggression (ICC = 0.92) and tricks (ICC = 0.77). The numbers of different types of creative ideas were recorded for further data analysis.

3.5. Statistical analysis

The data were analysed using SPSS 23.0 software. First, a paired-sample *t*-test was utilized to ensure the validity of the manipulation in this study (This step was aimed at verifying that revised UG task can effectively manipulate individuals' perception of unfairness). Subsequently, four separate ANOVAs were employed to investigate the effect of unfairness on various metrics of MCT. Then a mediation effect analysis was conducted to examine the mediating roles of anger and implicit aggression. Finally, independent sample *t*-test was performed to explore the differences in categories of MCT responses between control group and unfair group as well as across different genders.

3.6. Results

3.6.1. Manipulation check

To test the effectiveness of the sense of unfairness activated by the UG paradigm, we conducted a paired sample *t*-test of the pre-test and post-test between the control group and unfair group (see Table 2). The results showed that there were significant differences in the perceived fairness, emotional states, and implicit aggression of the participants in unfair group before and after the UG task. Their sense of anger, and implicit aggression all increased significantly while the sense of fairness, emotional valance and arousal decreased. By contrast, the sense of anger and implicit aggression in control group didn't change significantly and the sense of fairness, emotional valance and arousal increased. This indicated that the manipulation of perceived unfairness was effective and it also caused changes in the emotional states and implicit aggression of the participants.

Table 2
Manipulation check of perceived unfairness.

	Pre-test		Post-test		*t*-test		
	M	*SD*	*M*	*SD*	*t (103)*	*p*	*d*
Control group ($n = 52$)							
anger	1.88	1.06	1.81	1.07	0.68	0.498	0.19
fairness	5.87	1.79	6.60	1.69	−2.90	0.005	0.81
Emotional valence	5.85	0.99	6.15	0.92	−2.76	0.008	0.77
Emotional arousal	4.54	1.55	4.92	1.71	−2.55	0.014	0.71
Implicit aggression	8.94	3.17	8.77	4.01	0.49	0.630	0.14
Unfair group ($n = 53$)							
anger	2.26	1.87	3.89	2.06	−6.89	0.000	1.91
fairness	5.79	1.39	2.86	1.07	12.23	0.000	3.39
Emotional valence	6.04	1.33	4.51	1.51	8.79	0.000	2.44
Emotional arousal	4.92	1.31	4.34	1.67	2.45	0.018	0.68
Implicit aggression	9.06	3.46	12.47	2.89	−6.15	0.000	1.71

Note. *M* = mean value; *SD* = standard deviation, *t* = *t*-value, *p* = *p*-value, *d* = Cohen's d.

3.6.2. Effects of unfairness on MC task performance

Using unfairness (control group vs. unfair group) as the independent variable, a one-way MANOVA was conducted on the MCT fluency, originality, malevolence and total score (*Box's M* = 57.49, $p < .001$). The results indicated that the covariance matrices of the factors were heterogeneous, making them unsuitable for MANOVA. Therefore, four one-way ANOVAs with unfairness (control group vs. unfair group) as the between-subjects factor were performed on the MC fluency, originality, malevolence, and total score, respectively (see Fig. 3). There was no significant main effect for unfairness on MC fluency, $F(1, 103) = 3.37$, $p = .071$, $\eta_p^2 = 0.05$. This indicated that there was no statistically significant difference in the number of ideas generated in MCT between control group and unfair group. Specifically, unfairness had a significant main effect for MC originality, $F(1, 103) = 41.43$, $p < .001$, $\eta_p^2 = 0.28$. The unfair group produced ideas with greater originality ($M = 2.31$, $SD = 0.31$) than did the control group ($M = 2.78$, $SD = 0.44$). Unfairness also had a significant main effect for MC malevolence, $F(1, 103) = 75.25$, $p < .001$, $\eta_p^2 = 0.42$. The unfair group produced ideas with more malevolence ($M = 2.18$, $SD = 0.20$) than did the control group ($M = 2.71$, $SD = 0.39$). Likewise, unfairness had a significant main effect for MC total score, $F(1, 103) = 27.88$, $p < .001$, $\eta_p^2 = 0.21$. The unfair group generated more malevolent creative ideas than median score ($M = 2.15$, $SD = 0.85$) compared with the control group ($M = 1.28$, $SD = 0.84$). These results suggested that participants in unfair situations generate more creative and malevolent ideas.

