The Influence of Financial Scarcity on Prosocial Intentions: Based on Social Information Cues

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Abstract

The sense of money scarcity affects individuals' prosocial behavior; however, previous related research has mostly focused on prosocial behaviors that require individuals to incur substantial costs, with less examination of the impact of money scarcity on low-cost prosocial behavior—social mindfulness. Furthermore, previous studies have predominantly investigated factors influencing the mindfulness provider themselves, with less attention paid to factors influencing the recipient of mindfulness. This study conducted three experiments, using the dot comparison paradigm to prime participants' sense of money scarcity, and combined with the social mindfulness experimental paradigm to examine the effect of money scarcity (money scarcity group, non-money scarcity group) on social mindfulness, as well as the role of social information cues (other's attractiveness, self-presentation, target social class) therein. The findings revealed that, compared to the non-money scarcity group, the money scarcity group exhibited less social mindfulness. Additionally, the recipient's social information cues moderated the expression level of social mindfulness, where highly attractive faces, voices, positive emotional faces, and low target social class would elicit more social mindfulness from individuals. Finally, the recipient's social information cues could promote the expression of social mindfulness, and this promoting effect was stronger in the non-money scarcity group.

Full Text

The Impact of Financial Scarcity on Social Mindfulness: The Role of Social Information Cues

Abstract

Financial scarcity influences individuals' prosocial behavior. However, previous research has primarily focused on prosocial behaviors that require significant

personal cost, with less attention given to low-cost prosocial behavior—social mindfulness. Moreover, prior studies have predominantly examined factors related to the actor, while rarely investigating how characteristics of the recipient influence the expression of social mindfulness.

This study conducted three experiments using a dot-comparison paradigm to activate participants' sense of financial scarcity, combined with the social mindfulness experimental paradigm to examine the impact of financial scarcity (financial scarcity group vs. non-scarcity group) on social mindfulness and the role of social information cues (others' charisma, self-presentation, target social class) in this relationship. The findings revealed that, compared to the non-scarcity group, the financial scarcity group exhibited significantly less social mindfulness. Furthermore, recipients' social information cues moderated the expression of social mindfulness, with high-attractiveness faces and voices, positive emotional expressions, and low-target-social-class recipients eliciting greater social mindfulness. Finally, recipients' social information cues facilitated the expression of social mindfulness, with this facilitative effect being stronger in the non-scarcity group.

Keywords: financial scarcity, social mindfulness, social information cues

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Introduction

How financial scarcity influences changes in prosocial behavior has long been a focal point in psychological research. Financial scarcity motivates individuals to pursue their own interest-based goals, making personal gain and loss important predictors of whether they engage in prosocial behavior. For example, research indicates that in situations of financial scarcity, individuals primarily exhibit self-interest [**?**, **?**], yet sometimes they also become more generous and helpful [**?**, **?**, **?**]. Researchers have noted that such increases in prosocial behavior essentially serve to enhance social status and thereby indirectly benefit the actor [**?**, **?**]. Previous studies on the impact of financial scarcity on prosocial behavior have concentrated on behaviors requiring personal sacrifice, such as donations and cooperation, while paying less attention to social mindfulness—a prosocial behavior that requires virtually no personal cost. Social mindfulness, as everyday "small acts of kindness" and low-cost prosocial behavior (e.g., dining quietly and civilly, waiting in orderly queues for buses), holds significant importance for interpersonal relationships and promoting harmonious social development. In recent years, social mindfulness has emerged as a new perspective for studying prosocial behavior, yet the influence of financial scarcity on it remains unexplored. Moreover, since social mindfulness occurs in real social interactions, social cognition theory suggests that in social interactions, characteristics of the behavior recipient influence the actor's choice of cognitive strategies and cognitive judgment outcomes, thereby affecting the actor's behavior. Therefore, recipient characteristics may also moderate the impact of financial scarcity on

individual social mindfulness, a possibility that existing research has not addressed. This study will explore the influence of financial scarcity on individual social mindfulness and the moderating role of recipient characteristics.

1.1 The Impact of Financial Scarcity on Social Mindfulness Scarcity is ubiquitous in daily life. A survey found that people from both relatively wealthy and impoverished backgrounds frequently feel that certain resources are insufficient to meet their needs [**?**, **?**], indicating that scarcity is a universal phenomenon in human society. Scarcity theory proposes that scarcity not only means a shortage of material resources (e.g., money) but also implies a lack of cognitive resources (e.g., attention and executive control) [**?**, **?**]. Consequently, researchers have conceptualized "scarcity" as a psychological issue rather than merely a resource problem, representing a new perspective for studying scarcity. In psychology, scarcity is primarily manifested as "relative scarcity," or the perception of scarcity. Scarcity perception arises when individuals sense insufficient resources within a specific domain, referring to the perception and cognition that one's available resources cannot satisfy what is needed to accomplish a task [**?**, **?**]. Money, as a common incentive in life, represents a typical form of tangible resource scarcity [**?**, **?**]. Numerous studies have demonstrated that financial scarcity affects individuals in various ways, influencing perception, attention, cognition, executive control abilities [**?**, **?**], and decision-making tendencies [**?**, **?**, **?**]. Based on scarcity theory, this study defines financial scarcity as the dissatisfaction that arises when an individual subjectively perceives a discrepancy between their current economic resource level and a higher, more ideal reference point.

