Subjective social class positively predicts altruistic punishment

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Date: 2022-07-06T00:00:00+00:00

Abstract

Altruistic punishment refers to the behavior in which individuals incur costs themselves to punish violators, and it is influenced by social class. Study 1 utilized data from the 2013 China General Social Survey and found that class significantly and positively predicted altruistic punishment. Study 2 (N = 450), based on a survey of real-life events, demonstrated that punishment cost moderated the effect of class on punishment: in high-cost direct punishment, class positively predicted punishment, whereas in low-cost indirect punishment, this effect was no longer significant. Study 3 (N = 232) further confirmed the moderating role of punishment cost by manipulating class and cost: individuals from higher classes were more likely to engage in altruistic punishment than those from lower classes, but the gap between the two was more pronounced under high-cost conditions. Study 4 (N = 125) comprehensively examined the psychological mechanisms through which class influences punishment. Multilevel linear analysis revealed that when punishment cost was low, class indirectly affected punishment through belief in a just world, whereas when cost was high, class directly and positively influenced punishment. These results imply that altruistic punishment is influenced by individuals' social class, while also suggesting to some extent that strategic considerations based on cost-benefit calculations are not entirely absent in altruistic punishment.

Full Text

Subjective Social Class Positively Predicts Altruistic Punishment

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Abstract

Altruistic punishment refers to the behavior where individuals voluntarily incur costs to punish norm violators, a phenomenon influenced by social class. Study 1, utilizing data from the 2013 Chinese General Social Survey, found that social class significantly and positively predicted altruistic punishment. Study 2 (N = 450), based on surveys of real-life events, demonstrated that punishment costs moderated the effect of class on punishment: in high-cost direct punishment, class positively predicted punishment behavior, whereas this effect became non-significant in low-cost indirect punishment. Study 3 (N = 232) further confirmed the moderating role of punishment costs by manipulating both class and costs: higher-class individuals were more likely to engage in altruistic punishment than lower-class individuals, with this gap being more pronounced under high-cost conditions. Study 4 (N = 125) comprehensively examined the psychological mechanisms underlying the class-punishment relationship. Hierarchical linear modeling revealed that when punishment costs were low, class indirectly influenced punishment through belief in a just world, whereas when costs were high, class exerted a direct positive effect on punishment. These findings suggest that altruistic punishment is influenced by individuals' social class, while also indicating that cost-benefit strategic considerations are not entirely absent from altruistic punishment.

Keywords: altruistic punishment, social class, belief in a just world, punishment cost

1. Introduction

Altruistic punishment, a concept introduced by Fehr and Gächter (2002) to explain large-scale cooperation among non-kin individuals, involves three key features: (1) the punisher bears the cost of punishment; (2) the punishment inflicts losses on the violator; and (3) the punishment upholds social norms (Li et al., 2012). The role of altruistic punishment in promoting cooperation has been extensively documented (Balliet et al., 2011). However, most research on altruistic punishment has been conducted in laboratory settings with homogeneous, atomized participants to obtain clear causal conclusions (Gowdy, 2004; Manner & Gowdy, 2010). In reality, individuals are not isolated atoms; rather, genetic inheritance and life experiences create significant individual differences, with social class being a crucial source of such variation (Yang et al., in press). Chen and Fan (2016) note that most people possess class consciousness and tend to position themselves within a class hierarchy for cognition and action. Researchers from various countries have observed increasing social stratification in contemporary societies (Li, 2012; Law & Law, 2006), with class boundaries becoming increasingly clear. The rapid expansion of wealth inequality worldwide

has further intensified this trend, leading people to rely more heavily on class as a dimension for social categorization and identity, and to exhibit class-specific cognitive and behavioral patterns (Tanjitpiyanond et al., 2022). Therefore, a meaningful yet underexplored question in punishment research is: How does social class influence altruistic punishment? This article addresses this question through four studies, providing a comprehensive examination and preliminary answers. Introducing social class into altruistic punishment research can both expand the scope of social class studies and enrich the theoretical understanding of this concept, while also enhancing the ecological validity of punishment research by better understanding how class-based individual differences affect altruistic punishment.

