Does Scarcity Prompt Change While Abundance Seeks Security? The Impact of Financial Scarcity and Perceived Affluence on Individual Risk Decision-Making

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Abstract

Money, as a critical resource that satisfies both material and spiritual needs, is intimately connected to every individual. Does perceiving oneself as "poor" versus "rich" influence risk decision-making? Currently, research examining the effects of perceived money scarcity (abundance) on risk decision-making from a relative perspective remains extremely limited, and the psychological mechanisms underlying these effects are poorly understood. Grounded in the deconstruction of the physiological and psychological dimensions of perceived money scarcity and abundance, this study develops corresponding measurement scales and delineates money scarcity emotions and money abundance emotions; through laboratory and field experiments, longitudinal empirical research, and eye-tracking behavioral experiments, reveals the impact of perceived money scarcity (abundance) on individual risk decision-making (risk perception, expected returns, risk choices); and from a psychological mechanism perspective, constructs and explicates both the cognitive mechanisms (mediating roles of cognitive bias, cognitive reflection, and executive control) and emotional mechanisms (mediating roles of specific money scarcity emotions and money abundance emotions) through which money scarcity and abundance perceptions influence risk decision-making across different monetary perception contexts.

Full Text

Preamble

Poverty Leads to the Desire for Change, Wealth Leads to the Desire for Stability: The Impact of Perceived Money Scarcity and Abundance on Individual Risk Decision-Making

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Abstract: Money, as a crucial resource that satisfies both material and spiritual needs, is intimately connected to everyone. Does perceiving oneself as "poor" or "rich" influence risk decision-making? Currently, research examining the impact of perceived money scarcity (or abundance) on risk decision-making at a relative level remains very limited, and the psychological mechanisms underlying these effects are still unclear.

This study deconstructs the physiological and psychological dimensions of perceived money scarcity and abundance to develop measurement scales and define the specific emotions associated with each. Through laboratory and field experiments, longitudinal tracking studies, and eye-tracking experiments, we reveal how perceived money scarcity (and abundance) affects individual risk decision-making (encompassing risk perception, expected returns, and risk choice). At the psychological mechanism level, we construct and elucidate both cognitive mechanisms (mediating roles of cognitive biases, cognitive reflection, and executive control) and emotional mechanisms (mediating roles of specific scarcity and abundance emotions) through which money perceptions influence risk decision-making across different monetary contexts.

Keywords: perceived scarcity, perceived abundance, risky decisions, cognitive mechanisms, emotional mechanisms
Classification Code: B849: C93

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1. Problem Statement

Most people in life suffer from resource scarcity (Yu et al., 2023)—for instance, insufficient money, lack of time, loneliness, or absence of certain abilities (Liang et al., 2021; Mani et al., 2013). When economic resource scarcity reaches a certain level, it is termed poverty. As the primary economic resource that fulfills both material and spiritual needs, money triggers a series of cognitive, emotional, and behavioral responses (Sheehy-Skeffington & Rea, 2017), making it relevant to everyone (Ward & Kim, 2022). Since the emergence of money priming paradigms, money has been recognized as a latent variable influencing people' s thinking patterns and decisions in environmental contexts (Hansen et al., 2013; Li Aimei, Luo Ying, et al., 2016). Within the research framework of money' s influence on risk decision-making, the risk behaviors of impoverished populations facing money scarcity have remained a core issue in psychology, economics, and management studies (Chen Xiyou et al., 2023; Cook & Sadeghein, 2018).

Existing research on impoverished groups has primarily focused on the absolute possession of economic resources (Burlacu et al., 2021). Multiple studies have demonstrated that individuals with lower socioeconomic status exhibit stronger

risk-taking tendencies compared to wealthier groups, manifesting in unhealthy lifestyles, medical non-compliance, unsafe sexual practices, gambling, and crime (Wohl et al., 2014; Mena et al., 2017). Does "poverty" make people more risk-prone than "wealth"? Wohl et al. (2014) and Payne et al. (2017) found that impoverished individuals make higher-risk choices to improve their circumstances and obtain better outcomes. Conversely, Haushofer and Fehr (2014) discovered that poverty reduces risk-taking willingness, a finding supported by other research showing that economic scarcity leads to risk aversion (Chen Xiyou et al., 2023). Wang et al. (2019) proposed that wealth might trigger greater desire for riches, increasing participation in high-risk activities (Juergensen et al., 2018), while Romm et al. (2020) found that adolescents from high socioeconomic status families exhibited higher levels of risk behavior due to high expectations and greater tolerance for error. Thus, when poverty and wealth are defined by absolute economic resource scarcity (e.g., income level, wealth scale), their effects on risk propensity remain inconclusive.

Based on this, we propose that what influences risk propensity in poor or wealthy individuals may not be absolute economic scarcity, but rather perceived relative scarcity—namely, perceived money scarcity or perceived money abundance (Liang et al., 2021; Liang et al., 2023). Judgments about whether one' s possessed economic resources or wealth are "sufficient" affect emotions, motivation, and behavior (Li et al., 2020; Whillans et al., 2017), subsequently influencing economic planning and decision-making (Batista et al., 2023). The impact of perceived money scarcity on risk decision-making (including risk judgment and choice processes) has been validated in existing research (Guillemette et al., 2015; Huang et al., 2023; Mani et al., 2013). Meanwhile, perceived money abundance, often serving as a control condition, has demonstrated opposite effects on risk decision-making (Achtziger, 2022; Batista et al., 2023). Therefore, this study proposes the preliminary hypothesis that perceived money scarcity and abundance significantly influence risk decision-making. Our central questions are: Does perceiving oneself as "poor" lead to greater risk propensity than perceiving oneself as "rich"? How do perceived money scarcity and abundance affect individual risk decision-making?