3.6.3. Mediating role of anger and implicit aggression

Hayes' (2013) SPSS macro program PROCESS (model 6) was used to analyse the mediating effect of anger and implicit aggression between unfairness and MC performance. As shown in Fig. 4, the analysis of MC originality as the dependent variable showed that the regression equation was significant, $R^2 = 0.67$, $F(1, 103) = 67.53$, $p < 0{,}001$. The indirect effect of the pathway with anger and implicit aggression as mediating variables was significant ($b = 0.20$, $SE = 0.05$, 95 % CI = [0.11, 0.31]). The simple mediating effect with anger as the mediating variable was also significant ($b = 0.33$, $SE = 0.10$, 95 % CI = [0.13, 0.53]). The analysis of MC malevolence as the dependent variable showed that the regression equation was significant, $R^2 = 0.63$, $F(1, 103) = 57.79$, $p < 0{,}001$. The indirect effect of the pathway with anger and implicit aggression as mediating variables was significant ($b = 0.15$, $SE = 0.04$, 95 % CI = [0.09, 0.24]). Likewise, the analysis of MC total score as the dependent variable showed that the regression equation was significant, $R^2 = 0.48$, $F(1, 103) = 30.66$, $p < 0{,}001$. The indirect effect of the pathway with anger and implicit aggression as mediating variables was significant ($b = 0.53$, $SE = 0.13$, 95 % CI = [0.31, 0.81]).

3.6.4. Analysis of content categorization of MCT answers

Follow the approach of Perchtold-Stefan et al. (2023), we also conducted series of analyses for content categorization. First, four independent two-sample *t*-tests between control and unfair groups were performed on the four categories of MCT answers respectively. We did not find any differences between groups in terms of categories (see details in supplementary material, Table S1). Then we conducted gender difference analysis of MC categories. See Table 3 for descriptive statistics of categories by gender. We observed significant gender differences for individual's generation of ideas related to social aggression, $t(103) = 2.02$, $p = .046$, physical aggression, $t(103) = 7.89$, $p < .001$, and property aggression, $t(103) = 2.59$, $p = .011$. and there was no gender difference on tricks, $t(103) = 0.99$, $p = .325$. Because there were only few MC questions tested in this study and there were some particularities in the MCT topic context content, these effects were only observed as a possible statistical trend and these analyses were only used as auxiliary analyses for this study.

3.7. Interim discussion

The results revealed that individuals in an unfair experimental condition showed higher MC originality and MC malevolence than

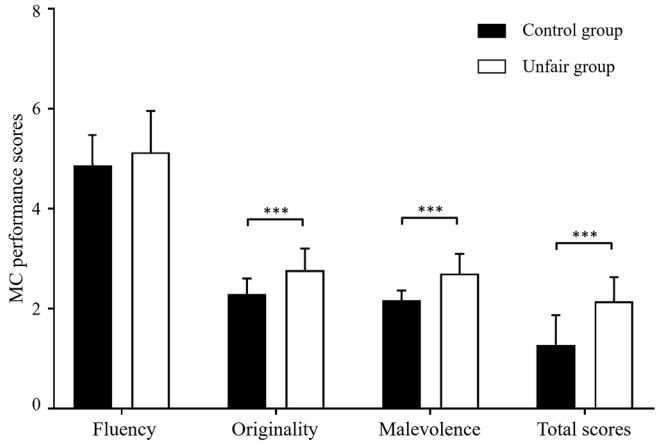

Fig. 3. MC fluency, originality, malevolence, and total score in the control and unfair groups. Error bars indicate standard errors of the mean. ***$p < .001$.