Previous research on scarcity and prosocial behavior presents divergent perspectives. On one hand, resource scarcity may make individuals more generous toward others [**?**, **?**, **?**, **?**]. For instance, 2013 U.S. survey data revealed that the poorest individuals (3.2%) tended to donate a larger proportion of their income compared to the wealthiest (approximately 1.3%). Additionally, when individuals realized they received scarce items, they were more likely to donate them [**?**, **?**]. On the other hand, resource scarcity may reduce generosity and promote selfish behavior [**?**, **?**, **?**]. For example, research manipulating participants' perception of food scarcity found that participants exhibited more selfish behavior [**?**, **?**]. Compared to high-income, high-status individuals, low-income, low-status individuals found it more difficult to spontaneously display altruistic behavior [**?**, **?**, **?**]. Furthermore, resource scarcity can make individuals more unethical [**?**, **?**] and lead to violations of social rules [**?**, **?**]. For instance, research has found that as people's perception of resource scarcity increases, the incidence of antisocial behavior also rises [**?**, **?**]. Scarcity can even alter individuals' racial perceptions, lowering the psychophysical threshold for perceiving mixed-race faces as "Black" rather than "White," thereby exacerbating racial discrimination [**?**, **?**].

In summary, both prosociality and selfishness represent responses to scarcity,

which aligns with the self-regulation model of scarcity [?, ?]. This model posits that when individuals face adverse consequences from insufficient resources, they can resolve the situation through either scarcity-reduction pathways or control-restoration pathways. Specifically, when individuals are in contexts with high resource variability, they adopt scarcity-reduction strategies to increase self-regulation, leading to selfish behavior. When resource variability is low, individuals enhance their sense of personal control in other domains (i.e., control restoration), thereby increasing prosocial behavior. Although these perspectives demonstrate the important influence of scarcity on prosocial behavior, social mindfulness differs from traditional prosocial behavior. Social mindfulness specifically refers to low-cost prosocial behavior where individuals consciously attend to, respect, and protect others' need for choice and rights [?, ?, ?], without requiring individuals to sacrifice their own interests. In contrast, traditional prosocial behavior focuses more on individuals' behavioral manifestations in social environments and may include sacrificing personal interests to help others. In simpler terms, social mindfulness refers to individuals' ability to consciously identify others' available options in a decision-making situation and willingness to make choices that do not restrict others' options [?, ?]. For example, when two people, A and B, are queuing for breakfast and the counter has one soy milk and two rice porridges, A chooses the non-unique rice porridge (excluding personal preference), thereby leaving B more choice opportunities. Thus, social mindfulness represents "effortless acts of kindness" in daily interactive contexts. As a low-cost prosocial behavior, people do not need to weigh material costs and benefits, yet such kindness significantly impacts interpersonal relationship development and socialization [?, ?, ?].

From previous research, only one study has indicated that financial scarcity is negatively correlated with trait social mindfulness [?, ?]; that is, the higher an individual's financial scarcity, the lower their trait social mindfulness level. This study preliminarily addressed the relationship between financial scarcity and trait social mindfulness, providing some evidence for empirical research on financial scarcity and social mindfulness. In summary, this study will explore the impact of financial scarcity on individual social mindfulness through empirical research, further enriching the theoretical system of scarcity and social mindfulness research.

1.2 The Moderating Role of Social Information Cues Social mindfulness occurs in social interaction contexts. According to social cognition theory, an actor's behavior results from the interaction between environment, social cognition, and the self. The recipient, as the actor's cognitive object in social interaction, influences the actor through three aspects: the recipient's charisma, reputation, and self-presentation, collectively termed the recipient's social information cues [?, ?]. Social information cues are key factors influencing social mindfulness expression, as they not only facilitate accurate interpretation of others' needs and intentions but also predict the degree of social mindfulness expression. Therefore, investigating how different social information cues of

recipients affect social mindfulness under financial scarcity is practically significant.

1.2.1 Others' Charisma: The Role of Attractiveness Facial and vocal attractiveness represent social cognition of a recipient's charisma. Faces and voices are important media for conveying social information during initial interpersonal contact and are the first information individuals notice in social interactions [**?**, **?**], playing important roles in social decision-making [**?**, **?**, **?**]. Research shows that people tend to treat those they perceive as physically attractive more positively in interactive contexts [**?**, **?**]. Individuals exhibit higher levels of social mindfulness toward high facial-attractiveness individuals, and compared to high-attractiveness males, males show higher social mindfulness toward high-attractiveness females [**?**, **?**]. Furthermore, when recipients have trustworthy faces, individuals' tendency to express social mindfulness strengthens [**?**, **?**, **?**]. Vocal attractiveness, known as a person's "auditory face" [**?**, **?**], refers to the degree to which a recipient's voice evokes positive, pleasant emotional experiences and drives others' willingness to approach [**?**, **?**], capable of eliciting a "beauty premium" effect similar to facial attractiveness [**?**, **?**].

Based on this evidence, we propose our first hypothesis:

Hypothesis 1: Compared to the non-financial-scarcity group, the financial-scarcity group will exhibit lower social mindfulness levels, and this effect will be influenced by others' facial and vocal attractiveness.

1.2.2 Self-Presentation: The Influence of Facial Expressions The face is one of a person's most prominent physical features, and individuals use facial expressions for self-presentation. Facial expressions serve as important information sources during interpersonal interactions, predicting individuals' immediate behaviors in interactive processes [**?**, **?**, **?**]. Research confirms that facial expressions affect prosocial behavior. For example, people are more trusting [**?**, **?**], friendlier [**?**, **?**], and more generous toward companions with happy expressions [**?**, **?**], but less trusting toward those with angry expressions [**?**, **?**]. Compared to angry expressions, participants show more positive social attitudes toward neutral and happy expressions [**?**, **?**]. Moreover, evidence suggests that dynamic faces have higher ecological validity than static faces [**?**, **?**] and provide richer information while enhancing expression intensity [**?**, **?**], particularly for happy and angry expressions [**?**, **?**].