1.1 Social Cognitive Theory of Social Class

From a social cognitive perspective, social class is typically defined as groups occupying different positions in the social hierarchy, with differential access to social resources and distinct self-concepts and social cognitions (Kraus et al., 2012). Social class can be assessed through objective indicators such as income, education, and occupation (Stephens et al., 2014), or through self-estimation (Christie & Barling, 2009). The former is termed objective social class or socioeconomic status, while the latter is called subjective social class (Hu et al., 2014). Social class significantly impacts various aspects of individuals' lives (Hu et al., 2014; Kraus et al., 2010; Stephens et al., 2014), including self-concept (lower/higher class individuals develop communal vs. agentic self-concepts; Stephens et al., 2011), social perception (both high- and low-class individuals consider warmth more important than competence when perceiving others, but this effect is stronger among low-class individuals; when perceiving themselves, low-class individuals prioritize warmth while high-class individuals prioritize competence; Wei et al., 2018), interpersonal relationships (high-class individuals prefer exchange relationships while low-class individuals favor communal relationships; Kraus & Keltner, 2009), physical and mental health (low-class individuals suffer more from physical and mental illnesses and have higher mortality rates; Elo, 2009), and prosocial behavior (low-class individuals are more willing to engage in prosocial behavior than high-class individuals; Piff et al., 2010; Piff et al., 2012; Piff & Robinson, 2017; Stellar et al., 2012), though this effect is moderated by factors such as age (Benenson et al., 2007), target of behavior (Kuang et al., 2021), public vs. private contexts (Kraus & Callaghan, 2016), salience of within-group inequality (Côté et al., 2015), and type of prosocial behavior (Penner, 2005). This literature review indicates that social class influences self-concept, interpersonal relationships, and various phenomena including prosocial behavior. Given that altruistic punishment is a form of prosocial behavior, we hypothesize that it is also influenced by social class. Unfortunately, no study has systematically explored this relationship. To fill this gap, this article examines the distribution, psychological mechanisms, and influencing factors of altruistic punishment from the novel perspective of social class.

1.2 The Effect of Social Class on Altruistic Punishment: Resource and Motivational Factors

Although no study has systematically examined the effect of social class on altruistic punishment, several lines of indirect evidence can inform our hypotheses. First, altruistic punishment is a costly signal that requires punishers to bear substantial costs (Jordan et al., 2016a; Nelissen, 2008), and a key difference between social classes lies in their differential access to social resources (Stephens et al., 2014). High-class individuals possess more resources, leading us to reasonably infer that they are better positioned to engage in altruistic punishment, all else being equal. Second, research on justice motives shows that high-class individuals hold stronger beliefs in a just world (BJW; Furnham & Procter, 1989), which positively predicts punishment attitudes (Bègue & Bastounis, 2003) and punishment behavior (Yang & Chen, 2022). Thus, from a motivational perspective, high-class individuals also appear more likely to punish violators. Experimental evidence supports these inferences: Ding et al. (2017) found that wealthy participants in an ultimatum game were more likely to reject unfair offers, a behavior widely considered altruistic punishment because individuals reduce violators' payoffs at personal cost to maintain fairness norms (Li et al., 2012). Based on this evidence, we propose our first hypothesis:

Hypothesis 1: Social class positively predicts altruistic punishment: the higher one' s class, the more likely one is to engage in altruistic punishment.

1.3 Perspectives on Punishment Cost and Belief in a Just World: A Conditional Process Model

Economic perspectives on punishment research often emphasize strategic cost-benefit considerations in altruistic punishment. For instance, Fan et al. (2013) and Chen and Bo (2016) found that altruistic punishment follows the demand curve in economics: higher prices (punishment costs) lead to lower demand (punishment behavior). In this sense, altruistic punishment appears no different from ordinary commodity purchasing behavior. Chen et al. (2020) showed that changing the form of punishment cost does not alter this conclusion but merely shifts the relationship between punishment and cost from one demand curve to another. Overall, punishment frequency or intensity tends to decrease as punishment costs increase (Aharoni et al., 2019; Anderson & Putterman, 2006). These findings demonstrate that strategic, cost-benefit motivations do exist in altruistic punishment. Importantly, individuals from different social classes have different resources (Drentea, 2000; Oakes & Rossi, 2003), resulting in varying cost sensitivity (Paulsen & John, 2002). High-class individuals are less sensitive to costs, so although rising punishment costs inhibit punishment behavior in both high- and low-class individuals, this inhibitory effect should be more pronounced for low-class individuals. Therefore, we propose:

Hypothesis 2: Punishment cost moderates the effect of social class on altruistic punishment: overall, high-class individuals are more likely to engage in altruistic

punishment than low-class individuals, but this gap is more pronounced under high-cost conditions.