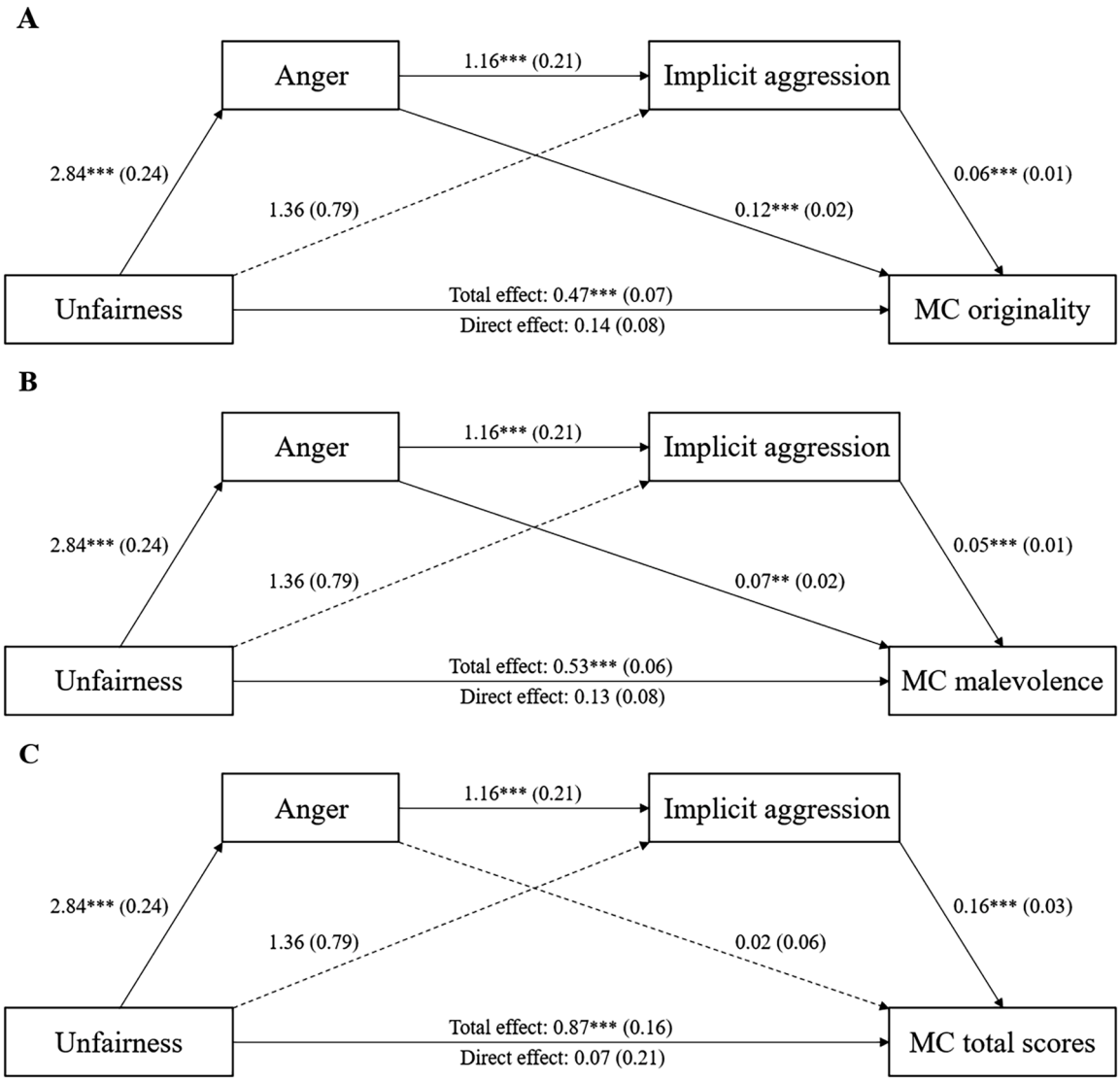

Fig. 4. The results of serial mediation model. The coefficient is non-standard coefficient. Standard errors are given in parentheses. *$p < .05$, **$p < .01$, ***$p < .001$.

Table 3
Gender differences in MC categories.

	Women ($n = 56$)		Men ($n = 49$)		*t*-test		
	M	*SD*	*M*	*SD*	*t (103)*	*p*	*d*
MC categories							
Social aggression	50.26	19.87	42.88	17.24	2.02	0.046	0.40
Physical aggression	4.27	2.12	9.57	4.49	7.89	0.000	1.51
Tricks	41.37	15.85	44.51	16.64	0.99	0.325	0.19
Property aggression	4.10	2.25	3.03	1.94	2.59	0.011	0.51

Note. M = mean value; SD = standard deviation, t = t-value, p = p-value, d = Cohen's d.

individuals in the control condition. The results also supported mediating roles of anger and implicit aggression that relating unfairness and MC. These findings were consistent with H2 and H3. Perceived unfairness is associated with negative emotional states that lead to behavioral changes (e.g., becoming more malicious). Besides, a slight gender difference of content categories of MCT was also observed in this study that man prefer physical aggression while women prefer social and property aggression. This may indicate that there are some differences in the choice of malevolent creative behavior between individuals of different genders.

4. General discussion

Two studies investigated the relationship between unfairness and MC from trait and state levels respectively. In Study 1, we observed a significant correlation between MC potential and unfairness, aggression, moral disengagement. And the parallel mediation model of aggression and moral disengagement between unfairness and MC was valid. In Study 2, perceived unfairness activated by the UG task significantly enhanced individuals' MC performance. And the serial mediation model of anger and implicit aggression between unfairness and MC was significant. A slight gender difference of categories of MCT was observed in Study 2.

Results of Study 1 showed that MC potential was positively correlated with trait aggression and moral disengagement, whereas negatively correlated with sense of fairness. Aggression and moral disengagement played mediating roles in the pathway of unfairness to MC potential. These results were consistent with H1. Previous findings revealed that experience of unfairness increased individuals' aggression (Anderson & Bushman, 2002) and the trait of aggression positively associated with MC (Gao et al., 2022; Hao et al., 2020; Lee & Dow, 2011). High moral disengagement is related to more malevolent creative behavior (Xu et al., 2021; Shi et al., 2023). Individuals with high sense of unfairness may tend to think aggressively and justify their immoral bahavior, which is beneficial to fostering potential of malevolent creation. As for theory, the results of Study 1 added new evidence to AMORAL model from the aspect of personality (Kapoor & Kaufman, 2022). Trait aggression and moral disengagement may be core affecting factors of MC. Although as a cross-sectional study, it cannot provide any causal explanations, the results of Study 1 offered preliminary evidence for the relationship between unfairness and MC. And these results also served as a basis for the subsequent Study 2.