In summary, a person's face conveys rich static and dynamic signals that are crucial for fully and rapidly understanding others' emotional states, thereby influencing individuals' decisions during interactions. Regarding social mindfulness, do the emotional messages carried by facial expressions under different face types affect individuals' behavioral choices? If so, how do different types of emotional information affect people's social interactions? Therefore, we propose the following hypotheses:

Hypothesis 1: Compared to the non-financial-scarcity group, the financial-scarcity group will exhibit lower social mindfulness levels, and this effect will be influenced by recipients' facial expressions.

Hypothesis 2: Compared to the non-financial-scarcity group, the financial-scarcity group will express more social mindfulness toward recipients with happy and neutral expressions than toward those with angry expressions.

Hypothesis 3: Compared to the non-financial-scarcity group, the financial-scarcity group will express more social mindfulness toward recipients with dynamic faces.

1.2.3 Renown: The Influence of Target Social Class Target social class reflects a recipient's reputation and represents individuals' perception of others' social class [**?**, **?**], which influences prosocial behavior. Research on the impact of self and others' social class on prosocial behavior finds that target social class has a greater influence on others' prosocial behavior than self social class [**?**, **?**]. For example, Lu (2020) proposed that actors' social mindfulness levels are affected by recipients' social class, but the actor's own social class is essentially unrelated to their expressed social mindfulness level. Four consecutive studies also found that regardless of the actor's own social class, low-social-class recipients elicited more social mindfulness from participants than high-social-class recipients [**?**, **?**]. In summary, in interpersonal interaction contexts, people base their altruistic behavior on the target's social class rather than their own. Whether social mindfulness under financial scarcity is also influenced by target social class requires in-depth discussion. Therefore, we propose our final hypothesis:

Hypothesis 4: Compared to the non-financial-scarcity group, the financial-scarcity group will exhibit lower social mindfulness levels, and this effect will be influenced by recipients' social class.

Overall, this article draws on scarcity theory and social cognition theory to explore the impact of financial scarcity on individual social mindfulness through three experiments, examining the moderating role of recipients' own social information cues in the relationship between financial scarcity and social mindfulness. Specifically, Experiment 1 focuses on social cognition of others' charisma, exploring it from the perspective of attractiveness. It includes Experiments 1a and 1b, which respectively examine the effects of recipients' facial and vocal attractiveness on financial scarcity and social mindfulness. Experiment 2 focuses on social cognition of self-presentation, exploring through facial expressions and examining the effects of different face types and expressions of recipients on financial scarcity and social mindfulness. Experiment 3 focuses on social cognition of renown, investigating the impact of recipients' social class status on financial scarcity and social mindfulness. This research aims to provide a new perspective for understanding how financial scarcity affects individual social behavior and to offer empirical evidence for promoting and maintaining social harmony under economic pressure.

Experiment 1a

Experiment 1a used a dot-comparison task within a stage-game paradigm to activate participants' financial scarcity and employed the Social Mindfulness Paradigm (SoMi) to measure social mindfulness. It examined whether participants' social mindfulness under different financial scarcity conditions would be affected by recipients' facial attractiveness.

Hypothesis 1a: Compared to the non-financial-scarcity group, the financial-scarcity group will exhibit lower social mindfulness levels, and this effect will be influenced by others' facial attractiveness.

2.1.3 Methods 2.1.3.1 Participants

This experiment recruited 110 university students from a university in Lanzhou. Four participants who withdrew mid-experiment were excluded, resulting in 106 valid participants. The 106 participants were randomly assigned to the financial-scarcity group and the non-scarcity group. The financial-scarcity group comprised 53 participants (25 males) with a mean age of 23.28 years (SD = 2.39). The non-scarcity group comprised 53 participants (28 males) with a mean age of 23.15 years (SD = 2.27). All participants received compensation after completing the experiment.

2.1.3.2 Design

A 2 (financial scarcity: scarcity vs. non-scarcity) × 2 (facial attractiveness: high vs. low) mixed design was employed, with financial scarcity as a between-subjects variable and recipients' facial attractiveness as a within-subjects variable. The dependent variable was social mindfulness score.

2.1.3.3 Materials

SoMi Paradigm: Social mindfulness scores were calculated using an adjusted scoring method [**?**, **?**, **?**]. Compared to the classic scoring method, the adjusted method better excludes errors caused by individual preferences for items [**?**, **?**]. Specifically, participants were only counted as socially mindful (scored 1) if they chose non-unique items in both the experimental and control groups. If participants consistently chose the same item across both groups, this only indicated a preference for that item (scored 0). The final social mindfulness score was the proportion of socially mindful choices out of total choices.

Item materials in the paradigm were selected based on previous research [**?**, **?**], using 12 categories of everyday items familiar in Chinese cultural contexts.

Facial Materials: To isolate the effect of facial attractiveness and avoid influences from facial emotion or gender, this study used neutral faces from the emotion picture database developed by Bai et al. (2005). Sixty-four university students (31 males, 33 females) rated these face pictures on a 7-point attractiveness scale

(1 = not at all attractive, 7 = very attractive). Based on these ratings, 24 faces of different attractiveness levels were selected (half male, half female): six high-attractiveness male faces (M = 3.54, SD = 0.18), six high-attractiveness female faces (M = 3.96, SD = 0.12), six low-attractiveness male faces (M = 2.38, SD = 0.05), and six low-attractiveness female faces (M = 2.50, SD = 0.06). The two groups of faces differed significantly in attractiveness ratings, t = 16.61, p < 0.001.

2.1.3.4 Procedure

All experimental procedures were presented and measured on the Tc Lab online psychology research platform. The specific process was as follows: First, all participants were randomly assigned to the financial-scarcity group or the non-scarcity group. Financial scarcity was then activated using a dot-comparison task [Figure 1: see original paper] [**?**, **?**]. Participants had to determine within 1 second which of two rectangles contained more dots. The task comprised 30 trials, ensuring participants experienced 15 successes and 15 failures. The financial-scarcity group started with ¥1, while the non-scarcity group started with ¥10. Each correct judgment earned ¥1, while each incorrect judgment deducted ¥1. The goal was to maintain at least ¥1 to receive experimental compensation. When participants had experienced 13 successes and 14 failures (i.e., at trial 27), the task was paused, leaving the financial-scarcity group with ¥0 and the non-scarcity group with ¥9.