We argue that in certain environments, states, periods, or moments, individuals perceive scarcity or abundance of specific resources (tangible or intangible, such as money), leading to changes in psychological states and behaviors (Liang et al., 2021; Liang et al., 2023)—producing scarcity effects or abundance effects. Scarcity perception emerges when individuals feel that what they "have" is less than what they "need" or "want" (Mullainathan & Shafir, 2013). Importantly, money-scarce groups are not the only ones who experience money scarcity perception; individuals in money-abundant groups may also perceive scarcity. Specifically, when classified by absolute economic resource scarcity, individuals in money-scarce groups experience scarcity perception from the gap between what they "have" and "need," while those in money-abundant groups experience it from the gap between what they "have" and "want." From this perspective, perceived money scarcity and abundance affect risk decision-making

across a broader population. In this study, scarcity effects refer to changes in risk decision-making caused by feeling that money "have" is less than "need" or "want," while abundance effects refer to changes caused by feeling that money "have" exceeds "need" or "want."

Risk decision-making is a multifaceted cognitive process involving exploration, learning, and forgetting (Obeso et al., 2021). Within the risk-return framework, it represents an interdisciplinary concept in psychology and economics determined by three elements: perceived risk, expected returns, and risk attitude (Weber et al., 2002; Yue Lingzi et al., 2018). The dual-system model of decision-making proposes that cognition and emotion constitute two important psychological pathways influencing risk decision-making (Li Aimei, Tan Lei, et al., 2016). Accordingly, this study deconstructs perceived money scarcity and abundance and their effects on risk decision-making, investigating the psychological mechanisms through both cognitive and emotional pathways to answer three core questions: "What are perceived money scarcity and abundance?" , "Do they affect risk decision-making?" , and "How do they influence risk decision-making at cognitive and emotional levels?"

Since everyone may face situations of money scarcity or abundance, and risk decision-making critically impacts individual life and work, examining these effects and their underlying psychological mechanisms (cognitive and emotional) can help predict, control, and intervene in risk decision-making at individual, organizational, or specific population levels. This holds significant theoretical and practical importance for individuals, families, organizations, and society.

Notably, money is not the only resource that can trigger scarcity or abundance perceptions—time, interpersonal relationships, and other intangible resources have also been shown to induce scarcity mindsets (Mani et al., 2013). Given money' s impact on mental health, prosocial tendencies, well-being, and its significance for organizational and social stability and development (Ward & Kim, 2022; Ward & King, 2019), this study selects money perception as the primary research object for scarcity and abundance effects, with future research exploring time and interpersonal perception effects.

2.1 Perceived Money Scarcity (and Abundance)

(1) Defining Perceived Money Scarcity (and Abundance)

Defining perceived money scarcity and abundance is the starting point of this research. Current literature offers four main approaches to defining money-related perceptions, primarily focusing on scarcity. First, perceived resources scarcity is defined as the outcome of experiencing various resource scarcities, including material resources scarcity, time scarcity, and psychological resources scarcity (DeSousa et al., 2020). Second, perceived scarcity is defined as the subjective feeling of having less than needed (Liang et al., 2021; Liang et al., 2023). Third, financial scarcity psychology is defined as individuals' cognitive and emotional reactions to their financial situation (van Dijk et al., 2022). Fourth, perceived

economic scarcity is defined as the feeling of having insufficient economic resources to meet one' s needs (Auger et al., 2024).

Among these definitions, DeSousa et al. (2020) defined material resource scarcity without specifically addressing economic or money scarcity. Van Dijk et al. (2022) specifically defined economic scarcity but, like DeSousa et al. (2020), did not explore it from a relative, subjective perspective. While Liang et al. (2021) and Liang et al. (2023) defined perceived scarcity from a relative, subjective angle, they did not specifically address economic or money scarcity. Auger et al. (2024) defined individual economic scarcity perception from a relative, subjective perspective across cognitive and emotional dimensions, but their emotional dimension included only a narrow range of specific emotions. Moreover, existing definitions rarely address perceived money abundance specifically, mostly treating it merely as the opposite of scarcity.

Therefore, this study must redefine perceived money scarcity and abundance from a relative, subjective perspective to address these gaps. This will supplement the insufficient conceptualization of perceived money scarcity and abundance in current research.

(2) Measuring Perceived Money Scarcity (and Abundance)

Existing measurement scales primarily focus on money scarcity. Three main scales are currently available. First, DeSousa et al. (2020) developed the Perceived Scarcity Scale (PScP) based on socioeconomic status, comprising three subscales (psychological resource scarcity, material scarcity, and time scarcity) with 24 items total. The material scarcity subscale' s 8 items closely approximate the concept of "economic scarcity" (Auger et al., 2024). Second, van Dijk et al. (2022) developed the Psychological Inventory of Financial Scarcity (PIFS), consisting of four subscales (shortage of money, lack of control over one' s financial situation, financial rumination and worries, and short-term focus) with 12 items (3 per dimension), designed to capture subjective feelings of financial scarcity. Third, Auger et al. (2024) developed the Perceived Economic Scarcity Scale (PESS), measuring subjective evaluation and experience of economic scarcity (i.e., feeling that financial resources are insufficient to meet needs). This scale comprises two subscales (evaluative and experiential aspects) with 9 items total. The evaluative subscale includes absolute reference point, other-based reference point, and subjective impression dimensions (3, 1, and 2 items respectively), while the experiential subscale includes emotion, cognition, and uncertainty dimensions (1 item each).

Examining these scales reveals that, except for PScP, both PIFS and PESS define financial scarcity perception from subjective, relative perspectives, and both include emotional components (primarily worry). However, they do not comprehensively capture the specific emotions triggered by perceived money scarcity, nor do they address emotions associated with perceived money abundance. Since subjective perceived scarcity differs from objective scarcity, devel-

oping emotion-based scales to measure subjective money scarcity and abundance remains necessary (Huang et al., 2023). More importantly, identifying the specific emotions elicited by perceived money scarcity and abundance will provide the theoretical foundation for constructing the emotional mechanisms through which these perceptions influence risk decision-making.