Results of Study 2 revealed that individual in the unfair condition showed higher MC originality and malevolence than those in the control condition. These results partly supported H2 that the quality of ideas was enhanced by perceived unfairness. Clark and James (1999) demonstrated that creative ideas generated by individuals in organizational unfair situations are more likely to contain negative content. Further, our study activated participants' perceived unfairness through a behavioral task and quantitatively measured participants' MC performance through MCT. From a methodological standpoint, the money exchange game in Study 2 successfully induced the sense of unfairness, providing a highly effective laboratory manipulation method for subsequent empirical research on unfairness. From the theoretical aspect, these results might indicate that malevolent idea generation can be enhanced by unfairness like regular antisocial behavior. This further contributed an empirical study on the influencing factors of MC, enriching the theoretical framework within its field. Besides, Dual Pathway to Creativity Model suggested that negative emotion motivate individual to persistently invest more effort in enhancing creative performance (De Dreu et al., 2008; Nijstad et al., 2010). Previous studies have suggested that unfairness activates anger (Gummerum et al., 2016; Seip et al., 2014) and further promotes MC performance (Russell, 2003; Baas et al., 2008). While in the unfair conditions, individuals were likely to relieve the emotional discomfort caused by unfairness by breaking social norms, which might be contributing to their MC performance. However, participants with higher level of anger didn't show higher level of MC fluency. It may indicate that though perceived fairness increased the anger of participants, it only affects the quality instead of quantity of MC idea generation.

In addition, a significant mediation effect of anger and implicit aggression on the relation between unfairness and MC was observed. These results were consistent with H3. Anger caused by unfairness can interfere with higher cognitive processes, including moral reasoning and judgment (Anderson & Bushman, 2002). It can also provide justification for aggressive behavior, causing individuals to develop false emotional attributions (Cheng et al., 2021). The results of current study revealed that participants' anger will directly affect their implicit aggression, which makes them more likely to explore damaging ideas. Individuals may try to achieve the harmful goal by generating more novel and harmful ideas. The studies on the cognitive mechanism of implicit aggression pointed out that situational factor is one of the important factors affecting implicit aggression (Blair, 2002; Richetin & Richardson, 2008). For highly aggressive individuals, it may be logical for them to act aggressively. Thus, they may be more likely to generate aggressive creative ideas which are considered to be more malevolent (Lee & Dow, 2011). This result was also consistent with the findings of Study 1 that aggression was significantly and positively correlated with malevolent creativity potential. Given that the data in this study were collected from college students, from an educational perspective, educators should also focus on fostering students' emotional regulation abilities. If appropriate emotional regulation strategies can be employed to mitigate one's negative emotions (such as anger) after experiencing unfair situations, it may further reduce the potential MC behaviors, thereby contributing to the stability and harmony of school and social environment.

Notably, the results of Study 2 found a gender difference of content categories of MCT answers that men tended to generate more ideas which contain physical aggression. On the contrary, women were more likely to generate ideas which involve social aggression and property aggression. These results were consistent with the previous studied that men tend to be more physically aggressive than women (Card et al., 2008). However, women may incline some indirect ways of aggression like social manipulation and exclusion (Björkqvist, 2018; Hess & Hagen, 2006). Perchtold-Stefan et al. (2023) found that men were more likely to generate physical aggresion ideas but gender difference was not significant in social aggression and property aggression. The category of ideas generated in MCT are easily influenced by the MCT topics. In certain scenario problems, participants may tend to generate certain category of malevolent creative ideas. For example, if pariticipants were asked to genenrate ideas to embarrass the teacher in front of the class, they would like to have more ideas about tricking. Therefore, gender differences of categories of MCT answers need deeper exploration in the future. It may be possible to use MCT covering more scenarios to explore the gender difference of categories of MCT answers.

Several limitations should be noted in the study. First, the questionnaire of unfairness used in Study 1 was composed of several items selected from three different scales. Although all the subscales which are chosen have good internal consistency reliabilities and they have been proved effective in measuring individuals' perception of unfairness (e.g., Lee & Ashton, 2004; Bizer, 2020), the external validity of the combined questionnaire still needs to be verified by subsequent studies. Additionally, from a methodological perspective, the results collected through the scale in Study 1 were all based on subjective self-reports, which are inevitably influenced