Unlike cost-benefit research, motivation-based studies have confirmed non-strategic motives in altruistic punishment, as it is partly driven by fairness principles, suggesting that people punish to uphold internal beliefs (Falk et al., 2015). Researchers have applied Lerner' s (1965) belief in a just world to explain this phenomenon: individuals need to believe they live in a fair world and are therefore willing to pay costs to punish those who violate this belief (Strelan et al., 2017). Furthermore, Furnham and Procter (1989) found a positive correlation between social class and belief in a just world, which in turn positively predicts punishment attitudes (Bègue & Bastounis, 2003) and punishment behavior (Yang & Chen, 2022). Evidence also suggests that belief in a just world mediates the relationship between social class and online altruistic behavior (Zheng et al., 2021). We hypothesize that belief in a just world plays a similar mediating role between social class and altruistic punishment. Note that belief in a just world includes both personal belief in a just world and general belief in a just world (Wu et al., 2011), with the latter being more closely associated with punishment attitudes (Bègue & Bastounis, 2003) and punishment behavior (Yang & Chen, 2022). Therefore, this article focuses on the mediating role of general belief in a just world (hereafter, unless otherwise specified, "belief in a just world" refers to general belief in a just world). We propose:

Hypothesis 3: General belief in a just world mediates the relationship between social class and altruistic punishment. Specifically, social class positively predicts belief in a just world, which in turn positively influences altruistic punishment.

Finally, by integrating internal (motivational) and external (cost) perspectives and introducing punishment cost as a moderator, we propose a conditional process model of how social class influences altruistic punishment (Figure 1 [Figure 1: see original paper]). This serves two purposes: (1) to provide a preliminary explanatory framework for our research topic by comprehensively examining the psychological mechanisms and boundary conditions of the class-punishment relationship; and (2) to offer a new perspective on understanding the relationship between strategic and non-strategic motives in altruistic punishment. Note that social class includes both objective and subjective social class, which are moderately correlated (Adler et al., 2000) and have independent effects on individuals (Manstead, 2018). Subjective social class has been shown to be a better predictor of behavior than objective social class (Cohen et al., 2008; Wolff et al., 2010). Therefore, this article examines both objective and subjective social class effects on altruistic punishment, using income and education as objective class indicators (following Kraus & Tan, 2015). However, we focus primarily on subjective social class when discussing results. Unless otherwise specified, "social class" in this article refers to subjective social class. All data analyses were conducted using SPSS 25.0 unless otherwise noted.

Study 1: The Relationship Between Social Class and Altruistic Punishment

2.1 Data Source and Variable Selection

Study 1 used data from the Chinese General Social Survey 2013 (CGSS2013) (National Survey Research Center at Renmin University of China, 2015) to test the relationship between social class and altruistic punishment (Hypothesis 1). We selected the following variables:

Subjective Social Class. The predictor variable was subjective social class, measured by participants' responses to item A43a. Following Adler et al. (2000), participants were shown a 10-rung ladder representing the social hierarchy, with 10 indicating the top and 1 the bottom. Participants selected an integer from 1-10 to represent their perceived social position. Responses of "-3=refuse to answer," "-2=don' t know," and "-1=not applicable" were excluded.

Altruistic Punishment. The outcome variable was altruistic punishment. CGSS2013 included two relevant items: reporting social problems (D13: "If your workplace implemented a measure that would improve collective welfare and benefit you personally but cause environmental pollution or social harm, would you report it?" ; -3=refuse to answer; -2=don' t know; -1=not applicable; 1=yes; 2=no) and resisting superior misconduct (D23: "Suppose your foreign boss insulted China. If protesting would have negative consequences for you, would you: -3=refuse to answer; -2=don' t know; -1=not applicable; 1=protest directly; 2=remain silent; 3=retaliate secretly; 4=complain privately; 5=not care"). Following Molho et al. (2020), we converted these items into binary variables: (1) For reporting social problems, we excluded responses of -3, -2, or -1 and coded 0=no, 1=yes. (2) For resisting superior misconduct, we similarly excluded -3, -2, or -1 responses and combined options 1 and 3 as punishment (coded 1) and options 2, 4, and 5 as no punishment (coded 0).

Control Variables. Control variables included gender (A2: 1=male, 2=female), age (A3a), highest education level (A7a: 1=no formal education to 13=graduate degree or higher), and annual income (A8a: "What was your total personal income last year [2012]?"). Participants responding "-3=refuse to answer,""-2=don't know,"or "-1=not applicable"on gender, "14=other"on education, or "9999997=not applicable," "9999998=don' t know," or "9999999=refuse to answer" on income were excluded. Due to the large absolute values of income, we applied a logarithmic transformation using ln(1+annual income) to accommodate participants reporting zero income.

After screening, we obtained 4,978 valid cases. The mean age was 48.57 years (SD = 15.66), with 49% female participants. The mean subjective social class was 4.33 (SD = 1.67), mean education level was 5.66 (SD = 3.65), and mean log-transformed annual income was 9.13 (SD = 1.09).