(3) Manipulating Perceived Money Scarcity (and Abundance)

Existing scarcity (and abundance) manipulations come from two main approaches. First, individual-difference-based manipulations are not limited to specific resources and tailor scarcity contexts to different sources of scarcity perception across individuals. Building on Vohs et al. (2006), Mehta and Zhu (2016) manipulated scarcity through writing tasks (Roux et al., 2015): scarcity condition participants wrote for 3 minutes about a situation of resource scarcity during their upbringing, while abundance condition participants wrote about a situation of resource abundance. Another method uses guided episodic recall tasks: scarcity participants recalled and wrote about 3-4 situations of resource scarcity, then selected two for detailed description (including what was lacking, feelings and experiences, and reasons for those feelings), while control participants recalled and wrote about 3-4 things they did in the past week, then selected two for detailed description (including time, place, people, reasons, process, and outcomes).

Second, economic-resource-based manipulations create economic scarcity through financial status manipulations. Shah et al. (2012) used assigned budgets distributed as "paychecks" each round, with poor participants receiving significantly less than rich participants. Wohl et al. (2014) induced anticipated poor economic conditions through a virtual global financial crisis. Mani et al. (2013) triggered scarcity mindsets by having participants answer financially relevant questions (e.g., unexpected expenses beyond payment capacity). Payne et al. (2017) manipulated scarcity perception through social comparison by informing participants in a gambling game about previous players' average earnings, with high inequality participants learning of large disparities.

Like resource scarcity, money scarcity should be divided into three levels: scarcity, abundance, and sufficiency (Daoud, 2018). Episodic recall tasks can manipulate both money scarcity contexts and activate scarcity perceptions; money abundance contexts and perceptions can be similarly manipulated.

2.2 Psychological and Behavioral Effects of Perceived Money Scarcity (and Abundance)

Resource scarcity often leads to risky behaviors, providing a theoretical foundation for how economic scarcity affects risk decision-making (Allen et al., 2016; Prediger et al., 2014; Venn & Strazdins, 2017). Research on the psychological and behavioral effects of money scarcity primarily draws from Shah et al.' s (2012) Scarcity Mindset Theory.

Psychological effects of money scarcity manifest in cognition and emotion. First, economic scarcity impairs cognitive function. Mani et al. (2013) found that financially relevant problems consume psychological resources, leaving fewer resources for other tasks and reducing tolerance for error. Consequently, low-income individuals showed significantly decreased cognitive ability after money scarcity activation compared to before. Mani et al. (2013) also conducted field experiments with sugarcane farmers, using naturally occurring financial crises to validate how money scarcity consumes cognitive bandwidth and negatively impacts cognitive capacity. Mullainathan and Shafir (2013) defined insufficient psychological resources as "cognitive bandwidth" occupation, demonstrating through experiments that money scarcity leads to cognitive bandwidth depletion and reduced cognitive ability and executive control. Zhao and Tomm (2018) built on Shah et al. (2012), proposing that resource scarcity affects attentional focus, causing neglect while simultaneously increasing resource utilization efficiency, affecting value perception, and impairing cognitive capacity. Second, economic scarcity triggers negative emotions and stress. Haushofer and Fehr (2014) showed that money scarcity reduces willingness to engage in high-risk, high-reward behaviors and increases temporal discounting, making decision-makers focus on short-term gains while neglecting long-term organizational benefits and strategic planning.

Behavioral effects of money scarcity primarily manifest as excessive borrowing and negative work behaviors. Shah et al. (2012) found that when focusing on insufficient funds, attention allocation changes: under financial constraints, participants focused only on "repaying debt quickly" while ignoring long-term trade-offs, leading to excessive borrowing. Economic scarcity (e.g., income levels) also causes negative employee behaviors. Individuals often suppress anxiety about financial issues in daily life. When employees feel their compensation falls short of expectations or experience significant financial pressure (economic scarcity manifested as "insufficient income" or "not enough money"), negative emotions arise (Meuris & Leana, 2015), weakening self-management capacity, reducing effort, and affecting performance (Pitesa & Thau, 2017). Additionally, economic scarcity intensifies competitive consciousness, making employees focus solely on self-interest and triggering selfish behaviors. Economic scarcity-induced stress also inhibits work motivation (Grant & Ashford, 2008), reducing organizational commitment, work effort, and positive behavioral intentions, resulting in negative work behaviors (Grant & Gino, 2010; Shah et al., 2015).

In summary, facing money scarcity affects not only cognitive and emotional states (de Bruijn & Antonides, 2021; Ridley et al., 2020) but also leads to riskier, more negative behaviors through psychological changes. In some studies, economic abundance serves as a control or experimental group contrasting with natural conditions, showing different cognitive effects from scarcity conditions (Achtziger, 2022; Batista et al., 2023). Overall, existing research has concentrated on psychological and behavioral effects of money scarcity (and abundance), with limited exploration of perceived money scarcity (and abundance) effects. Moreover, while money scarcity' s impairment of cognitive function af-

fects variables closely related to risk decision-making (e.g., cognitive capacity, executive control), few studies have explored how money scarcity (and abundance) influences risk decision-making, let alone the effects of perceived money scarcity (and abundance). To provide a strong theoretical basis for these effects, this study systematically reviews and summarizes the psychological factors influencing risk decision-making.

2.3 Psychological Factors Influencing Risk Decision-Making

Kahneman' s (2003) extensive empirical research on behavioral decision-making revealed that the human brain operates through two systems: a cognitive system associated with higher-level cognitive processing and an affective system associated with experience and associations. Risk decision-making results from the interaction of these dual systems. Therefore, this study constructs psychological mechanisms of perceived money scarcity (and abundance) affecting risk decision-making through cognitive and emotional pathways. Based on this framework, this section reviews current research on major cognitive and emotional factors influencing risk decision-making.

(1) Cognitive Factors

The influence of cognitive control on decision-making processes has been confirmed by numerous behavioral decision-making studies, patient studies, and neuroimaging research (Del Missier et al., 2012). Cognitive neuroscientists propose that cognitive control best reflects the limited capacity of the prefrontal cortex, affecting perception, judgment, and choice behavior (Botvinick & Braver, 2015). Key manifestations include goal-gap perception and expected return judgment: when individuals perceive income gaps, they exhibit higher risk propensity to seek fairness; similarly, when experiencing procedural injustice, perceived fairness gaps promote risk-taking behavior (Mishra et al., 2015). Additionally, whether individuals take risks relates to their expected return judgments: people take risks because they anticipate potential positive consequences; higher expected return judgments lead to greater preference for high-risk options (Parker & Weller, 2015).