by the participants' own self-perception biases and social desirability (i.e., King & Bruner, 2000; Blumenthal-Barby et al., 2015; Bizer, 2020). These may lead to certain deviations that could affect the generalizability of the findings. Also, considering the measurement instruments were tailored to a Chinese context, and that the study exclusively involved Chinese university students—a group characterized by highly homogeneous living and learning conditions, the generalizability of the questionnaire results warrants further substantiation. This necessitates conducting additional investigations across a broader demographic spectrum, including individuals in the workforce, international cohorts, and diverse ethnic groups, to affirm the results' applicability beyond the initial study population. Second, perceived unfairness induced by the UG task was mainly distributive unfairness. In real life, there are also procedural unfairness and interactional unfairness which also have an impact on individual behavior (Folger & Cropanzano, 2001). The influence of other types of unfairnesses on MC also deserves further research. Furthermore, Study 2 only focused on the influence of anger induced by unfairness on MC. But unfairness may trigger emotions other than anger which can also contribute to MC. Also, the research design of Study 2 only focused on the sense of unfairness caused by uneven distribution. While in real life, there are many other situations that could give rise to the sense of unfairness (such as social exclusion in interactions). The sense of unfairness induced by different scenarios may also have varying effects on individuals' subsequently subjective affect and behavior. Future research on MC and unfairness could explore more ways on inducing the sense of unfairness and can also examine more emotions induced by unfairness and compare the differences in their effects on MC.

Several studies (e.g., Oyserman et al., 2002; Triandis & Gelfand., 2012; Lin et al., 2019) have highlighted significant discrepancies in the perception of certain social situations (i.e., unfair situation) between individuals from collectivist cultures (such as those in Asia, Africa, and Latin America) and those from individualist cultures (such as those in North America and Western Europe). Collectivist cultures tend to prioritize group harmony and communal interests, potentially leading individuals to overlook or tolerate instances of unfairness in favor of preserving group cohesion. In contrast, individualist cultures champion personal autonomy and self-expression, which may result in individuals exhibiting stronger dissatisfaction and resistance towards perceived unfairness. Additionally, the cognitive process of creativity is also influenced by cultural contexts (Niu & Sternberg, 2001). For instance, individuals in collectivist cultures place a stronger emphasis on the utility of ideas. Conversely, in individualistic cultures, there is a marked preference of the novelty of ideas (Bechtoldt et al., 2010; De Dreu, 2010). Hence, within the framework of research exploring the nexus between perceived unfairness and MC, cultural factors represent a critical direction for future studies. Individuals in different cultures are bound by varying social norms and exhibit distinct behavioral patterns. The impact of perceived unfairness on their MC performance may also differ. The participants in this study are all college students. However, it is important to note that participants from different regions and diverse upbringing environments may exhibit variations in behavioral responses. So, future studies could pay more attention to the selection of participants, even considering conducting cross-cultural studies, incorporating cultural factors into experimental manipulations to refine our understanding of the relationship between unfairness and MC.

CRediT authorship contribution statement

Wenyu Zhang: Writing – review & editing, Writing – original draft, Visualization, Investigation, Formal analysis, Data curation, Conceptualization. **Qiuyu Liang:** Writing – original draft, Formal analysis, Data curation, Conceptualization. **Xinuo Qiao:** Writing – review & editing, Writing – original draft, Formal analysis, Data curation, Conceptualization. **Ning Hao:** Writing – review & editing, Writing – original draft, Supervision, Funding acquisition, Conceptualization.

Declaration of competing interest

The authors declare that they have no competing interests.

Data availability

Data will be made available on request.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.tsc.2024.101586.