2.2 Results and Discussion

Descriptive statistics and correlations are presented in Table 1 . We conducted binary logistic regression with social class as the predictor and altruistic punishment (reporting social problems) as the outcome (N = 4,921). Model fit was good (^{2}(5, 4921) = 38.93, p < 0.001; Hosmer-Lemeshow test: p = 0.597). Results showed that age (B = -0.003, Wald = 2.80, OR = 1.00, 95% CI [0.99, 1.001], p = 0.094), income (B = 0.01, Wald = 1.45, OR = 1.01, 95% CI [0.99, 1.03], p = 0.228), and education (B = -0.01, Wald = 1.55, OR = 0.99, 95% CI [0.97, 1.01], p = 0.214) did not significantly predict altruistic punishment. Female participants were significantly less likely to punish than males (B = -0.24, Wald = 15.61, OR = 0.79, 95% CI [0.70, 0.89], p < 0.001), with women being 21% less likely to engage in altruistic punishment in similar situations. Subjective social class significantly positively predicted altruistic punishment (B = 0.07, Wald = 16.70, OR = 1.08, 95% CI [1.04, 1.11], p < 0.001), with each one-level increase in subjective social class increasing the likelihood of altruistic punishment by 8%.

Next, we conducted binary logistic regression with subjective social class predicting the second form of altruistic punishment—resisting superior misconduct (N = 4,864). Model fit was good (^{2}(5, 4864) = 70.46, p < 0.001; Hosmer-Lemeshow test: p = 0.056). Age (B = 0.001, Wald = 0.10, OR = 1.00, 95% CI [0.997, 1.005], p = 0.747) and income (B = 0.01, Wald = 1.51, OR = 1.01, 95% CI [0.99, 1.03], p = 0.219) did not significantly predict altruistic punishment. Education significantly positively predicted punishment (B = 0.03, Wald = 7.85, OR = 1.03, 95% CI [1.01, 1.06], p = 0.005), with each education level increase raising punishment likelihood by 3%. Female participants were 30% less likely to punish than males (B = -0.35, Wald = 32.53, OR = 0.70, 95% CI [0.62, 0.79], p < 0.001). Subjective social class significantly positively predicted altruistic punishment (B = 0.05, Wald = 8.74, OR = 1.06, 95% CI [1.02, 1.09], p = 0.003), with each class level increase raising punishment likelihood by 6%.

Study 1 supported Hypothesis 1: Subjective social class positively predicted altruistic punishment even after controlling for other variables, and this relationship held for both reporting social problems and resisting superior misconduct. These findings also help compare the effects of objective versus subjective social class. Income and education are considered important indicators of objective social class (Wang et al., 2017; Stephens et al., 2014), but neither significantly predicted altruistic punishment in the reporting scenario, and only education was significant in the superior resistance scenario. In contrast, subjective social class consistently predicted punishment behavior across both scenarios. This partially supports previous research showing that objective and subjective social class have independent effects on behavior (Manstead, 2018) and that subjective class is a better predictor (Cohen et al., 2008; Wolff et al., 2010).

One explanation for these findings is that different classes have different cost sensitivities (Paulsen & John, 2002). If true, we would predict that class would

significantly predict punishment in high-cost scenarios but not in low-cost scenarios, where cost sensitivity differences may not manifest. Following Molho et al.' s (2020) recommendation, Study 2 distinguished between direct punishment (physical confrontation and verbal accusation) and indirect punishment (gossip and social avoidance). While these forms differ in their manifestations, researchers widely acknowledge that they differ substantially in cost (Archer & Coyne, 2005; Balafoutas et al., 2014; Molho et al., 2020), with direct punishment representing high-cost punishment and indirect punishment representing low-cost punishment. Based on this distinction, we hypothesized that class would significantly predict direct but not indirect punishment.

Study 2: Punishment Cost as a Moderator

3.1 Participants

We administered 500 questionnaires through the online platform "Credamo." Participants were asked to recall the most serious norm violation they had witnessed in the past month that did not directly affect them but negatively impacted others. They briefly described the event (3-5 sentences including time, place, and details) before answering related questions. This description task helped ensure participants understood altruistic punishment and prevented inclusion of irrelevant data. Fifty participants either failed to describe a specific violation or described events not qualifying as altruistic punishment, leaving 450 valid questionnaires (90% valid response rate). Mean age was 30.21 years (SD = 5.73), with 61.33% female participants.

3.2 Variables and Measures

Subjective Social Class. Measured identically to Study 1.

Altruistic Punishment. The outcome variable was distinguished into two forms: direct and indirect punishment, each comprising two items scored 1 for "yes" and 0 for "no," with scores summed for each form. Items were adapted from Molho et al. (2020): "When the violation occurred, what was your actual response to the violator?" The items were: (1) physical confrontation, (2) shouting or arguing, (3) telling others about the violator' s misconduct, and (4) avoiding contact with the violator. Items 1-2 represented direct punishment; items 3-4 represented indirect punishment.

