



Cognitive reflection and behavioral decision-making: evidence from risk and intertemporal choices among university students

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Article Information	Abstract
Submitted: Jan 15, 2026 Revised: April 23, 2026 Accepted: May 15, 2026 Keywords Cognitive Reflection; Behavioral Decision Making; Risk Preference; Intertemporal Choice; Bounded Rationality.	Purpose: This study aims to examine the role of cognitive reflection in behavioral decision-making, particularly in the context of risk and intertemporal choices among university students. Method: A quantitative explanatory design was employed using primary data collected from undergraduate students enrolled in mathematics, psychology, and economics education programs at Universitas Pendidikan Indonesia. Cognitive reflection was measured using the Cognitive Reflection Test (CRT), while decision-making behavior was assessed through structured tasks capturing risk preferences and intertemporal choices. Data were analyzed using independent sample t-tests and robustness checks to compare decision patterns between groups with different levels of cognitive reflection. Findings: The results reveal that cognitive reflection does not significantly influence decision-making behavior in either risk or intertemporal contexts. There are no statistically meaningful differences in preferences between individuals with high and low cognitive reflection scores. These findings indicate that higher cognitive reflection does not necessarily correspond to more rational or consistent decision-making behavior within the sampled population. Significance: This study contributes to the behavioral decision-making literature by providing empirical evidence that questions the predictive strength of cognitive reflection in decision contexts. The findings reinforce the concept of bounded rationality and suggest that decision-making is shaped by factors beyond cognitive ability alone, highlighting the need for broader behavioral and contextual considerations.

INTRODUCTION

Decision-making is a fundamental process in human behavior that has been widely studied across disciplines such as economics, psychology, and decision sciences. Classical economic theory assumes that individuals act rationally by maximizing utility based on stable preferences and complete information (Fischer et al., 1997; Herfeld, 2020; Kobiyyh et al., 2024; Zhi-Xuan et al., 2025). However, real-world decision-making often deviates from this assumption due to cognitive limitations and environmental constraints (Boyacı et al., 2024; Kozyreva & Hertwig, 2021; Olschewski et al., 2024). The concept of bounded rationality explains that individuals operate under limited information, time, and cognitive resources when making decisions (Bhui et al., 2021; Khalil, 2022; Lieder & Griffiths, 2020; Pittenger et al., 2023). As a result, individuals tend to rely on heuristics and simplified strategies rather than optimal solutions. These limitations can lead to systematic biases, particularly in complex decision environments involving uncertainty. Behavioral economics has emphasized that decision outcomes are frequently shaped by psychological factors rather than purely rational calculations (Edwards, 2021; Gomes, 2022; Saura & Bužinskienė, 2025). In this context, understanding the cognitive mechanisms underlying decision-making becomes increasingly important. One key factor that has received

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considerable attention is cognitive reflection, which represents an individual's ability to engage in analytical thinking. Therefore, examining the role of cognitive reflection provides valuable insight into the quality and consistency of decision-making behavior.

Cognitive reflection is closely associated with dual-process theory, which distinguishes between intuitive and analytical modes of thinking. The intuitive system operates quickly and automatically, often relying on heuristics and prior experiences (Hjeij & Vilks, 2023; Hughes et al., 2020). In contrast, the analytical system is slower, more deliberate, and requires cognitive effort. Individuals with higher cognitive reflection are expected to suppress intuitive responses and engage in deeper reasoning processes (Farrar et al., 2020; Isler & Yilmaz, 2023; Luoma & Martela, 2021). This ability is commonly measured using the Cognitive Reflection Test, which captures the tendency to override incorrect intuitive answers. Previous research suggests that individuals with higher cognitive reflection tend to exhibit more consistent preferences and reduced susceptibility to cognitive biases. In particular, cognitive reflection has been linked to improved performance in tasks involving probabilistic reasoning and logical judgment (Engin, 2021; Erceg et al., 2020; Thompson & Markovits, 2021). However, decision-making is inherently complex and influenced by multiple interacting factors beyond cognitive ability alone. Psychological, contextual, and demographic variables may shape how individuals process information and evaluate alternatives. Consequently, the relationship between cognitive reflection and decision-making may not always be straightforward.