References

Adams, J. S. (1965). Inequity in social exchange. *Advances in Experimental Social Psychology, 2*, 267–299.
Anderson, C. A., & Bushman, B. J. (2002). Human aggression. *Annual Review of Psychology, 53*, 27–51.
Aquino, K., & Reed, A. (2002). The self-importance of moral identity. *Journal of Personality and Social Psychology, 83*, 1423–1440.
Baas, M., De Dreu, C. K., & Nijstad, B. A. (2008). A meta-analysis of 25 years of mood-creativity research: Hedonic tone, activation, or regulatory focus? *Psychological Bulletin, 134*, 779–806.
Baas, M., Roskes, M., Koch, S., Cheng, Y., & De Dreu, C. K. W. (2019). Why social threat motivates malevolent creativity. *Personality and Social Psychology Bulletin, 45*, 1590–1602.
Bandura, A., Barbaranelli, C., Caprara, G. V., & Pastorelli, C. (1996). Mechanisms of moral disengagement in the exercise of moral agency. *Journal of Personality and Social Psychology, 71*, 364–374.
Barone, G., & Mocetti, S. (2016). Inequality and trust: New evidence from panel data. *Economic Inquiry, 54*, 794–809.
Bechtoldt, M. N., De Dreu, C. K., Nijstad, B. A., & Choi, H. S. (2010). Motivated information processing, social tuning, and group creativity. *Journal of Personality and Social Psychology, 99*, 622–637.
Bizer, G. Y. (2020). Who's bothered by an unfair world? The emotional response to unfairness scale. *Personality and Individual Differences, 159*, Article 109882.
Björkqvist, K. (2018). Gender differences in aggression. *Current Opinion in Psychology, 19*, 39–42.
Blair, I. V. (2002). The malleability of automatic stereotypes and prejudice. *Personality and Social Psychology Review, 6*, 242–261.
Blumenthal-Barby, J. S., & Krieger, H. (2015). Cognitive biases and heuristics in medical decision making: A critical review using a systematic search strategy. *Medical Decision Making, 35*(4), 539–557.
Book, A. S., Volk, A. A., & Hosker, A. (2012). Adolescent bullying and personality: An adaptive approach. *Personality and Individual Differences, 52*, 218–223.
Bradley, M. M., & Lang, P. J. (1994). Measuring emotion: The Self-Assessment Manikin and the semantic differential. *Journal of Behavior Therapy and Experimental Psychiatry, 25*, 49–59.
Brüne, M., Juckel, G., & Enzi, B. (2013). An eye for an eye"? Neural correlates of retribution and forgiveness. *PloS One, 8*, e73519.
Buss, A. H., & Perry, M. (1992). The aggression questionnaire. *Journal of Personality and Social Psychology, 63*, 452–459.
Card, N. A., Stucky, B. D., Sawalani, G. M., & Little, T. D (2008). Direct and indirect aggression during childhood and adolescence: A meta-analytic review of gender differences, intercorrelations, and relations to maladjustment. *Child Development, 79*(5), 1185–1229.
Chávez-Eakle, R. A., Eakle, A. J., & Cruz-Fuentes, C. S. (2012). The multiple relations between creativity and personality. *Creativity Research Journal, 24*, 76–82.
Cheng, R., Lu, K., & Hao, N. (2021). The effect of anger on malevolent creativity and strategies for its emotion regulation. *Acta Psychologica Sinica, 53*, 847–860.
Clark, K., & James, K. (1999). Justice and positive and negative creativity. *Creativity Research Journal, 12*, 311–320.
Cohen-Charash, Y., & Mueller, J. S. (2007). Does perceived unfairness exacerbate or mitigate interpersonal counterproductive work behaviors related to envy? *Journal of Applied Psychology, 92*, 666–680.
Colquitt, J. A. (2001). On the dimensionality of organizational justice: A construct validation of a measure. *The Journal of applied psychology, 86*, 386–400.
Côtéa, S., Housea, J., & Willer, R. (2015). High economic inequality leads higher-income individuals to be less generous. *PNAS Proceedings of the National Academy of Sciences of the United States of America, 112*, 15838–15843.
Cropley, A., & Cropley, D. (2011). Creativity and lawbreaking. *Creativity Research Journal, 23*, 313–320.
Cropley, D. H. (2010). Malevolent innovation: Opposing the dark side of creativity. In D. H. Cropley, A. J. Cropley, J. C. Kaufman, & M. A. Runco (Eds.), *The dark side of creativity* (pp. 339–359). Cambridge University Press.
Cropley, D. H., Kaufman, J. C., & Cropley, A. J. (2008). Malevolent creativity: A functional model of creativity in terrorism and crime. *Creativity Research Journal, 20*, 105–115.