A manipulation check for financial scarcity activation followed, including four questions: "How excited were you when you received ¥1 (¥10) for the task?" "How motivated were you?" "How stressed were you?" (reverse-scored), and "How confident were you in your task performance?" (1-7 scale from "not at all" to "very"). After ensuring successful activation of financial scarcity in the scarcity group, both groups proceeded to the item-selection game [Figure 2: see original paper]. Participants always chose first and could not change their selection after making a choice.

Before the formal experiment, participants practiced four trials. During the experiment, a fixation cross "+" appeared for 200 ms, followed by a face for 500 ms. The face and item pictures then appeared simultaneously, with the face at the top of the screen and items at the bottom, and instructions presented between them. Participants viewed 24 faces of different attractiveness levels (half male, half female). Each face corresponded to one item type, with each item having experimental and control group combinations, resulting in 48 trials total. To minimize environmental effects, item positions were balanced, and the presentation order of faces and items was randomized, as was the presentation of experimental and control stimuli [**?**, **?**]. After completing the item-selection game, participants finished the remaining dot-comparison trials.

2.1.4 Results 2.1.4.1 Manipulation Check for Financial Scarcity

To verify whether the dot-comparison task successfully activated financial

scarcity, independent samples t-tests were conducted on participants' scores across the four questions (excitement, motivation, stress, and confidence) . Results showed that the financial-scarcity group scored significantly lower on excitement, motivation, and confidence than the non-scarcity group, confirming effective manipulation of financial scarcity.

2.1.4.2 Social Mindfulness Analysis

Using SPSS 26.0, a 2 (financial scarcity: scarcity vs. non-scarcity) × 2 (facial attractiveness: high vs. low) repeated-measures ANOVA was conducted with social mindfulness score as the dependent variable.

Results showed [Figure 3: see original paper] a significant main effect of financial scarcity, $F(1,104) = 5.02$, $p < 0.05$, $p^2 = 0.05$. The financial-scarcity group's social mindfulness score ($M = 0.17$, $SD = 0.02$) was significantly lower than the non-scarcity group's score ($M = 0.23$, $SD = 0.02$). The main effect of facial attractiveness was also significant, $F(1,104) = 53.24$, $p < 0.001$, $p^2 = 0.34$. Social mindfulness scores for high-attractiveness faces ($M = 0.26$, $SD = 0.02$) were significantly higher than for low-attractiveness faces ($M = 0.15$, $SD = 0.02$).

The interaction between financial scarcity and facial attractiveness was significant, $F(1,104) = 6.88$, $p = 0.01$, $p^2 = 0.06$. Simple effects analysis [Figure 5: see original paper] revealed that when facing high-attractiveness recipients, the financial-scarcity group's social mindfulness score was significantly lower than the non-scarcity group's, $F(1,104) = 11.24$, $p \leq 0.001$, $p^2 = 0.10$. However, when facing low-attractiveness recipients, no significant difference existed between the two groups, $F(1,104) = 0.44$, $p = 0.51$.

Experiment 1b

Experiment 1b used the same dot-comparison task to activate financial scarcity and the SoMi paradigm to measure social mindfulness. It examined whether participants' social mindfulness under different financial scarcity conditions would be affected by vocal attractiveness.

Hypothesis 1b: Compared to the non-financial-scarcity group, the financial-scarcity group will exhibit lower social mindfulness levels, and this effect will be influenced by others' vocal attractiveness.

2.2.3 Methods 2.2.3.1 Participants

Eighty university students from a university in Lanzhou were recruited. One participant who withdrew mid-experiment was excluded, resulting in 79 valid participants. The 79 participants were randomly assigned to the financial-scarcity group ($n = 39$, 20 males, mean age = 20.59 years, $SD = 2.25$) and the non-scarcity group ($n = 40$, 20 males, mean age = 20.85 years, $SD = 2.25$). All

participants received compensation after completing the experiment.

2.2.3.2 Design

A 2 (financial scarcity: scarcity vs. non-scarcity) × 2 (vocal attractiveness: high vs. low) mixed design was employed, with group as a between-subjects variable and recipients' vocal attractiveness as a within-subjects variable. The dependent variable was social mindfulness score.

2.2.3.3 Materials

The materials were identical to Experiment 1a, except that facial materials were replaced with vocal materials.

Vocal Materials: Selected from the vocal material database developed by Zhang et al. (2020), vowel /ai/ samples were used, uniformly 400 ms in duration and 70 dB in volume. Sixty-four university students (31 males, 33 females) rated these voices on a 7-point attractiveness scale (1 = not at all attractive, 7 = very attractive). Based on these ratings, 24 voices were selected (12 high-attractiveness, 12 low-attractiveness). The two groups differed significantly in vocal attractiveness ratings, $t = 11.69$, $p < 0.001$. To balance participant gender and voice gender, independent samples t-tests were conducted on attractiveness ratings for male and female voices, showing no significant difference, $t = -0.25$, $p = 0.81$.

2.2.3.4 Procedure

The procedure was identical to Experiment 1a, except that in the item-selection game, participants wore headphones. A fixation cross "+" appeared for 400-600 ms, followed by a 400 ms playback of the recipient's voice. Item pictures then appeared on screen at the bottom, with instructions at the top. After selection, a black blank screen appeared for 200-300 ms before the next trial. Participants heard 24 voices of different attractiveness levels (12 high, 12 low). Each voice corresponded to one item type, with experimental and control combinations, totaling 48 trials. Item positions were balanced across different items, and the presentation order of voices, items, and experimental/control stimuli was completely randomized.