Control Variables. Gender (1=male, 2=female), age, income (1: ≤¥5,000/month; 2: ¥5,001-10,000; 3: ¥10,001-15,000; 4: >¥15,000), and education (1=junior high or below; 2=high school/technical school; 3=undergraduate/college; 4=graduate or above).

3.3 Results and Discussion

We first tested for common method bias. Harman' s single-factor test yielded four factors with eigenvalues greater than 1, with the first unrotated factor

explaining 20.00% of variance—well below the 40% threshold. Given the diverse measurement methods, serious common method bias was unlikely. Descriptive statistics and correlations are presented in Table 2 .

Since both outcome variables were sums of two binary items and thus not continuous, normality tests were conducted. Kolmogorov-Smirnov tests indicated that both direct ($p < 0.001$) and indirect ($p < 0.001$) punishment violated normality assumptions. Therefore, we used ordinal logistic regression.

For direct punishment, the parallel lines test supported the proportional odds assumption ($^2(5, 450) = 4.22$, $p = 0.518$). Deviance goodness-of-fit was adequate ($^2(539, 450) = 401.28$, $p = 1.000$), and the model fit significantly better than the intercept-only model ($^2(5, 450) = 29.97$, $p < 0.001$). Income (Wald = 0.12, OR = 1.06, 95% CI [0.77, 1.46], $p = 0.727$) and education (Wald = 0.49, OR = 1.18, 95% CI [0.74, 1.89], $p = 0.484$) did not significantly predict direct punishment. Although men appeared more likely to punish, the gender difference was not significant (Wald = 2.13, OR = 1.37, 95% CI [0.90, 2.08], $p = 0.144$). Age (Wald = 10.35, OR = 1.06, 95% CI [1.02, 1.10], $p = 0.001$) and subjective social class (Wald = 8.50, OR = 1.32, 95% CI [1.10, 1.59], $p = 0.004$) significantly predicted direct punishment, with each one-year age increase raising punishment likelihood by 6% and each class level increase raising it by 32%.

For indirect punishment, the parallel lines test supported the proportional odds assumption ($^2(5, 450) = 0.86$, $p = 0.973$). Deviance goodness-of-fit was adequate ($^2(539, 450) = 417.05$, $p = 1.000$), but the model did not fit significantly better than the intercept-only model ($^2(5, 450) = 6.91$, $p = 0.228$), indicating no significant effects of any predictors. Income (Wald = 1.44, OR = 1.25, 95% CI [0.87, 1.78], $p = 0.230$), education (Wald = 0.08, OR = 1.07, 95% CI [0.65, 1.78], $p = 0.781$), and gender (Wald = 1.33, OR = 0.77, 95% CI [0.49, 1.20], $p = 0.248$) did not significantly predict indirect punishment. Unlike direct punishment, age (Wald = 2.19, OR = 0.97, 95% CI [0.94, 1.01], $p = 0.139$) and subjective social class (Wald = 1.14, OR = 1.10, 95% CI [0.92, 1.33], $p = 0.286$) also did not significantly predict indirect punishment.

Interestingly, item D23 in Study 1 also contained both direct (protest directly) and indirect (retaliate secretly) punishment options. We reanalyzed these data by treating direct protest as direct punishment and secret retaliation as indirect punishment, with remaining options coded as no punishment. Binary logistic regression controlling for gender, age, education, and income showed that class significantly positively predicted direct punishment (B = 0.05, Wald = 9.03, OR = 1.06, 95% CI [1.02, 1.09], $p = 0.003$) but not indirect punishment (B = -0.01, Wald = 0.06, OR = 0.99, 95% CI [0.88, 1.10], $p = 0.809$). This supplementary analysis corroborates Study 2' s findings.

These results largely replicate Study 1: objective social class indicators (income and education) generally failed to predict punishment behavior, whereas subjective social class consistently predicted punishment across most scenarios.

Study 2 further confirmed our hypothesis that punishment cost plays a moderating role: class differences in cost sensitivity (Paulsen & John, 2002) may not manifest in low-cost indirect punishment, rendering class effects non-significant. However, Study 2 had limitations: (1) correlational data cannot establish causality; (2) distinguishing direct vs. indirect punishment only indirectly addresses cost effects; and (3) it cannot specify how costs operate in the class-punishment relationship. Study 3 was designed to address these issues by directly manipulating both social class and punishment cost. We used potential retaliation as a non-monetary cost manipulation because (1) retaliation is a common punishment cost in daily life (Engelmann & Nikiforakis, 2015), and (2) research shows retaliation more strongly inhibits punishment than monetary costs when cost amounts are equal (Chen et al., 2020).