De Dreu, C. K. W., Baas, M., & Nijstad, B. A. (2008). Hedonic tone and activation level in the mood-creativity link: Toward a dual pathway to creativity model. *Journal of Personality and Social Psychology, 94*, 739–756.
De Dreu, C. K. W. (2010). Human creativity: Reflections on the role of culture. *Management and Organization Review, 6*, 437–446.
Delhey, J., & Dragolov, G. (2014). Why inequality makes europeans less happy: The role of distrust, status anxiety, and perceived conflict. *European Sociological Review, 30*, 151–165.
Ding, Y., Wu, J., & Ji, T. (2022). I deserve better outcomes: Self-esteem relates to stronger reactions to unfairness. *Personality and Individual Differences, 190*, Article 111533.
Eisenman, R. (2008). Malevolent creativity in criminals. *Creativity Research Journal, 20*, 116–119.
Eisenman, R. (2010). Creativity and crime: How criminals use creativity to succeed. In D. Cropley, A. Cropley, J. Kaufman, & M. Runco (Eds.), *The dark side of creativity* (pp. 204–217). Cambridge: Cambridge University Press.
Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods, 39*, 175–191.
Fehr, E., & Schmidt, K. M. (1999). A theory of fairness, competition, and cooperation. *The Quarterly Journal of Economics, 114*, 817–868.
Folger, R., & Cropanzano, R (2001). Fairness theory: Justice as accountability. In J. Greenberg, & R. Cropanzano (Eds.), *Advances in organization justice* (pp. 1–55). Stanford University Press.
Fu, H., & Zhang, Z. (2023). The relationship between honesty-humility and malevolent creativity: Sequential mediation models with prosocial moral emotional traits and prosocial tendencies. *Current Psychology*. https://doi.org/10.1007/s12144-023-04941-2
Gamman, L., & Raein, M. (2010). Reviewing the art of crime: What, if anything, do criminals and artists/designers have in common? In D. H. Cropley, A. J. Cropley, J. C. Kaufman, & M. A. Runco (Eds.), *The dark side of creativity* (pp. 155–176). Cambridge University Press.
Gao, Z., Qiao, X., Xu, X., & Hao, N. (2022). Darkness within: The internal mechanism between dark triad and malevolent creativity. *Journal of Intelligence, 10*, 119.
Gill, P., Horgan, J., Hunter, S. T., & Cushenbery, L. D. (2013). Malevolent creativity in terrorist organizations. *The Journal of Creative Behavior, 47*, 125–151.
Gino, F., & Wiltermuth, S. S. (2014). Evil genius? How dishonesty can lead to greater creativity. *Psychological Science, 25*, 973–981.
Gummerum, M., Van Dillen, L. F., Van Dijk, E., & López-Pérez, B. (2016). Costly third-party interventions: The role of incidental anger and attention focus in punishment of the perpetrator and compensation of the victim. *Journal of Experimental Social Psychology, 65*, 94–104.
Güth, W., Schmittberger, R. W., & Schwarze, B. (1982). An experimental analysis of ultimatum bargaining. *Journal of Economic Behavior and Organization, 3*, 367–388.
Hao, N., Qiao, X., Cheng, R., Lu, K., Tang, M., & Runco, M. A. (2020). Approach motivational orientation enhances malevolent creativity. *Acta Psychologica, 203*, Article 102985. Article.
Hao, N., Tang, M., Yang, J., Wang, Q., & Runco, M. A. (2016). A new tool to measure malevolent creativity: The malevolent creativity behavior scale. *Frontiers in Psychology, 7*, 682.
Harris, D. J., & Reiter-Palmon, R. (2015). Fast and furious: The influence of implicit aggression, premeditation, and provoking situations on malevolent creativity. *Psychology of Aesthetics, Creativity, and the Arts, 9*, 54–64.
Harris, D. J., Reiter-Palmon, R., & Kaufman, J. C. (2013). The effect of emotional intelligence and task type on malevolent creativity. *Psychology of Aesthetics, Creativity, and the Arts, 7*, 237–244.
Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. Guilford Press.
Hess, N. H., & Hagen, E. H. (2006). Sex differences in indirect aggression psychological evidence from young adults. *Evolution and Human Behavior, 27*, 231–245.
Hilton, K. (2010). Boundless creativity. In D. Cropley, A. Cropley, J. Kaufman, & M. Runco (Eds.), *The dark side of creativity* (pp. 134–154). Cambridge: Cambridge University Press.
James, K., Clark, K., & Cropanzano, R. (1999). Positive and negative creativity in groups, institutions, and organizations: A model and theoretical extension. *Creativity Research Journal, 12*, 211–226.
Kapoor, H., & Kaufman, J. C. (2022). The evil within: The AMORAL model of dark creativity. *Theory & Psychology, 32*, 467–490.