2.2.4 Results 2.2.4.1 Manipulation Check for Financial Scarcity

Independent samples t-tests on the four manipulation-check questions showed that the financial-scarcity group scored significantly lower on excitement, motivation, and confidence than the non-scarcity group, confirming effective manipulation.

2.2.4.2 Social Mindfulness Analysis

A 2 (financial scarcity: scarcity vs. non-scarcity) × 2 (vocal attractiveness: high vs. low) repeated-measures ANOVA was conducted.

Results showed a significant main effect of financial scarcity, $F(1,77) = 8.98$, $p < 0.01$, $p^2 = 0.10$. The financial-scarcity group's social mindfulness score (M

= 0.17, SD = 0.02) was significantly lower than the non-scarcity group's (M = 0.24, SD = 0.02). The main effect of vocal attractiveness was significant, $F(1,77) = 101.90$, $p < 0.001$, $p^2 = 0.57$. High-attractiveness voices elicited higher social mindfulness scores (M = 0.29, SD = 0.01) than low-attractiveness voices (M = 0.12, SD = 0.02).

The interaction between financial scarcity and vocal attractiveness was significant, $F(1,77) = 16.95$, $p < 0.001$, $p^2 = 0.18$. Simple effects analysis [Figure 4: see original paper] revealed that when facing high-attractiveness voices, the financial-scarcity group's social mindfulness score was significantly lower than the non-scarcity group's, $F(1,77) = 28.76$, $p < 0.001$, $p^2 = 0.27$. When facing low-attractiveness voices, no significant difference existed between groups, $F(1,77) = 0.002$, $p = 0.96$.

2.2.5 Discussion Experiments 1a and 1b both found that after activating financial scarcity, participants in the financial-scarcity group expressed less social mindfulness toward recipients compared to the non-scarcity group. This result aligns with previous findings that financial scarcity negatively predicts trait social mindfulness [**?**, **?**]. This outcome may occur because when experiencing financial scarcity, the financial-scarcity group focuses attention on their scarce monetary resources, creating a "tunneling mindset" that excludes awareness of others' needs, resulting in lower social mindfulness. Additionally, both groups showed significant differences in social mindfulness expressed toward high-attractiveness faces and voices, supporting Hypothesis 1 and consistent with previous research [**?**, **?**]. From a neurobiological perspective, the willingness to leave more choice opportunities for others may result from activation of the brain's "reward" regions when facing attractive recipients, producing more pleasant emotions [**?**, **?**].

In summary, both groups were influenced by recipients' attractiveness, with the financial-scarcity group showing significantly lower social mindfulness toward high-attractiveness recipients than the non-scarcity group, while showing no significant difference toward low-attractiveness recipients. This suggests that the psychological pressure from activated financial scarcity posed a threat in the selection task, and although others' attractiveness moderated the relationship between financial scarcity and social mindfulness, this moderating effect was relatively limited. Moreover, in interpersonal interactions, besides noticing recipients' charisma, recipients' self-presentation also influences social cognition. What impact might this have under financial scarcity? We continue this investigation in Experiment 2.

Experiment 2

3.1 Purpose and Hypotheses Using the dot-comparison task to activate financial scarcity and the SoMi paradigm to measure social mindfulness, this

experiment examined changes in participants' social mindfulness when viewing recipients' static and dynamic faces displaying happy, neutral, and angry expressions under different financial scarcity conditions.

Hypotheses: - **Hypothesis 1:** Compared to the non-financial-scarcity group, the financial-scarcity group will exhibit lower social mindfulness levels, and this effect will be influenced by recipients' facial expressions. - **Hypothesis 2:** Compared to the non-scarcity group, the financial-scarcity group will express more social mindfulness toward recipients with happy and neutral expressions than toward those with angry expressions. - **Hypothesis 3:** Compared to the non-scarcity group, the financial-scarcity group will express more social mindfulness toward recipients with dynamic faces.

3.2 Methods 3.2.1 Participants

Eighty-one university students were recruited from a university in Lanzhou. One participant withdrew, leaving 80 valid participants. These were randomly assigned to the financial-scarcity group (n = 40, 20 males, mean age = 20.14 years, SD = 3.08) and the non-scarcity group (n = 40, 18 males). All participants received compensation after completing the experiment.

3.2.2 Design

A 2 (financial scarcity: scarcity vs. non-scarcity) × 2 (face type: static vs. dynamic) × 3 (expression type: happy vs. neutral vs. angry) mixed design was employed, with group as a between-subjects variable and recipients' face type and expression type as within-subjects variables. The dependent variable was social mindfulness score.

3.2.3 Materials

Item materials for social mindfulness were identical to Experiment 1.

Facial Materials: Both static and dynamic faces were selected. Static facial expression pictures were sourced from the Chinese Affective Picture System (CAPS), selecting 12 static facial expression pictures (6 male, 6 female; 2 each of happy, neutral, and angry expressions) with no significant differences in expression intensity. Dynamic facial expression pictures (1-second duration) were selected from the Chinese Undergraduate Dynamic Affective Facial Database [**?**, **?**], with 12 pictures (6 male, 6 female; 2 each of happy, neutral, and angry). Forty-two students (21 male) rated the 12 dynamic faces on 9-point scales for pleasantness, arousal, and attractiveness. One-way ANOVA showed no significant differences in arousal ($F = 2.09$, $p = 0.18$) or attractiveness ($F = 0.37$, $p = 0.70$) across expression types, but pleasantness differed significantly, $p < 0.001$. Post-hoc comparisons revealed significant differences between happy, neutral, and angry expressions.