Study 3: Experimental Manipulation of Class and Cost

4.1 Participants

A power analysis using G*Power 3.1 indicated that a 2 × 2 between-subjects ANOVA with medium effect size (f = 0.25), $\alpha = 0.05$, requires at least 210 participants to achieve 95% power (1 - β). We recruited 240 non-psychology undergraduate students (mean age = 20.60 years, SD = 1.49; 56.90% female).

4.2 Design and Variables

Study 3 employed a 2 (subjective social class: low/high) × 2 (punishment cost: low/high) between-subjects design. Social class was manipulated following Kraus et al. (2010) and Piff et al. (2010). Punishment cost was manipulated by introducing potential retaliation from the punished party, creating high-cost (potential retaliation) and low-cost (no retaliation) conditions. The dependent variable was punishment behavior—the number of tokens participants chose to deduct from the violator at personal cost.

4.3 Procedure

Participants were randomly assigned to four groups (8 failed comprehension checks, leaving 232 valid participants: high-class/high-cost = 57, high-class/low-cost = 57, low-class/high-cost = 58, low-class/low-cost = 60). First, we manipulated subjective social class using Kraus et al.' s (2010) and Piff et al.' s (2010) method: participants viewed a 10-rung ladder (10 = top, 1 = bottom), compared themselves to people at the bottom (high-class condition) or top (low-class condition) who had the least/most wealth, lowest/highest education, and worst/best jobs, imagined meeting such a person, described how they would greet and converse with them (3-5 sentences, minimum 20 characters), and finally rated their own social class on the 1-10 ladder.

Next, participants observed a modified dictator game: Person A (allocator) and Person B (recipient) jointly earned 50 tokens with equal contributions, but A

unilaterally allocated only 10 tokens to B, keeping 40. As an uninvolved third party with 60 tokens, participants could pay to punish A at a rate of 0.25 tokens per 1 token deducted from A, choosing any amount from 0-40 tokens. In the high-cost condition, participants were told their decision would be visible to A, who might retaliate by deducting an equal number of tokens; in the low-cost condition, decisions were invisible and retaliation impossible. After making their decision, participants rated the perceived cost of their choice (1 = very low to 5 = very high). Finally, the experimenter explained the study purpose and compensated participants.

4.4 Results and Discussion

Manipulation checks confirmed effectiveness: high-class participants reported significantly higher perceived class than low-class participants ($t(230) = 7.01$, $p < 0.001$, $d = 0.92$, 95% CI [0.93, 1.65]), and high-cost participants reported significantly higher perceived costs than low-cost participants ($t(230) = 2.64$, $p = 0.009$, $d = 0.34$, 95% CI [0.07, 0.52]).

A 2 × 2 between-subjects ANOVA revealed significant main effects of social class ($F(1, 228) = 6.96$, $p = 0.009$, partial $^2 = 0.03$) and punishment cost ($F(1, 228) = 20.09$, $p < 0.001$, partial $^2 = 0.08$), and a significant interaction ($F(1, 228) = 4.90$, $p = 0.028$, partial $^2 = 0.02$). Simple effects analysis (Figure 2 [Figure 2: see original paper]) showed that under low-cost conditions, high-class ($M = 24.93$, $SE = 1.33$) and low-class ($M = 24.37$, $SE = 1.30$) participants did not differ significantly in punishment ($F(1, 228) = 0.09$, $p = 0.763$). However, under high-cost conditions, low-class participants ($M = 15.52$, $SE = 1.32$) punished significantly less than high-class participants ($M = 21.93$, $SE = 1.33$; $F(1, 228) = 11.67$, $p < 0.001$). For low-class participants, punishment was significantly lower under high vs. low cost ($F(1, 228) = 22.80$, $p < 0.001$), whereas high-class participants showed no significant difference across cost conditions ($F(1, 228) = 2.53$, $p = 0.113$).

Piff et al. (2010) argued that temporarily inducing high or low social class experiences activates corresponding cognitions and motivations that produce class-typical behavior patterns. Our results support this view and advance understanding of how social class affects punishment. When induced to experience high class, participants were more likely to punish violators, especially under high-cost conditions—where class differences emerged clearly but were absent under low-cost conditions. This provides clear experimental evidence for Hypothesis 2 and corroborates Study 2' s findings. Study 2 showed that class predicted direct (high-cost) but not indirect (low-cost) punishment; Study 3 similarly demonstrated that while costs generally reduced punishment, this effect was much stronger for low-class participants. This confirms that different classes have different cost sensitivities (Paulsen & John, 2002): potential retaliation affected low-class participants much more than high-class participants.