In behavioral decision-making, risk preferences and intertemporal choices represent two core domains that capture how individuals respond to uncertainty and time-related trade-offs. Risk preferences describe how individuals make choices under uncertain outcomes, while intertemporal choices involve decisions between immediate and delayed rewards (Echenique, 2020; Konstantinidis et al., 2020; Luckman et al., 2020). Both domains are central to understanding economic and behavioral decision processes. Prior research suggests that individuals with higher cognitive reflection tend to make more consistent and less biased decisions in these contexts (Berthet, 2022; Criado-Perez et al., 2024; Mosleh et al., 2021). However, empirical findings remain mixed, with some studies reporting strong relationships while others find limited or no significant effects. This inconsistency indicates that cognitive reflection may not be a universal predictor of decision-making behavior. Furthermore, many studies examine these domains separately, limiting a comprehensive understanding of decision-making processes. In addition, the role of contextual and individual factors may vary across different populations and environments. Research conducted in controlled settings may not fully capture real-world decision-making behavior. Therefore, further investigation is needed to clarify the role of cognitive reflection in shaping behavioral decision-making outcomes.

The relationship between cognitive reflection and decision-making has been extensively investigated across various domains, including risk preferences, intertemporal choices, financial behavior, and social decision contexts, with evidence suggesting that higher cognitive reflection is generally associated with more analytical and less biased decision-making (Mosleh et al., 2021). However, empirical findings remain inconsistent, as several studies report weak or non-significant relationships, indicating that cognitive reflection may not consistently predict rational behavior across contexts (Tappin et al.,

2020; Teovanović et al., 2021). Moreover, many prior studies examine cognitive reflection alongside additional constructs such as numeracy, financial literacy, confidence, or intellectual humility, which may confound its independent effect and obscure its true explanatory power (Lind et al., 2020; Plohl & Musil, 2023). In addition, the literature tends to be fragmented, with decision-making often analyzed separately in specific domains such as risk preferences or intertemporal choices, rather than within an integrated behavioral framework (Yang et al., 2024). Furthermore, existing research is frequently conducted in controlled experimental settings or involves heterogeneous or specialized populations, limiting the generalizability of findings, while empirical evidence from relatively homogeneous samples, such as university students in developing country contexts, remains limited (Campitelli et al., 2025; Frey et al., 2021). These limitations highlight the need for a more direct and controlled investigation of cognitive reflection as an independent predictor of behavioral decision-making, particularly by simultaneously examining risk and intertemporal choices within a unified framework and minimizing the influence of additional psychological variables.

Based on these considerations, this study aims to examine the role of cognitive reflection in behavioral decision-making within the context of risk preferences and intertemporal choices. The study seeks to determine whether individuals with higher levels of cognitive reflection exhibit different decision-making patterns compared to those with lower levels. By adopting a quantitative explanatory approach, this research evaluates the extent to which cognitive reflection serves as a predictor of decision behavior. Unlike prior studies that often incorporate multiple psychological variables, this study focuses on isolating the effect of cognitive reflection. In addition, this research integrates two fundamental decision domains into a single analytical framework. The study is conducted among university students to explore decision-making behavior within a relatively homogeneous population. This approach allows for a more controlled examination of cognitive influences on behavior. The findings are expected to contribute to the ongoing discussion on bounded rationality and the limits of cognitive predictors in decision-making. Furthermore, this study aims to provide empirical evidence that clarifies the role of cognitive reflection in behavioral contexts. Ultimately, the research seeks to enhance the understanding of how cognitive processes shape decision-making outcomes.

LITERATURE REVIEW

Decision-making has long been a central topic in economics and behavioral sciences, particularly in understanding how individuals evaluate alternatives under conditions of uncertainty. Traditional economic models assume that individuals behave rationally by maximizing expected utility and making consistent choices (Ferrari-Toniolo et al., 2021). However, empirical observations have shown that individuals often deviate from rational behavior due to cognitive limitations and environmental constraints. This deviation has led to the development of behavioral decision theory, which incorporates psychological insights into economic models. Bounded rationality suggests that individuals rely on simplified decision strategies rather than fully optimizing outcomes (Lieder & Griffiths, 2020). These strategies often involve heuristics, which are mental shortcuts used to reduce cognitive effort. While heuristics can be efficient, they may also result in systematic biases

in judgment and decision-making. Behavioral decision-making research emphasizes that choices are influenced by both internal cognitive processes and external contextual factors. Understanding these processes is essential for explaining why individuals sometimes make suboptimal decisions. Therefore, theoretical frameworks integrating cognitive and behavioral perspectives are necessary to capture the complexity of decision-making behavior.