Cognitive reflection is a crucial indicator distinguishing intuitive and heuristic systems. In gain situations, higher cognitive reflection levels increase preference for high-return options; in loss situations, higher cognitive reflection increases preference for low-risk options (Frederick, 2005). Cognitive reflection significantly influences risk decision-making by affecting risk judgment and choice processes.

Self-control is a limited resource for modifying one' s responses to align with social morality and long-term goals (Dou Kai et al., 2014). Individuals with lower self-control prefer higher-risk options in risk decision-making; they also experience higher ego depletion, which suppresses deliberative systems, preventing rational risk-return assessment and generating risk-taking behavior. Those with

lower self-control cannot restrain instinctive impulses when pursuing immediate rewards and high returns, leading to high-risk behaviors.

(2) Emotional Factors

Li Aimei, Tan Lei, et al. (2016) proposed the Different Affect-Different Effect (DADE) model, suggesting that different emotions lead to different decision outcomes. However, how emotions influence risk behavior remains inconclusive. Some scholars propose that positive emotions promote risk-taking while negative emotions promote risk aversion (Devlin et al., 2015). The Affective Generalization Hypothesis suggests that individuals in positive emotional states perceive reduced probabilities of risky events, increasing risk-seeking behavior and risk propensity, with the opposite occurring in negative states. The Mood Maintenance Model, conversely, proposes that individuals in negative emotional states are more risk-seeking to increase opportunities for gains and generate positive emotions to change their negative mood. Regarding specific emotions: anger leads to risk-seeking (Ferrer et al., 2017); anxiety promotes risk aversion; sadness makes individuals more likely to choose high-risk, high-return options (Aslan et al., 2017).

In summary, existing research shows relatively clear cognitive effects on risk decision-making, but emotional effects remain inconsistent. Some scholars examine relationships between general positive/negative emotions and risk decision-making, while others explore how specific emotion types affect risk decision-making. Therefore, this study investigates how specific emotions triggered by perceived money scarcity (and abundance) influence risk decision-making, addressing gaps in research on specific emotions and risk decision-making while providing theoretical foundations for intervening in emotion-driven risk decisions.

In conclusion, existing research demonstrates that money scarcity (and abundance) affects cognition and emotion, which in turn influence risk decision-making, providing a theoretical foundation for this study. However, research explicitly analyzing the relationship between perceived money scarcity (and abundance) and risk decision-making from a subjective perspective remains scarce. Aguilar et al. (2020) examined relationships between economic scarcity and risk behavior, finding that individuals in economic scarcity with concrete thinking exhibit higher risk behavior, but their economic scarcity was defined objectively rather than subjectively. Liang et al. (2021) and Liang et al. (2023) examined relationships between perceived scarcity and both moral risk-taking and risk decision-making, finding that perceived scarcity promotes risk-taking but risk aversion when certain gains are available, though their scarcity sources were not money-specific. Therefore, this study explores how perceived money scarcity and abundance affect risk decision-making and constructs psychological mechanisms (cognitive and emotional pathways) through which money perceptions influence risk decision-making, enriching theoretical research on money perception and risk decision-making while providing new theoretical foundations for

improving risk decision-making quality.

2.4 Literature Review and Critique

The above literature review reveals that significant progress has been made in research on resource scarcity and money scarcity effects. However, research on the psychological mechanisms of scarcity and abundance effects of money perception on risk decision-making remains insufficient. The necessity and importance of this project are 主要体现在以下两个方面:

First, deconstructing the dimensions of perceived money scarcity (and abundance) and developing measurement scales are foundational for testing their effects on risk decision-making. Money scarcity has both absolute and relative aspects; perceived money scarcity is relative and subjective (Huang et al., 2023; Liang et al., 2021). Scarcity Mindset Theory (Shah et al., 2012) clearly defines scarcity as not merely a state of tangible or intangible resources but as a subjective feeling of having less than needed. Daoud (2018) proposed that scarcity is a situation where resources directly controlled by an agent are insufficient to meet needs or engage in exchange activities, representing a relative concept alongside abundance and sufficiency that fundamentally influences human behavior. The needs-wants distinction is crucial for differentiating absolute scarcity (needs) from relative scarcity (wants). Therefore, studying perceived money scarcity (and abundance) requires deconstructing subjective feelings from a relative perspective. While DeSousa et al. (2020), van Dijk et al. (2022), and Auger et al. (2024) defined economic scarcity and perception from different angles and developed corresponding scales, they did not comprehensively define the subjective feelings of perceived money scarcity (and abundance). Cognitively, perceived money scarcity and abundance may have opposite effects on risk decision-making; emotionally, however, no evidence indicates they trigger identical or opposite emotions. Therefore, developing scales based on subjective feelings to define specific emotions triggered by perceived money scarcity (and abundance) is necessary. This will provide theoretical foundations for constructing emotional mechanisms and expand knowledge boundaries of money effects.

Second, constructing cognitive and emotional mechanisms through which money perception influences risk decision-making offers new explanations for inconsistent findings in money-risk research. Existing studies have built limited mechanisms for money scarcity' s decision-making effects. Aguilar et al. (2020) simply constructed a mechanism for economic scarcity promoting risk-taking through concrete mindset. Liang et al. (2021) and Liang et al. (2023) tested scarcity perception effects on moral risk-taking and risk decision-making but did not explain why perceived scarcity promotes both moral risk-taking and risk aversion. Cognition and emotion, as the two major systems and pathways of decision-making, have not received adequate examination in relevant research. Therefore, this study constructs psychological mechanisms of perceived money scarcity (and abundance) influencing risk decision-making from cognitive and emotional per-

spectives, potentially revealing the roles of money perceptions, cognitive biases, cognitive reflection, executive control, and specific scarcity (and abundance) emotions in risk decision-making mechanisms.