3.2.4 Procedure

The procedure was similar to Experiment 1a, with differences in the item-selection game. A fixation cross "+" appeared for 200 ms, followed by a face picture with different expressions for 1000 ms. The face and item pictures then appeared simultaneously, with the face at the top and items at the bottom, and instructions between them. After selection, a black blank screen appeared for 500 ms before the next trial. Participants viewed 24 faces of different types and expressions, each corresponding to one item type, with experimental and control combinations, totaling 48 trials. Item positions were balanced, and the presentation order of face type, expression type, and items was completely randomized, as was the presentation of experimental and control stimuli.

3.3 Results 3.3.1 Manipulation Check for Financial Scarcity

Independent samples t-tests on the four manipulation-check questions showed that the financial-scarcity group scored significantly lower on excitement, motivation, and confidence than the non-scarcity group, confirming effective manipulation.

3.3.2 Social Mindfulness Analysis

A 2 (financial scarcity: scarcity vs. non-scarcity) × 2 (face type: static vs. dynamic) × 3 (expression type: happy vs. neutral vs. angry) repeated-measures ANOVA was conducted.

Results [FIGURE:5, FIGURE:6] showed a significant main effect of financial scarcity, $F(1,78) = 9.07$, $p < 0.01$, $p^2 = 0.10$. The financial-scarcity group's social mindfulness score ($M = 0.18$, $SD = 0.02$) was significantly lower than the non-scarcity group's ($M = 0.25$, $SD = 0.02$). The main effect of expression type was significant, $F(1,78) = 47.3$, $p < 0.001$, $p^2 = 0.38$. Participants showed highest social mindfulness toward happy expressions ($M = 0.29$, $SD = 0.01$), followed by neutral expressions ($M = 0.21$, $SD = 0.02$), and lowest toward angry expressions ($M = 0.15$, $SD = 0.02$). The main effect of face type was significant, $F(1,78) = 4.19$, $p < 0.05$, $p^2 = 0.05$. Participants showed higher social mindfulness toward static faces ($M = 0.23$, $SD = 0.01$) than dynamic faces ($M = 0.21$, $SD = 0.01$).

The two-way interaction between face type and expression type was significant, $F(1,78) = 13.52$, $p < 0.001$. Simple effects analysis revealed that for happy expressions, social mindfulness was lower for static faces ($M = 0.27$, $SD = 0.02$) than dynamic faces ($M = 0.31$, $SD = 0.02$). For angry expressions, social mindfulness was significantly higher for static faces ($M = 0.20$, $SD = 0.02$) than dynamic faces ($M = 0.10$, $SD = 0.02$). For neutral expressions, no significant difference existed between face types, $p > 0.05$. Neither the two-way interactions of group × face type or group × expression type, nor the three-way interaction of group × face type × expression type were significant, $p > 0.05$.

3.4 Discussion Experiment 2 found that both the financial-scarcity and non-scarcity groups showed significant differences in social mindfulness across differ-

ent emotional faces, supporting Hypothesis 1. This indicates that social mindfulness is affected by financial scarcity and others' facial expressions, with both groups expressing most social mindfulness toward happy faces, followed by neutral faces, and least toward angry faces, supporting Hypothesis 2. According to Fredrickson's (2009) broaden-and-build model of positive emotions, positive emotions can expand individuals' immediate thought-action repertoires for attention, cognition, and action, which may explain why both groups expressed more mindfulness toward positive facial expressions.

Additionally, Experiment 2 found that recipients' face type also influenced social mindfulness, supporting Hypothesis 3. Specifically, both groups expressed more social mindfulness toward static than dynamic faces. This may be because dynamic faces contain more subtle changes that could interfere with cognitive processing. This interference may reduce social mindfulness expression by occupying cognitive resources. These findings are based on participants' cognition of recipients' facial expressions. Besides facial expressions, recipients' social cognition also includes renown. Therefore, Experiment 3 will examine the role of target social class in financial scarcity and social mindfulness.

Experiment 3

4.1 Purpose and Hypothesis Using the dot-comparison task to activate financial scarcity and the SoMi paradigm to measure social mindfulness, this experiment examined whether participants' social mindfulness under different financial scarcity conditions would vary based on recipients' social class status.

Hypothesis: Compared to the non-financial-scarcity group, the financial-scarcity group will exhibit lower social mindfulness levels, and this effect will be influenced by recipients' social class.

4.2 Methods 4.2.1 Participants

One hundred twenty-nine university students were recruited from a university in Lanzhou. One participant withdrew due to equipment issues, leaving 128 valid participants. Based on scores from the Subjective Socioeconomic Status Scale, the 128 participants were classified as high or low social class and then randomly assigned to the financial-scarcity group (n = 60, 33 males, 32 low social class, mean age = 21.80 years, SD = 2.07) and the non-scarcity group (n = 68, 34 males, 32 low social class, mean age = 21.34 years, SD = 2.19). All participants received compensation after completing the experiment.

4.2.2 Design

A 2 (financial scarcity: scarcity vs. non-scarcity) × 2 (target social class: high vs. low) between-subjects design was employed, with both group and target social class as between-subjects variables. The dependent variable was social mindfulness score.

4.2.3 Materials

Item materials for social mindfulness were identical to Experiment 1.

Subjective Socioeconomic Status Scale: The MacArthur Ladder was used to measure participants' subjective socioeconomic status. This scale presents participants with a picture of a 10-rung ladder representing social class hierarchy in China. After reading instructions, participants indicated which rung represented their family's socioeconomic status, with higher rungs indicating higher status [**?**, **?**]. As university students lack fixed income, their subjective assessment of socioeconomic status is based on their parents' status [**?**, **?**]. Thus, participants judged their family's socioeconomic status level.