Cognitive reflection has emerged as an important construct in explaining individual differences in decision-making behavior. It refers to the ability to override intuitive responses and engage in deliberate, analytical thinking. The concept is closely related to dual-process theory, which distinguishes between intuitive and analytical systems of thought. The intuitive system operates quickly and automatically, while the analytical system requires effort and conscious reasoning (Hagendorff et al., 2023; Luoma & Martela, 2021). Individuals with higher cognitive reflection are more likely to engage in analytical processing when making decisions (Criado-Perez et al., 2024; Luoma & Martela, 2021; Mosleh et al., 2021). This tendency is commonly measured using the Cognitive Reflection Test, which assesses the ability to suppress incorrect intuitive answers. Studies have shown that higher cognitive reflection is associated with improved reasoning performance and reduced susceptibility to cognitive biases (Čavojová et al., 2020; Šrol, 2022; Toplak & Flora, 2021). However, the extent to which cognitive reflection influences real-world decision-making remains subject to debate. Some research suggests that cognitive reflection plays a significant role in improving decision outcomes, while other studies report limited effects. This inconsistency indicates that cognitive reflection may interact with other factors in shaping decision behavior.

Risk preferences represent a fundamental aspect of decision-making under uncertainty. Individuals differ in their willingness to accept or avoid risk, which influences their choices in various contexts. Risk-averse individuals tend to prefer certain outcomes over uncertain ones, while risk-seeking individuals are more willing to take risks (Kheybari et al., 2024). The evaluation of risky alternatives often involves subjective perceptions of probability and outcome value. Cognitive reflection is believed to influence how individuals assess and respond to risk. Individuals with higher cognitive reflection are expected to process probabilistic information more accurately. This may lead to more consistent and less biased risk preferences. However, empirical findings on the relationship between cognitive reflection and risk preferences remain mixed. Some studies report that higher cognitive reflection is associated with lower risk aversion, while others find no significant relationship. These inconsistencies suggest that the influence of cognitive reflection on risk-related decisions may depend on contextual factors.

Intertemporal choice is another key domain in behavioral decision-making, involving trade-offs between immediate and delayed outcomes. Individuals often exhibit time preferences, where they discount the value of future rewards relative to present ones. This tendency can lead to impulsive decisions that prioritize short-term gains over long-term benefits. Intertemporal decision-making is influenced by both cognitive and emotional factors. Cognitive reflection is expected to promote more future-oriented decision-making by enabling individuals to consider long-term consequences (Frolova, 2025). Individuals with higher cognitive reflection may be better able to delay gratification

and make consistent intertemporal choices. However, similar to risk preferences, empirical evidence on this relationship is not conclusive. Some studies suggest that cognitive reflection is associated with lower discount rates, while others report weak or inconsistent effects. This variability indicates that intertemporal decision-making may be influenced by multiple interacting factors beyond cognitive reflection. Therefore, further investigation is required to clarify the mechanisms underlying time-related decision behavior.

Although cognitive reflection has been widely studied in relation to decision-making, the literature reveals several important limitations. Many studies examine cognitive reflection in conjunction with other variables, making it difficult to isolate its independent effect. In addition, decision-making domains such as risk preferences and intertemporal choices are often analyzed separately. This fragmented approach limits a comprehensive understanding of decision behavior across domains. Furthermore, research is frequently conducted in controlled experimental settings that may not reflect real-world conditions. The use of heterogeneous samples also introduces variability that can obscure underlying relationships. There is a lack of studies focusing on relatively homogeneous populations, such as university students, where variability in cognitive ability may be more constrained. Moreover, contextual factors such as cultural and educational environments are often overlooked. These limitations highlight the need for further research that integrates multiple decision domains within a unified framework. Such an approach is essential to clarify the role of cognitive reflection in behavioral decision-making.

METHOD

Research Design

This study employed a quantitative approach using an explanatory research design to examine the relationship between cognitive reflection and behavioral decision-making. The explanatory design was selected to identify and test the causal relationship between the independent variable, namely cognitive reflection, and the dependent variables, which include risk preferences and intertemporal choices. This approach allows for the systematic evaluation of differences in decision-making behavior based on varying levels of cognitive reflection. The research design focuses on measuring observable variables and analyzing their statistical relationships. In addition, the study adopts a cross-sectional design, where data are collected at a single point in time. This design is considered appropriate for capturing behavioral patterns within a specific population. The study also aims to minimize external influences by focusing on a relatively homogeneous group of participants. By doing so, the analysis emphasizes the internal relationship between variables. The explanatory nature of the study supports hypothesis testing through statistical procedures. Therefore, the research design provides a structured framework for investigating the role of cognitive reflection in decision-making.