3. Research Plan

This study comprises four research modules. Module 1 deconstructs dimensions of perceived money scarcity (and abundance), develops measurement scales, and defines specific emotions. Module 2 examines the effects of perceived money scarcity (and abundance) on risk decision-making. Module 3 tests cognitive mechanisms (cognitive biases, cognitive reflection, executive control) mediating these effects. Module 4 tests emotional mechanisms (scarcity and abundance emotions) mediating these effects. Module 1 provides the foundation for Modules 2-4; Module 2 is the prerequisite for Modules 3 and 4; Modules 3 and 4 explain Module 2' s findings.

3.1 Key Concept Definitions

Key concepts in this study are defined as follows:

In experimental designs, perceived money scarcity context manipulates situations where individuals' money "have" is less than "need" or "want" ; perceived money abundance context manipulates situations where money "have" exceeds "need" or "want" ; natural state/context refers to control groups without money perception manipulation.

In cognitive mechanisms, cognitive bias 主要指决策过程中个体存在的沉没成本效应、框架效应等影响决策水平的认知偏差; cognitive reflection refers to using analytical rather than intuitive thinking in judgment and decision-making, reflecting intuitive thought inhibition; executive control refers to the ability to plan, focus, inhibit behavior, and control impulses.

In emotional mechanisms, money scarcity emotion refers to specific emotion types triggered in money scarcity contexts; money abundance emotion refers to specific emotion types triggered in money abundance contexts.

In risk decision-making judgment, risk perception refers to assessments of the likelihood of specific risky behaviors occurring; potential loss refers to evaluations of risk levels; expected benefit assessment refers to evaluations of expected benefit levels.

In risk decision-making choice, positive frame refers to decision presentation frameworks emphasizing gains and their probabilities; negative frame refers to frameworks emphasizing losses and their probabilities.

3.2 Research Module 1: Deconstructing Perceived Money Scarcity (and Abundance)

(1) Research Objectives

Module 1 will provide emotion-based definitions of perceived money scarcity and abundance from subjective perspectives, identifying sources, sensitivity, reference points, and subjective feeling sets of perceived money scarcity and abundance in Chinese research contexts. Physiological experiments will record physiological indicators (EEG) of individuals in money scarcity and abundance contexts. Based on psychological characteristics such as insecurity and unfairness perception, preliminary dimensional structures and item pools for perceived money scarcity and abundance will be constructed. Through standard scale development procedures (item purification, exploratory factor analysis, confirmatory factor analysis, and test-retest reliability), scales for perceived money scarcity and abundance will be developed, revealing EEG patterns associated with these perceptions to lay foundations for Modules 2-4 and neurobiological research.

(2) Propositions and Hypotheses

Emotion is the primary psychological effect of resource scarcity. Economic scarcity, in particular, triggers negative emotions that alter behavioral tendencies (Haushofer & Fehr, 2014). Economic scarcity contexts stimulate negative emotions because stress from financial problems triggers cortisol secretion. As a key hormone regulating human emotion, cortisol level changes make individuals in economic scarcity contexts exhibit higher depression and anxiety characteristics (Sacks et al., 2012).

Insecurity is another psychological consequence of economic scarcity (Wohl et al., 2014). When facing money scarcity, individuals develop feelings of poverty that motivate them to acquire expected money while avoiding losses (Sun Shijin, Xu Fei, 2019). Individuals with high poverty feelings, due to anxiety about money and life, uncontrollability, and uncertainty about the future, develop psychological insecurity (Sun Shijin, Xu Fei, 2019).

Unfairness perception is a typical psychological state triggered by economic scarcity. The relativity of perceived money scarcity primarily stems from comparisons with personal or others' states, involving social comparison processes related to reference points: reference points for scarcity perception include personal "self-expectations" and social "others' possessions" (Xie Xiaofei, Lu Jingyi, 2014). Upward comparison triggers scarcity perception—namely, "gaps between self-state and expected state" or "gaps between self-state and others' state."

In summary, money scarcity triggers specific negative emotions, insecurity containing emotional structures (Zotova & Karapetyan, 2018), and unfairness perception. These provide substantial reference for deconstructing perceived money scarcity (and abundance) from a relative perspective and offer bases for defining

and measuring these perceptions through specific emotions.

3.3 Research Module 2: Effects of Perceived Money Scarcity (and Abundance) on Risk Decision-Making

(1) Research Objectives

Module 2 proposes hypotheses based on Life History Theory, Risk Sensitivity Theory, Social Comparison Theory, and Scarcity Mindset Theory, testing whether perceived money scarcity (and abundance) promotes (or inhibits) high-risk choices and whether it weakens (or strengthens) risk perception while amplifying (or diminishing) expected benefit estimates. Additionally, while general behavioral experiments can only verify effects on outcomes, this study will (1) use eye-tracking experiments to examine how perceived money scarcity (and abundance) affect risk perception and expected benefit assessment during risk judgment processes, and (2) use behavioral experiments to test effects on risk choice (including positive and negative frame decisions).

(2) Propositions and Hypotheses

Life History Theory suggests that individuals in resource-abundant environments exhibit higher psychological security and adopt slow life history strategies, while those in resource-scarce environments exhibit higher psychological insecurity and adopt fast strategies (Simpson et al., 2012). Fast-strategy individuals tend to violate social norms, act impulsively, and take risks; slow-strategy individuals tend to follow social norms, act cautiously, and conservatively. When facing risk decisions, fast-strategy individuals make relatively short-sighted, aggressive decisions, while slow-strategy individuals make relatively long-term, cautious decisions.

Risk Sensitivity Theory (RST) indicates that when caloric intake is high, animals avoid risk, showing low-risk, low-reward foraging behavior; as energy stores decrease, they seek risk, showing high-risk, high-reward behavior (Mishra & Fiddick, 2012). Humans follow RST predictions: when facing scarcity and feeling gaps between reality and ideals, individuals choose high-risk options to reduce these gaps and meet needs. For example, in experimental gambling tasks, when minimum reward requirements increase, participants become more willing to make high-risk, high-reward choices to meet higher demands (Gonzales et al., 2017).