Target Social Class Activation: Following the method by Van Doesum et al. (2016), which effectively activates participants' perception of recipients' social class, participants were asked to imagine completing the item-selection game with a high- or low-social-class partner before the task. Recipients' social class was distinguished by education, income, transportation, and home environment [**?**, **?**]:

- *High target social class manipulation:* "This game requires two players. Please imagine your partner is a middle-aged person around 40 years old (Player A) who graduated from a prestigious, top-ranked university; has an enviable job; lives in a high-end neighborhood; drives a luxury car; and earns about ¥30,000 per month."
- *Low target social class manipulation:* "This game requires two players. Please imagine your partner is a middle-aged person around 40 years old (Player A) who graduated only from high school; works a hard, low-paying job; lives in a dilapidated house; drives an old, poorly maintained car; and earns about ¥2,000 per month."

4.2.4 Procedure

The basic procedure was identical to Experiment 1a, with differences in the item-selection game. Participants were told the game required another player (Player A). As the first chooser, participants could select one of four items on screen, but their chosen item would not be replaced and Player A could not select it. Twenty-four items were presented on screen, with participants reminded each round of their priority selection right. The other player would choose after them.

The experiment was divided into low and high target social class groups, each comprising 24 trials (experimental and control groups), for a total of 48 item-selection trials. The order of item presentation and picture display was completely randomized.

4.3 Results 4.3.1 Manipulation Check for Financial Scarcity

Independent samples t-tests on the four manipulation-check questions showed that the financial-scarcity group scored significantly lower on excitement, moti-

vation, and confidence than the non-scarcity group, confirming effective manipulation.

4.3.2 Social Mindfulness Analysis

A 2 (financial scarcity: scarcity vs. non-scarcity) × 2 (target social class: high vs. low) one-way ANOVA was conducted with social mindfulness score as the dependent variable.

Results showed a significant main effect of financial scarcity, $F(1,127) = 11.13$, $p \leq 0.001$, $p^2 = 0.82$. The financial-scarcity group's social mindfulness score ($M = 0.14$, $SD = 0.02$) was significantly lower than the non-scarcity group's ($M = 0.22$, $SD = 0.02$). The main effect of target social class was significant, $F(1,127) = 70.72$, $p < 0.001$, $p^2 = 0.36$. Participants showed higher social mindfulness toward low-social-class recipients than high-social-class recipients (M_{high} = 0.08, SD = 0.02; M_{low} = 0.28, SD = 0.02).

The interaction between group and target social class was significant, $F(1,127) = 8.89$, $p < 0.01$, $p^2 = 0.07$. Simple effects analysis [Figure 7: see original paper] revealed that for low target social class, the financial-scarcity group's social mindfulness score was lower than the non-scarcity group's, $F(1,127) = 20.11$, $p < 0.001$, $p^2 = 0.14$. For high target social class, no significant difference existed between groups, $F(1,127) = 0.06$, $p = 0.80$.

4.4 Discussion Experiment 3 found that after activating financial scarcity, the financial-scarcity group expressed less social mindfulness than the non-scarcity group. This may be because financial scarcity occupied participants' thoughts, reducing cognitive resources available for the social mindfulness task [**?**, **?**], thereby weakening their ability to cognitively process and judge recipients' social class. Both groups showed significant differences in social mindfulness expressed toward recipients of different social classes, indicating that recipients' social class moderated the relationship between financial scarcity and social mindfulness, supporting the hypothesis. Both groups were influenced by recipients' social class, with the financial-scarcity group showing significantly lower social mindfulness toward low-social-class recipients than the non-scarcity group, but no significant difference toward high-social-class recipients. This suggests that when participants learned their interactive partner was from a lower social stratum with limited resources and choices, they expressed more social mindfulness. Research indicates that low-social-class individuals are more likely to engage in other-beneficial prosocial behaviors, so both groups expressed more social mindfulness toward low-social-class recipients. High-social-class individuals tend to engage in self-beneficial behaviors [**?**, **?**], leading actors to perceive high-social-class partners as less charitable and generous [**?**, **?**]. Consequently, both scarcity and non-scarcity groups showed similarly low social mindfulness toward high-social-class recipients.

General Discussion

5.1 Negative Impact of Financial Scarcity on Social Mindfulness This study examined the impact of financial scarcity on social mindfulness through three behavioral experiments. All results found that the financial-scarcity group expressed significantly less social mindfulness than the non-scarcity group, consistent with our hypotheses. This finding supports Mani et al.'s (2013) proposition that financial scarcity significantly negatively predicts social mindfulness. It also empirically validates Vohs et al.'s (2006) view that financial scarcity activation makes individuals less sensitive to others' needs, reducing helping willingness and behavior. Scarcity theory suggests that when individuals face financial scarcity, they concentrate substantial psychological and cognitive resources on managing and optimizing these limited resources. This concentrated attention demand increases cognitive load, as the brain must simultaneously process scarcity-related information and other daily thoughts. As cognitive load increases, processing capacity for external information decreases, reducing cognitive resources for others' needs and consequently lowering social mindfulness expression [**?**, **?**].

5.2 Influence of Social Information Cues Furthermore, this study examined the influence of recipients' social information cues from a social cognition perspective. From Experiment 1 to Experiment 3, we explored the moderating role of three cognitive factors—others' charisma, self-presentation, and renown—in the relationship between financial scarcity and social mindfulness.