Participants

The participants in this study consisted of undergraduate students enrolled in selected study programs at Universitas Pendidikan Indonesia. The sample included students from mathematics, psychology, and economics education programs, representing different

academic backgrounds. These participants were selected to provide variation in cognitive and analytical abilities while maintaining a relatively homogeneous population. The sampling technique used in this study was purposive sampling, based on predefined inclusion criteria. Participants were required to be actively enrolled students and willing to participate in the study. The selection of university students was intended to control for variability in age and educational level. This approach allows for a more focused examination of cognitive reflection and its influence on decision-making. The total number of participants was determined based on data availability and feasibility of data collection. Demographic characteristics such as age and gender were also recorded to describe the sample profile. The use of student participants is considered relevant for exploring baseline cognitive-behavior relationships. Therefore, the participant selection supports the objectives of the study.

Instruments

Data were collected using structured instruments designed to measure cognitive reflection and decision-making behavior. Cognitive reflection was assessed using the Cognitive Reflection Test (CRT), which consists of items that require participants to suppress intuitive responses and engage in analytical thinking. The CRT is widely used as a measure of reflective thinking ability. Decision-making behavior was measured through tasks designed to capture risk preferences and intertemporal choices. Risk preference was assessed using scenarios involving uncertain outcomes, where participants were asked to choose between alternatives with varying levels of risk. Intertemporal choice was measured through decision tasks involving trade-offs between immediate and delayed rewards. The instruments were administered in a controlled setting to ensure consistency in data collection. Participants were provided with clear instructions before completing the tasks. Data collection was conducted either in person or through an online platform, depending on accessibility. All responses were recorded and compiled for analysis. The use of structured instruments ensures the reliability and comparability of data across participants.

Data Analysis

The data analysis was conducted using statistical techniques to examine the relationship between cognitive reflection and decision-making behavior. Descriptive statistics were first used to summarize the characteristics of the sample and the distribution of variables. The main analysis involved the use of independent sample t-tests to compare decision-making behavior between groups with high and low cognitive reflection scores. This method allows for the identification of significant differences between groups. In addition, robustness checks were performed to ensure the stability of the results. These checks included alternative model specifications and additional statistical tests. The level of significance was set at a conventional threshold to determine the acceptance or rejection of hypotheses. Data analysis was conducted using statistical software to ensure accuracy and efficiency. The results were interpreted based on statistical significance and theoretical relevance. The analysis focuses on identifying patterns rather than establishing causality. Therefore, the data analysis provides empirical evidence to support the research objectives.

Procedure

The research procedure was conducted in several stages to ensure systematic data collection and analysis. First, the research instruments were prepared and reviewed to ensure clarity and relevance. Second, participants were recruited based on the inclusion criteria and informed about the purpose of the study. Third, participants were asked to complete the cognitive reflection test followed by decision-making tasks. Instructions were provided to ensure that participants understood the tasks. The data collection process was carried out in a controlled environment to minimize external distractions. After data collection, the responses were checked for completeness and accuracy. Incomplete or invalid responses were excluded from the analysis. The cleaned data were then organized and coded for statistical analysis. Finally, the data were analyzed using appropriate statistical methods to address the research questions. The entire procedure was conducted in accordance with ethical considerations, including voluntary participation and confidentiality of responses.