While Studies 2 and 3 examined external objective conditions (cost), Study 4

investigated internal subjective motivation—belief in a just world—to provide a more complete explanatory framework.

Study 4: The Conditional Process Model

5.1 Participants

A power analysis using G*Power 3.1 indicated that multiple regression with medium effect size ($f^2 = 0.15$), $\alpha = 0.05$, requires at least 119 participants to achieve 95% power. We recruited 125 community participants (mean age = 30.19 years, SD = 7.47; 62.40% female) through the Credamo platform.

5.2 Variables and Procedure

Subjective Social Class. Measured identically to Study 2.

Belief in a Just World. The mediator was measured using 6 items (Cronbach's $\alpha = 0.75$) adapted from Wu et al. (2011; e.g., "In the long run, I believe people who suffer injustice will be compensated" and "I am confident that justice will always triumph over injustice"). Items were rated on a 6-point Likert scale (1 = strongly disagree to 6 = strongly agree), with higher scores indicating stronger belief in a just world.

Punishment Cost. The moderator was manipulated by presenting participants with a dictator game similar to Study 3 but varying retaliation levels. All participants were told their punishment decisions would be visible to the allocator (Person A) and that there was an 80% chance of retaliation. We used the strategy method (Jordan et al., 2016b) to present five retaliation conditions: for each token spent to punish (deducting 4 tokens from A), participants faced an 80% chance of A deducting 1, 2, 3, 4, or 5 tokens in retaliation. These conditions were presented in random order.

Altruistic Punishment. The outcome variable was the number of tokens participants chose to deduct from A.

Control Variables. Gender, age, income, and education (identical to Study 2).

5.3 Results and Discussion

Descriptive statistics and correlations are presented in Table 3 . Study 4 yielded 625 data points (125 participants × 5 cost conditions), with punishment and cost as level-1 variables and belief in a just world, social class, and controls as level-2 variables. To test the conditional process model (Figure 1 [Figure 1: see original paper]), we used Mplus 8.3 with maximum likelihood estimation to examine cross-level mediation and moderation.

A null model showed sufficient within-person variance in punishment (ICC = 0.29), warranting multilevel modeling (Lin, 2017). The cross-level mediation

model revealed that belief in a just world significantly positively predicted altruistic punishment (B = 2.42, SE = 0.76, p = 0.001), and social class remained significant after including the mediator (B = 1.05, SE = 0.47, p = 0.026), indicating partial mediation (supporting Hypothesis 3). The cross-level moderation analysis showed a significant negative interaction between belief in a just world and punishment cost (B = -0.90, SE = 0.27, p = 0.001) and a significant positive interaction between social class and punishment cost (B = 0.44, SE = 0.14, p = 0.002). This suggests that the direct effect of class on punishment strengthens as costs increase, while the indirect effect through belief in a just world weakens with rising costs. Control variables (gender, age, income, education) did not significantly predict punishment.

To illustrate the moderation effect, we used Edwards and Lambert's (2007) path analysis technique to examine direct, indirect, and total effects of social class on altruistic punishment at different cost levels (M ± 1SD), presented in Table 4 . The direct effect was non-significant at low cost (M - 1SD) but became significant and increasingly strong at moderate and high cost levels. Conversely, the indirect effect was significant at low to moderate costs but became non-significant at high cost (M + 1SD). The total effect remained significant across all cost levels, strengthening as punishment cost increased. These results support Hypothesis 3 and refine our understanding of how punishment cost and belief in a just world operate.

6. General Discussion

This article examined the distribution, psychological mechanisms, and influencing factors of altruistic punishment from a social class perspective, connecting two important social science domains and advancing understanding of several key issues.

6.1 Why Do High-Class Individuals Punish More?

Our most important finding is that social class positively and robustly predicts altruistic punishment across four studies. We offer two explanatory perspectives: punishment cost and belief in a just world. First, altruistic punishment is a costly signal (Henrich et al., 2006; Rodrigues et al., 2020), and cost necessarily constrains punishment behavior. Previous research consistently shows that higher costs reduce punishment (Chen & Bo, 2016; Fan et al., 2013). High-class individuals possess more resources, enabling them to offset punishment costs and exhibiting lower cost sensitivity (Paulsen & John, 2002). Thus, they are better positioned to engage in altruistic punishment. Studies 2 and 3 confirmed this: costs generally inhibited punishment in both classes, but the decline was less steep for high-class individuals, resulting in higher overall punishment levels.

Second, belief in a just world drives altruistic punishment. Hafer and Rubel (2015) argue that people have an intrinsic need to maintain belief in a just world because it enhances subjective well-being and social stability long-term.