Social Comparison Theory (SCT) states that upward comparison processes make individuals perceive gaps and inadequacies relative to others, triggering scarcity perception and manifesting as unfairness perception. Higher perceived unfairness creates stronger needs to obtain resources to compensate for gaps, increasing risk-taking propensity (Payne et al., 2017). Combined with Needs Theory, when physiological and safety needs are unmet, individuals develop insecurity. According to Mittal and Griskevicius (2014), insecurity alters environ-

mental control perceptions, weakening self-control consciousness and increasing risk propensity. Mishra et al. (2017) proposed a needs-based risk-taking theory: those at relative resource disadvantages use risk-taking as a resource acquisition strategy. Additionally, Compensation Theory suggests that psychological insecurity requires compensation mechanisms (Sun Shijin, Xu Fei, 2019): individuals typically compensate for deficiencies through risk-taking to obtain money.

Economic scarcity' s impact on risk decision-making has gained increasing attention. Economic scarcity, typically defined as insufficient cash flow, correlates with higher risk-taking in economic decisions (Cook & Sadeghein, 2018). Participants under economic scarcity conditions prefer risk-taking (e.g., gambling, roulette) to obtain money, with this effect mediated by beliefs about "acquiring money through risk-taking" (Wohl et al., 2014).

Based on these findings, we derive that perceived money scarcity promotes high-risk choices in risk decision-making. Risk decisions are often influenced by option description frames. Choice tasks typically present gains/losses and their probabilities, and framing options as gains (positive frame) versus losses (negative frame) triggers different choices (Gonzalez et al., 2005; Gonzalez & Mehlhorn, 2015)—the framing effect in risk decision-making. This effect refers to inconsistent preferences when mathematically equivalent outcomes are expressed positively (gains) or negatively (losses) (Iotzov et al., 2022). The most prominent framing effect is the reflection effect: decision-makers show risk-seeking tendencies in loss frames but risk-aversion in gain frames when evaluating gambles relative to a reference point, a key prediction of Prospect Theory (Lakshminarayanan et al., 2011). Gonzalez et al. (2005) used fMRI to show that negative frames trigger high-risk responses, while positive frames trigger more certain (low-risk) responses. Mishra and Fiddick (2012) proposed that Risk Sensitivity Theory can supplement Prospect Theory by explaining risk choices at different need levels: negative frames interact with high-need situations to produce higher-risk choices compared to positive frames. Notably, perceived money scarcity triggers high-need orientations; therefore, we propose that perceived money scarcity' s promotion of high-risk choices will be more pronounced under negative frames.

Combined with evidence that money abundance produces different decision consequences than scarcity, we propose Hypothesis 1:

Hypothesis 1: Perceived money scarcity (and abundance) promotes high-risk (low-risk) choices, with perceived money scarcity' s promotion effect being more significant under negative frames.

Existing research shows scarcity mindsets affect risk decision-making judgment processes. Huijsmans et al.' s (2019) neuroimaging research indicates that scarcity mindsets increase orbitofrontal cortex activity, affecting decision judgment and evaluation. Behavioral studies show inconsistent directions: Haushofer and Fehr (2014) found economic scarcity weakens risk expected

returns, while Williams et al. (2016) recorded medial frontal cortex activity in 17 adults, finding that scarcity group participants' P300 amplitudes showed significant differences during gain and loss estimation, with scarcity perception enhancing perceived gain value.

Within psychology' s risk-return framework, individuals' judgments of expected benefits from risky behaviors are important predictors of risk participation (Wang et al., 2016). Weber et al. (2002) distinguished risk propensity, risk perception, and expected benefits, proposing that risk propensity is a function of risk perception and expected benefit judgment. Therefore, under the risk-return framework, risk-taking depends on assessments of expected benefits and risk magnitude: larger expected benefits increase risk propensity, while larger risk perception decreases it (Blais & Weber, 2006; Zhang et al., 2022).

In summary, risk perception and expected benefit judgments are affected by scarcity perception, while expected benefit judgments negatively correlate with risk perception (Weber et al., 2002; Blais & Weber, 2006; Wang et al., 2016). Based on this, we propose Hypotheses 2 and 3:

Hypothesis 2: Perceived money scarcity (and abundance) promotes high-risk (low-risk) propensity by amplifying (diminishing) risk expected benefit assessments.

Hypothesis 3: Perceived money scarcity (and abundance) promotes high-risk (low-risk) propensity by weakening (strengthening) risk perception.

(3) Research Design

Module 2 primarily uses behavioral experiments to test effects of perceived money scarcity and abundance on risk decision-making, consisting of six experiments. Experiments 1-2 are between-subjects laboratory experiments testing risk decision-making differences across money scarcity, money abundance, and natural contexts. Experiment 3 is a within-subjects laboratory experiment testing risk decision-making differences within the same individual across the three contexts, using cross-temporal tracking to reduce cognitive burden and context manipulation interaction effects (same participant experiences natural, scarcity, and abundance contexts at three separate time points). Experiment 4 is a 3 (money scarcity vs. abundance vs. natural) $\times$ 2 (positive vs. negative risk decision frame) between-subjects field experiment testing effects on real-world positive and negative frame risk decisions. Experiment 5 is a 3 $\times$ 2 within-subjects field experiment testing effects on real-world risk decisions. Experiment 6 is an eye-tracking experiment testing attention differences to potential risks, expected benefits, and risk levels (probabilities) during risk judgment processes across contexts. After each scarcity/abundance manipulation, the scales developed in Module 1 will measure perceived scarcity/abundance levels to test manipulation effectiveness. Module 2 primarily uses ANOVA to analyze risk decision-making differences across contexts.

3.4 Research Module 3: Cognitive Mechanisms of Perceived Money Scarcity (and Abundance) Effects on Risk Decision-Making

(1) Research Objectives

Module 3 constructs cognitive mechanisms explaining how perceived money scarcity (and abundance) promote high-risk (low-risk) decision-making, testing mediating effects of cognitive biases, cognitive reflection, and executive control, and revealing cognitive pathways.