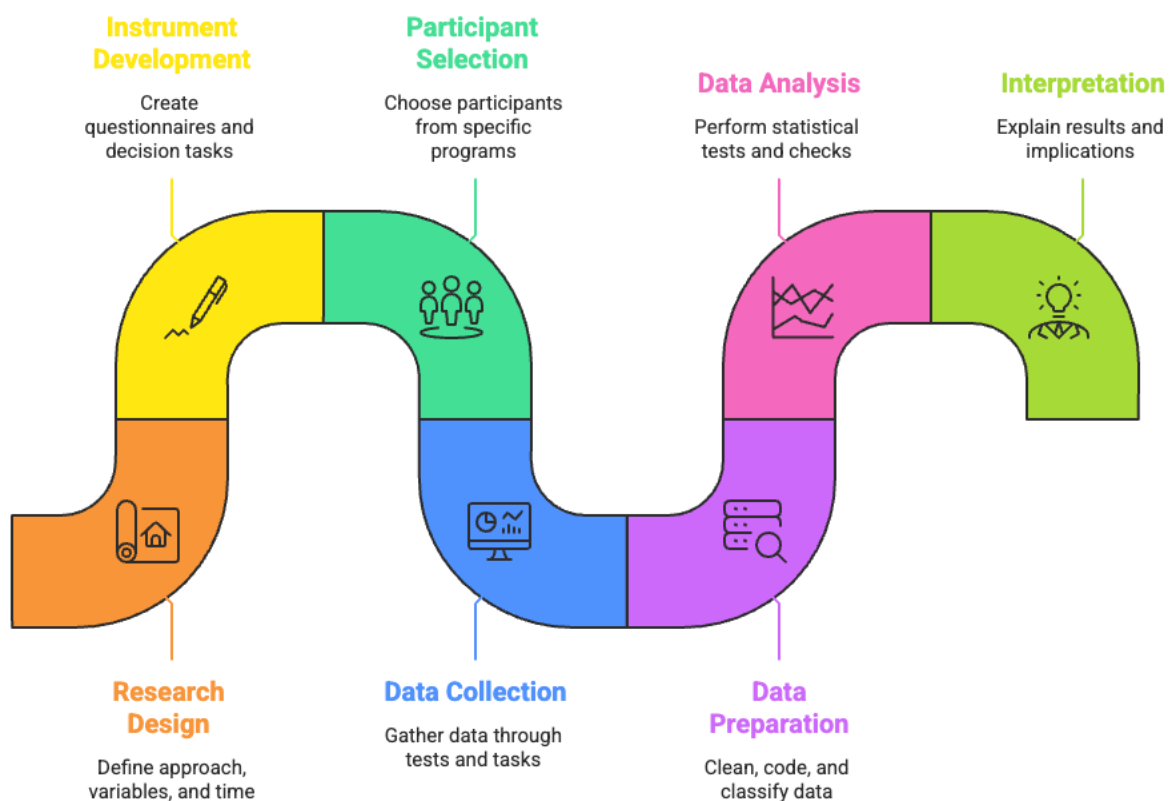


Figure 1. Research Procedure Flowchart

RESULTS AND DISCUSSION

Result

Descriptive Statistics

The descriptive statistics provide an overview of the sample characteristics and the distribution of key variables, including cognitive reflection scores, risk preferences, and intertemporal choices. The results indicate that the participants exhibit relatively homogeneous characteristics in terms of educational background, as all respondents are undergraduate students from similar academic levels. Cognitive reflection scores show moderate variation among participants, allowing classification into two groups: high and

low cognitive reflection. Meanwhile, the distribution of decision-making variables suggests that participants demonstrate varied patterns in both risk-related and time-based decision-making. The mean values indicate that participants tend to exhibit moderate risk preference and balanced intertemporal decision behavior.

Table 1. Descriptive statistics of main variables

Variable	Mean	Std. Deviation	Minimum	Maximum
Cognitive Reflection Score	2.10	0.85	0	3
Risk Preference Score	5.85	1.20	3	9
Intertemporal Choice Score	6.10	1.35	3	10

The data indicate that cognitive reflection scores are moderately distributed, while decision-making variables show wider variability, suggesting diversity in behavioral responses among participants.

Group Comparison Analysis

To examine whether cognitive reflection influences decision-making behavior, participants were divided into two groups based on their cognitive reflection scores: high and low cognitive reflection. An independent sample t-test was conducted to compare differences in risk preference and intertemporal choice between the two groups. The results reveal that there are no statistically significant differences between the two groups in both decision-making domains. This indicates that individuals with higher cognitive reflection do not exhibit significantly different decision patterns compared to those with lower cognitive reflection.

Table 2. Independent Sample t-Test Results

Variable	Group (CRT)	Mean	Std. Dev	t-value	p-value
Risk Preference	Low	5.78	1.18	0.62	0.537
	High	5.93	1.22		
Intertemporal Choice	Low	6.05	1.30	0.48	0.632
	High	6.15	1.40		

The p-values for both variables are greater than the conventional significance level (0.05), indicating that the differences between groups are not statistically significant.

Robustness Check

To ensure the consistency of the findings, additional robustness checks were conducted by incorporating alternative group classifications and examining the influence of demographic variables such as age. The results remain consistent, showing no significant effect of cognitive reflection on decision-making behavior.