Altruistic punishment is one strategy to uphold this belief (Strelan et al., 2017). High-class individuals typically hold stronger just world beliefs (Furnham & Procter, 1989), meaning they have both greater capacity and stronger motivation to punish. This dual advantage explains why high-class individuals consistently showed higher punishment tendencies across our studies.

6.2 Is Belief in a Just World an Alternative Proximal Mechanism?

Our second key finding is that belief in a just world may serve as an important psychological mechanism linking social class to altruistic punishment, offering a new perspective on proximal mechanisms. Previous research has emphasized anger as a primary driver of altruistic punishment (Fehr & Gächter, 2002; Fischer & Roseman, 2007). One might hypothesize a chain mediation: high social class → high just world belief → greater anger → more altruistic punishment. However, evidence suggests the opposite: just world belief appears to reduce anger (Dalbert, 2002; Nesbit et al., 2012), implying a negative association between just world belief and anger. This suggests the chain mediation may not hold and that just world belief represents an independent psychological mechanism. In other words, individuals may punish not only out of anger but simply to protect their belief in a just world—what Chen and Yang (2020) termed the first type of altruistic punishment motive. If confirmed, this finding provides new insights into the psychological mechanisms driving altruistic punishment, though the precise relationship between just world belief and anger requires further investigation.

6.3 Why Does Belief in a Just World Only Operate at Low Cost?

Integrating just world belief and punishment cost, our conditional process model revealed a third novel finding: the mediating role of just world belief is bounded. Specifically, when punishment cost is low, class influences altruistic punishment indirectly through just world belief, but this mediation disappears at very high costs. Conversely, the direct effect of class is non-significant at low cost but emerges and strengthens beyond a certain cost threshold. We interpret this as follows: Different classes possess different resources (Drentea, 2000; Oakes & Rossi, 2003). At low cost, resource differences do not directly affect punishment because the action consumes few resources; instead, punishment is driven primarily by the strength of one' s desire to maintain a just world belief. As objective costs increase, the role of internal beliefs weakens. At very high costs, internal beliefs alone cannot sustain punishment behavior; instead, the amount of resources available and associated cost sensitivity become primary determinants. Thus, at low cost, people punish more to uphold internal justice beliefs (non-strategic considerations), whereas at high cost, punishment becomes more driven by resource availability and cost-benefit calculations (strategic considerations).

6.4 Does Subjective Class Predict Altruistic Punishment Better Than Objective Class?

Across four studies, we examined both objective (income and education) and subjective social class. Objective class indicators were generally non-significant predictors, except for education in Study 1. In contrast, subjective social class consistently and significantly predicted altruistic punishment across all studies. This raises two questions: (1) Why do subjective and objective class have different effects? (2) Why does objective class show inconsistent effects across studies?

Regarding the first question, we speculate that China' s rapid social transformation (Zhang et al., 2020) may weaken objective class indicators while strengthening subjective class effects (Chen & Fan, 2016). Our findings support this: subjective class effects substantially outweighed objective class effects across all scenarios, possibly reflecting China's unique historical period. Previous research also reports inconsistent effects of education and income (Kraus & Tan, 2015), suggesting objective class effects are less stable and robust than subjective class effects (Cohen et al., 2008; Wolff et al., 2010). For altruistic punishment, subjective class appears to be the superior predictor.

Regarding the second question, the inconsistent education effects likely stem from sample differences. Study 1 used nationally representative CGSS data, while Studies 2 and 4 used online platform samples that may be more educated and homogeneous, reducing education' s predictive power.

6.5 Limitations and Future Directions

Despite meaningful findings, this research has limitations. First, although we simulated retaliation as realistically as possible, it remained monetary due to ethical constraints. Real-world retaliation often involves physical or verbal aggression that cannot be ethically implemented in laboratories. Future research should explore more realistic retaliation simulations within ethical boundaries to enhance ecological validity.

Second, our samples varied in class composition. Study 1' s CGSS data showed mean subjective class of 4.33 (SD = 1.67), while Studies 2 and 4' s online samples showed higher means (5.45 ± 1.24 and 5.70 ± 1.13) with lower variance, indicating greater homogeneity. Study 3' s college student sample was also likely higher-class. While this demonstrates robustness across class levels, it raises concerns about representativeness that warrant caution in generalizing findings.

Finally, no research has directly examined how cultural factors moderate the social class-altruistic punishment relationship, though some evidence suggests cultural differences. Ding et al. (2022) found that in American samples, subjectively poorer participants were more likely to reject unfair offers, whereas the opposite pattern emerged in Chinese samples. Given cross-cultural differences in subjective class distributions (Chen & Fan, 2016), the generalizability of our

findings to other cultures requires further exploration.

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Note: Figure translations are in progress. See original paper for figures.