(2) Propositions and Hypotheses

Economic scarcity impedes cognitive function: it triggers scarcity mindsets that allocate attentional resources, occupy "mental bandwidth," create "tunneling" phenomena, and lead to risk behaviors (Mani et al., 2013; Mullainathan & Shafir, 2013; Shah et al., 2012). Economic scarcity' s impact on cognitive function manifests in cognitive capacity and executive control. Mani et al. (2013) showed that money scarcity-related problems consume psychological resources, reducing resources available for other tasks and significantly impairing cognitive capacity. Cognitive capacity—the psychological mechanism for problem-solving, information acquisition, and logical reasoning—is highly relevant to decision-making processes (Del Missier et al., 2012). Based on the conclusion that "cognitive capacity affects decision-making processes," "cognitive decision-making competence" has been increasingly proposed as a comprehensive concept measuring decision-making skills (Parker & Fischhoff, 2005). Weller et al. (2015) found that cognitive decision-making competence negatively correlates with risk attitudes regarding safety, morality, and gambling; in risk-return models, expected benefits mediate the effect of cognitive decision-making competence on risk propensity more significantly than risk perception. Therefore, perceived economic scarcity' s impact on cognitive decision-making competence changes expected benefit and risk perception judgments, thereby affecting risk choices. Cognitive decision-making competence includes four components: belief assessment, value assessment, integration of beliefs and values, and meta-cognitive abilities (Parker & Fischhoff, 2005). Value assessment ability reflects sensitivity to key information affecting decision gains/losses: information not affecting gains/losses should not change judgments regardless of presentation format (Liang & Zou, 2018). Resistance to framing and resistance to sunk costs are primary manifestations of value assessment ability—two cognitive biases closely related to risk decision-making. Economic scarcity-induced attention allocation changes have dynamic interactions with framing effects and risk biases (Glickman et al., 2018); individuals with sunk costs show significantly higher risk perception than those without (Qi et al., 2018). Accordingly, this study selects resistance to framing and resistance to sunk costs as primary cognitive bias dimensions to construct one cognitive mechanism pathway.

Executive control (also called executive function or cognitive control) refers to

the ability to plan, focus, inhibit behavior, and control impulses (Huang et al., 2023), forming the basis for conscious self-direction and behavioral control (Blair, 2016). Executive control helps individuals limit impulsive reactions, regulate emotions, and avoid risk decisions focusing on short-term benefits while ignoring long-term disadvantages (Huang et al., 2023). Different decision tasks require different cognitive control processes (Del Missier et al., 2010). Some scholars emphasize two systems: an intuition-based heuristic system and a rational analysis system (Frederick, 2005; Sun Yan et al., 2007), with cognitive reflection as the key distinguishing indicator (Kahneman & Frederick, 2007). Cognitive reflection involves using analytical rather than intuitive thinking in judgment and decision-making (Finucane & Guillon, 2010), reflecting intuitive inhibition ability and strongly predicting reasoning and decision-making (Sirota & Juanchich, 2018). Frederick (2005) found that cognitive reflection positively correlates with risk propensity in potential gain situations but negatively correlates in potential loss situations. Deliberative cognition in cognitive reflection constrains impulsive behavior, suppressing risk choice processes. The inhibiting factor in executive function most significantly affects risk decision-making (Diamond, 2013). From a cognitive processes perspective, resource scarcity-induced cognitive function decline triggers ego depletion and suppresses deliberative systems, leading to high-risk decisions (Dou Kai et al., 2014; Fischer et al., 2011; Vohs et al., 2008).

Based on these findings, Module 3 proposes Hypotheses 4-6:

Hypothesis 4: Perceived money scarcity (and abundance) promotes high-risk (low-risk) decision-making by strengthening (weakening) cognitive biases.

Hypothesis 5: Perceived money scarcity (and abundance) promotes high-risk (low-risk) decision-making by inhibiting (facilitating) cognitive reflection.

Hypothesis 6: Perceived money scarcity (and abundance) promotes high-risk (low-risk) decision-making by inhibiting (facilitating) executive control.

(3) Research Design

Module 3 tests mediating effects of cognitive biases, cognitive reflection, and executive control from a cognitive perspective, using behavioral experiments and longitudinal empirical methods. Behavioral experiments include Experiment 1 (between-subjects laboratory experiment) and Experiment 2 (within-subjects laboratory experiment with cross-temporal tracking). Experiment 1 procedures: record basic information and control variables; manipulate perceived money scarcity/abundance and measure manipulation effectiveness; measure cognitive biases, cognitive reflection, and executive control; measure risk propensity, risk perception, expected benefit assessment, and risk choice behavior (negative and positive frames). Experiment 2 uses cross-temporal tracking at three time points (T1, T2, T3, one week apart) to manipulate natural, scarcity, and abundance contexts in random order, with identical procedures to Experiment 1 at each time point. The empirical study measures relevant variables at three time points

(T1, T2, T3, one month apart): T1 collects basic information and control variables; T2 measures perceived scarcity/abundance using Module 1 scales and measures cognitive biases, reflection, and executive control; T3 measures risk propensity, perception, expected benefit assessment, and choice behavior. Module 3 uses ANOVA, structural equation modeling, and Bootstrap methods for data analysis.

3.5 Research Module 4: Emotional Mechanisms of Perceived Money Scarcity (and Abundance) Effects on Risk Decision-Making

(1) Research Objectives

Module 4 first decomposes dimensions of specific scarcity (and abundance) emotions based on Module 1 findings, then constructs emotional mechanisms explaining how perceived money scarcity (and abundance) promote high-risk (low-risk) propensity, testing mediating effects of scarcity and abundance emotions.

(2) Propositions and Hypotheses

Decision-making is defined as a process involving both cognitive and affective factors (Rovelli & Allegretta, 2023). Resource scarcity, especially economic scarcity, affects cognitive function and triggers negative emotions that alter decision-making behavior (Haushofer & Fehr, 2014). Economic scarcity contexts stimulate cortisol secretion, increasing depression and anxiety (Sacks et al., 2012). Fessler et al. (2004) found that economic scarcity triggers disgust, making female individuals more willing to take risks. Negative emotions' effects on risk decision-making remain inconclusive. The Affective Generalization Hypothesis proposes that negative emotions reduce risk-seeking, while the Mood Maintenance Model suggests they promote risk-seeking to gain benefits and generate positive emotions. Regarding specific emotions: anger leads to risk-seeking (Ferrer et al., 2017); anxiety promotes risk aversion; sadness increases high-risk, high-return choices (Aslan et al., 2017). From an affective processes perspective, resource scarcity triggers negative emotions that, in some studies, promote risk decision-making (Aslan et al., 2017).