Kifle, T. (2013). Relative income and job satisfaction: Evidence from Australia. *Applied Research Quality Life, 8*, 125–143.
King, M. F., & Bruner, G. C. (2000). Social desirability bias: A neglected aspect of validity testing. *Psychology & Marketing, 17*(2), 79–103.
Lee, K., & Ashton, M. C. (2004). Psychometric properties of the HEXACO personality inventory. *Multivariate Behavioral Research, 39*, 329–358.
Lee, S. A., & Dow, G. T. (2011). Malevolent creativity: Does personality influence malicious divergent thinking? *Creativity Research Journal, 23*, 73–82.
Lin, Y., Arieli, S., & Oyserman, D. (2019). Cultural fluency means all is okay, cultural disfluency implies otherwise. *Journal of Experimental Social Psychology, 84*, Article 103822.
Melita, D., Willis, G. B., & Rodríguez-Bailón, R. (2021). Economic inequality increases status anxiety through perceived contextual competitiveness. *Frontiers in Psychology, 12*, Article 637365.
Nijstad, B. A., De Dreu, C. K. W., Rietzschel, E. F., & Baas, M. (2010). The dual pathway to creativity model: Creative ideation as a function of flexibility and persistence. *European Review of Social Psychology, 21*, 34–77.
Nishi, A., Shirado, H., Rand, D. G., & Christakis, N. A. (2015). Inequality and visibility of wealth in experimental social networks. *Nature, 526*, 426–429.
Niu, W., & Sternberg, R. J. (2001). Cultural influences on artistic creativity and its evaluation. *International Journal of Psychology, 36*, 225–241.
Oishi, S., & Kesebir, S. (2015). Income inequality explains why economic growth does not always translate to an increase in happiness. *Psychological Science, 26*, 1630–1638.
Oyserman, D., Coon, H. M., & Kemmelmeier, M. (2002). Rethinking individualism and collectivism: Evaluation of theoretical assumptions and meta-analyses. *Psychological Bulletin, 128*, 3–72.
Pailing, A., Boon, J., & Egan, V. (2014). Personality, the dark triad and violence. *Personality and Individual Differences, 67*, 81–86.
Perchtold-Stefan, C. M., Fink, A., Rominger, C., & Papousek, I. (2022a). Social exclusion increases antisocial tendencies: Evidence from retaliatory ideation in a malevolent creativity task. *Psychology of Aesthetics, Creativity, and the Arts*. Advance online publication.
Perchtold-Stefan, C. M., Fink, A., Rominger, C., & Papousek, I. (2021). Creative, antagonistic, and angry? Exploring the roots of malevolent creativity with a real-world idea generation task. *The Journal of Creative Behavior, 55*, 710–722.
Perchtold-Stefan, C. M., Rominger, C., Papousek, I., & Fink, A. (2022b). Antisocial schizotypy is linked to malevolent creativity. *Creativity Research Journal, 34*, 355–367.
Perchtold-Stefan, C. M., Rominger, C., Papousek, I., & Fink, A. (2023). Women and men have a similar potential for malevolent creativity - but their underlying brain mechanisms are different. *Brain Research, 1801*, Article 148201.
Plucker, J. A., Beghetto, R. A., & Dow, G. T. (2004). Why isn't creativity more important to educational psychologists? Potentials, pitfalls, and future directions in creativity research. *Educational Psychologist, 39*, 83–96.
Qiao, X., Lu, K., Teng, J., Gao, Z., & Hao, N. (2022). Middle occipital area differentially associates with malevolent versus benevolent creativity: An fNIRS investigation. *Social Neuroscience, 17*, 127–142.
Richetin, J., & Richardson, D. S. (2008). Automatic processes and individual differences in aggressive behavior. *Aggression and Violent Behavior, 13*, 423–430.
Runco, M. A., & Acar, S. (2012). Divergent thinking as an indicator of creative potential. *Creativity Research Journal, 24*, 66–75.
Runco, M. A., & Jaeger, G. J. (2012). The standard definition of creativity. *Creativity Research Journal, 24*, 92–96.
Russell, J. A. (2003). Core affect and the psychological construction of emotion. *Psychological Review, 110*, 145–172.
Seip, E. C., Van Dijk, W. W., & Rotteveel, M. (2014). Anger motivates costly punishment of unfair behavior. *Motivation and Emotion, 38*, 578–588.
Shi, Z., Zhou, Z., Tian, L., Zhu, Y., Liu, C., & Xu, L. (2023). What causes malevolent creative people to engage in malevolent behaviors? Mediating role of moral disengagement and moderating effects of conscience. *Thinking Skills and Creativity, 49*, Article 101329. Article.
Singer, J. K. (2010). Creativity in confinement. In D. H. Cropley, A. J. Cropley, J. C. Kaufman, & M. A. Runco (Eds.), *The dark side of creativity* (pp. 177–203). Cambridge University Press.
Singer, T., Seymour, B., O'Doherty, J. P., Stephan, K. E., Dolan, R. J., & Frith, C. D. (2006). Empathic neural responses are modulated by the perceived fairness of others. *Nature, 439*, 466–469.
Triandis, H. C., & Gelfand, M. J. (2012). A theory of individualism and collectivism. In P. A. M. Van Lange, A. W. Kruglanski, & E. T. Higgins (Eds.), *Handbook of theories of social psychology* (pp. 498–520). Sage Publications Ltd.
Valle, N. D., & Ploner, M. (2017). Reacting to unfairness: Group identity and dishonest behavior. *Games, 8*, 1–19.
Wang, L. (2019). Creativity as a pragmatic moral tool. *Journal of Business Research, 96*, 1–13.
Wang, Y. (2022). Understanding the role of social factors in cyberbullying at work. *Computers in Human Behavior, 134*, Article 107325.
Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54*, 1063–1070.
Xu, X., Zhao, J., Xia, M., & Pang, W. (2021). I can, but I won't: Authentic people generate more malevolently creative ideas, but are less likely to implement them in daily life. *Personality and Individual Differences, 170*, Article 110431. Article.
Yang, J., Wang, X., & Gao, L. (2010). Concept, measurement and related variables of moral disengagement. *Advances in Psychological Science, 18*, 671–678.
Yang, Y., & Konrath, S. (2023). A systematic review and meta-analysis of the relationship between economic inequality and prosocial behaviour. *Nature Human Behaviour, 7*(11), 1899–1916.
Zhu, C., Gong, H., & Zheng, X. (2006). An experimental research on character of implicit aggression among juveniles. *Psychological Exploration, 26*, 48–50.
Zitek, E. M., Jordan, A. H., Monin, B., & Leach, F. R. (2010). Victim entitlement to behave selfishly. *Journal of Personality and Social Psychology, 98*, 245–255.