First, by manipulating recipients' facial and vocal attractiveness, we found that others' charisma influences actors' social mindfulness expression. Both groups expressed significantly higher social mindfulness toward high-attractiveness recipients than low-attractiveness recipients, consistent with previous research [**?**, **?**]. The primary reason is that people subconsciously hold the stereotype that "what is beautiful is good" [**?**, **?**], leading them to show more kindness to physically attractive individuals. Interestingly, when facing high-attractiveness recipients, the financial-scarcity group expressed significantly less social mindfulness than the non-scarcity group, while showing the same trend toward low-attractiveness recipients. Previous research suggests financial scarcity triggers a scarcity mindset that makes individuals more self-focused. This mindset may lead to more cautious resource allocation, especially toward out-group members. Although attractiveness can increase social mindfulness expression, financial scarcity weakens this effect because individuals focus more on protecting and optimizing their own resource allocation. When facing low-attractiveness faces, the unattractive faces may activate "social hostility," leading participants to leave fewer choice opportunities and making financial scarcity's influence less pronounced.

Second, manipulating recipients' different facial expression types revealed that recipients' self-presentation influences the relationship between financial scarcity and social mindfulness. Both groups expressed decreasing social mindfulness

across happy, neutral, and angry expressions, consistent with previous findings [**?**, **?**]. Changes in facial expressions help us understand others' feelings to respond appropriately, so recipients' direct facial expressions trigger emotional resonance in actors, increasing their social mindfulness expression. Fredrickson's (2009) broaden-and-build model also supports this result, as positive emotions expand individual cognition, promoting more prosocial behavior. However, the financial-scarcity group expressed significantly less social mindfulness than the non-scarcity group across all emotional expressions. This suggests that under scarcity, participants prioritize resource allocation, defining any behavior that might consume limited resources as high-cost. Consequently, even low-cost social mindfulness may be perceived as relatively costly, weakening the influence of facial expressions on mindful behavior. Additionally, face type (static vs. dynamic) influenced social mindfulness, with more expressed toward static faces. This may be because static and dynamic faces provide different information formats, triggering different cognitive processing styles. When observing static faces, individuals tend to focus on static facial features like expression and characteristic lines, which help them analyze and understand others' external features more deeply, thereby eliciting more social mindfulness.

Finally, manipulating actors' perception of recipients' different social classes revealed that recipients' social class influences the relationship between financial scarcity and social mindfulness. Both groups expressed significantly more social mindfulness toward low-social-class recipients than high-social-class recipients, consistent with previous research [**?**, **?**]. Target social class represents individuals' cognitive understanding of others' identities in daily interactions. According to social comparison theory, individuals often evaluate their status and worth by comparing themselves to others. When interacting with lower-social-class individuals, people may feel relatively superior, leading them to show more social mindfulness to maintain their social status and self-esteem. Similar to the attractiveness results, for low-social-class recipients, the financial-scarcity group expressed significantly less social mindfulness than the non-scarcity group, indicating the moderating effect of social information cues is limited. When facing low-social-class recipients, individuals may focus more on their own economic difficulties, neglecting recipients' social needs and contexts, thereby reducing social mindfulness expression [**?**, **?**]. However, for high-social-class recipients, both groups showed similarly low social mindfulness, possibly due to the stereotype that high-social-class interaction partners are less charitable and generous [**?**, **?**].

Overall, this study verifies and supplements previous research on the relationship between scarcity and prosocial behavior, expanding earlier work in several ways. First, while previous scarcity-prosociality research focused on actors' self-interest, this study confirms that financial scarcity negatively predicts social mindfulness expression, demonstrating that even "low-cost" prosocial behavior—social mindfulness—is not enhanced when individuals perceive no substantial benefit from it. Second, results show that recipients' social information cues (others' charisma, self-presentation, renown) moderate the relationship between

financial scarcity and social mindfulness, with stronger facilitative effects in the non-scarcity group. This indicates that financial scarcity weakens the influence of these social information cues because they fall outside the actor's attentional focus, which concentrates on scarce resources, corroborating scarcity theory. In summary, this study explores the internal mechanisms of social mindfulness expression when facing different groups and how these factors are modulated by internal psychological states and external social standards. These findings are significant for understanding why individuals' social behaviors change and can provide empirical evidence for future interventions.

5.3 Limitations and Future Directions Although this study examined the impact of financial scarcity on social mindfulness and the role of social information cues through three experiments, further enriching the theoretical system of scarcity and social mindfulness research, several limitations require deeper investigation in the future.

1. **Sample Composition:** This study primarily used university students. Although significant main effects were found across experiments, the single age range limits ecological validity. Future research should examine financial scarcity's impact on social mindfulness across different age groups and investigate whether social mindfulness differs by age.
2. **Types of Scarcity:** This study only examined financial scarcity's impact on social mindfulness, without investigating other scarcity types. Future research could manipulate different types of resource scarcity to explore their effects on social mindfulness.
3. **Experimental Techniques:** This study used only behavioral experiments to explore financial scarcity's impact on social mindfulness in social interaction contexts. Future research could employ event-related potentials or functional magnetic resonance imaging to investigate in real-time how financial scarcity affects individual behavior in social interaction contexts.

Conclusion

This study used behavioral experiments to explore the relationship between financial scarcity and social mindfulness, examining the moderating role of recipients' social information cues from a social cognition perspective. The conclusions are:

1. Compared to the non-financial-scarcity group, the financial-scarcity group exhibited less social mindfulness.
2. High-attractiveness faces and voices, positive emotional expressions, and low-target-social-class recipients elicited more social mindfulness.

3. Recipients' social information cues facilitated social mindfulness expression, with stronger facilitative effects in the non-financial-scarcity group.

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Appendix A: Subjective Socioeconomic Status Scale

This ladder represents the current Chinese social class hierarchy. The top "10" corresponds to the highest social class—people with the most affluent living conditions, highest income, highest education, and most prestigious jobs. The bottom "01" corresponds to the lowest social class—people with the worst living conditions, lowest income, lowest education, and least prestigious jobs. Please

indicate which rung best represents your family's situation by checking the corresponding number. There are no right or wrong answers.

Appendix B: Sample Item Materials from the SoMi Paradigm

Stimuli (presentation order set to random) Grouping (S = experimental group, C = control group)

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