This study derives that perceived money scarcity triggers negative emotions such as unfairness and insecurity. Research shows unfairness perception promotes risk-taking: economic inequality increases risk behavior (Song Yunqiang et al., 2017); higher perceived economic inequality leads participants to take greater risks for higher benefits (Payne et al., 2017); upward social comparison-induced unfairness significantly affects risk attitudes and promotes risk-taking (Gamba et al., 2017). Insecurity' s promotion of risk-taking has also been confirmed. Insecurity stems from perceived threats to life and promotes risk-taking, primarily related to compensating for missing resources and associated neural mechanisms (Ben-Zur & Zeidner, 2009). When individuals experience psychological insecurity, compensation mechanisms activate. Economic insecurity is an important

dimension of psychological insecurity promoting risk-taking (Fagerström et al., 2011); when economic insecurity compensation mechanisms activate, desire for benefits increases risk propensity (Sun Shijin, Xu Fei, 2019).

Based on these findings, Module 4 proposes Hypothesis 7:

Hypothesis 7: Perceived money scarcity (and abundance) triggers specific negative scarcity (and abundance) emotions, which mediate the effects of perceived money scarcity (and abundance) on high-risk (low-risk) decision-making propensity.

(3) Research Design

Module 4 tests mediating effects of scarcity and abundance emotions from an emotional perspective, using behavioral experiments and longitudinal methods. Behavioral experiments include Experiment 1 (between-subjects) and Experiment 2 (within-subjects with cross-temporal tracking). Experiment 1 procedures: record basic information and control variables; manipulate perceived scarcity/abundance and measure effectiveness; measure scarcity and abundance emotions; measure risk propensity, perception, expected benefit assessment, and choice behavior. Experiment 2 uses three time points (T1, T2, T3, one week apart) for within-subjects manipulation of natural, scarcity, and abundance contexts in random order, with identical procedures to Experiment 1. The empirical study measures variables at three time points (T1, T2, T3, one month apart). Module 4 uses ANOVA, structural equation modeling, and Bootstrap methods for data analysis.

4. Theoretical Contributions and Innovations

Based on Life History Theory (Kaplan & Gangestad, 2005), Risk Sensitivity Theory (Caraco et al., 1980), Social Comparison Theory (Festinger, 1954), and Scarcity Mindset Theory (Mullainathan & Shafir, 2013), this study operates within the dual-system (cognitive and emotional) decision-making model (Kahneman, 2003) and risk-return framework (Parker & Weller, 2015). It defines perceived money scarcity and abundance from a relative perspective, explores scarcity and abundance effects on individual risk decision-making (risk judgment and choice), and constructs psychological mechanisms through both cognitive (cognitive biases, cognitive reflection, executive control) and emotional (scarcity emotions, abundance emotions) pathways [Figure 1: see original paper].

Figure 1 Psychological Mechanism Model of Scarcity and Abundance Effects of Money Perception on Individual Risk Decision-Making

First, this study defines money scarcity and abundance effects from a relative perception perspective, using physiological and psychological information to deconstruct these perceptions. This provides new explanatory bases for how relative poverty (perceived money scarcity) affects risk decision-making. Examining the relative perception of money abundance and its effects on risk judgment

and choice processes will enrich risk decision-making and money effect theories. Introducing perceived money scarcity and abundance into risk decision-making research will further enrich key influencing factors and expand knowledge boundaries.

Second, testing mediating effects of cognitive functions (cognitive biases, cognitive reflection, executive control) provides new explanatory pathways for risk decision-making cognitive mechanisms. Introducing these constructs into money perception and risk decision-making research not only verifies behavioral findings about decision process effects but also expands applications of cognitive decision-making biases and cognitive reflection, enriching relevant theories.

Third, testing mediating effects of emotions (scarcity and abundance emotions) provides new explanatory pathways for emotional mechanisms. Developing emotion scales for money scarcity and abundance will more clearly define these perceptions emotionally, deepening understanding of relationships among money effects, emotional states, and risk decision-making.

Fourth, since everyone may face money scarcity or abundance contexts, exploring these effects and their psychological mechanisms can predict, control, and intervene in risk decision-making at individual, organizational, or specific population levels. In management, examining effects on workplace risk decision-making can guide improvements in manager and employee performance and prevent counterproductive behaviors. For specific populations, exploring perceived scarcity and abundance among impoverished groups can guide reasonable decision-making and improve decision quality.

This study' s innovations and characteristics include:

First, deconstructing money perception in scarcity and abundance contexts from physiological and psychological perspectives. Existing research mostly focuses on natural/public resource scarcity or classifies economic resource scarcity by absolute possession quantities, with limited research from relative, subjective perspectives. This study simultaneously employs physiological and psychological experimental methods to deconstruct dimensions of perceived money scarcity and abundance, with very limited existing research in this area. Additionally, while deconstructing perceived money scarcity, it also deconstructs perceived money abundance, which has received little attention.

Second, constructing psychological mechanisms through dual cognitive and emotional systems. Existing literature has limited research on mechanisms of money scarcity' s decision-making effects. This study explains "why perceived money scarcity (and abundance) affect risk decision-making" from both cognitive and emotional levels based on physiological and psychological analysis, advancing beyond neurobiological association tests.

Third, cross-age samples, multiple participant types, and multi-method approaches characterize this project. Besides recruiting from typical industries, organizations, positions, and levels, the study will recruit participants aged 16-

60 for more comprehensive age coverage and stronger external validity. Beyond laboratory and field experiments, physiological experiments using EEG signals will explore effects and mechanisms from multiple angles. Cross-temporal tracking in within-subjects experiments enhances internal validity. In scale development, text analysis and sentiment analysis methods will supplement depth interviews and open questionnaires to reduce information loss.

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Shujing Liang: Conceptualized research, designed research plan, drafted and revised manuscript;
Guangyong Yang: Revised manuscript.

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