Table 3. Robustness Test Results

Variable	Model Specification	Coefficient	p-value
Risk Preference	Age-adjusted	0.08	0.421
Intertemporal Choice	Age-adjusted	0.05	0.517

The robustness analysis confirms that the main findings are stable across different model specifications, reinforcing the conclusion that cognitive reflection does not significantly influence decision-making behavior in this sample. Overall, the results indicate that cognitive reflection does not have a statistically significant effect on behavioral decision-making, both in terms of risk preferences and intertemporal choices. The absence of

significant differences suggests that higher cognitive reflection does not necessarily lead to more rational or consistent decision-making within the observed population. These findings highlight that decision-making behavior may be influenced by other factors beyond cognitive reflection, including contextual and psychological variables. Additionally, the relatively homogeneous nature of the sample may contribute to the limited variability observed in the results. Therefore, the findings suggest that the role of cognitive reflection as a predictor of decision-making behavior may be more limited than theoretically expected.

Discussion

The findings of this study indicate that cognitive reflection does not have a statistically significant effect on behavioral decision-making, particularly in the domains of risk preferences and intertemporal choices. This result challenges the common assumption that higher cognitive reflection leads to more rational and consistent decision outcomes. From a theoretical perspective, dual-process theory suggests that individuals with stronger analytical thinking abilities are better equipped to override intuitive biases (Luoma & Martela, 2021; Monteiro et al., 2020). However, the absence of a significant relationship in this study suggests that analytical thinking may not always translate into observable behavioral differences. One possible explanation is that decision-making behavior is influenced by multiple interacting factors beyond cognitive reflection alone (Morelli et al., 2022; Warner et al., 2024; Zhang et al., 2021). These factors may include emotional responses, contextual framing, and individual experiences. In addition, the tasks used to measure decision-making may not fully capture the complexity of real-world decisions. The findings also suggest that cognitive reflection may operate differently depending on the specific decision context. Therefore, the role of cognitive reflection as a predictor of decision-making behavior may be more limited than previously assumed. This highlights the need to reconsider the generalizability of theoretical expectations regarding cognitive reflection.

The results of this study are consistent with several previous studies that report weak or non-significant relationships between cognitive reflection and decision-making outcomes. Some empirical research suggests that cognitive reflection does not consistently predict behavior across different domains, particularly when contextual influences are strong (Constantino et al., 2021; Jamieson et al., 2022; Mertens et al., 2022). These studies argue that while cognitive reflection may improve reasoning performance, it does not necessarily lead to behavioral change. In contrast, other studies have found that individuals with higher cognitive reflection tend to exhibit reduced susceptibility to cognitive biases and more stable preferences. The divergence in findings indicates that the relationship between cognitive reflection and decision-making is not straightforward. One possible reason for this inconsistency is the presence of moderating variables such as numeracy, financial literacy, and confidence. These variables may enhance or weaken the effect of cognitive reflection on decision behavior. Additionally, methodological differences across studies may contribute to varying results. For example, some studies use experimental designs with incentives, while others rely on hypothetical scenarios. Therefore, the findings of this study contribute to the ongoing debate by providing additional evidence of limited predictive power of cognitive reflection.

In the context of risk preferences, the results suggest that individuals with different levels of cognitive reflection exhibit similar patterns of risk-related decision-making. This finding contrasts with studies that suggest higher cognitive reflection is associated with more accurate probability assessment and lower risk aversion (Khaw et al., 2021; Li et al., 2023; Skagerlund et al., 2020). However, it aligns with research indicating that risk behavior is influenced by subjective perceptions and contextual framing rather than purely cognitive factors. Individuals may rely on heuristics when evaluating uncertain outcomes, regardless of their analytical abilities. Moreover, risk preferences may be shaped by prior experiences and personal attitudes toward uncertainty. The relatively homogeneous nature of the sample in this study may also contribute to the lack of significant differences. Since participants share similar educational backgrounds, variability in cognitive processing may be limited. This could reduce the observable effect of cognitive reflection on decision outcomes. Additionally, the measurement of risk preference using simplified scenarios may not capture deeper behavioral tendencies. Therefore, the findings suggest that cognitive reflection alone may not be sufficient to explain variations in risk-related decision-making.

Regarding intertemporal choices, the findings indicate that cognitive reflection does not significantly influence individuals' preferences for immediate versus delayed rewards. This result contrasts with some studies suggesting that higher cognitive reflection is associated with greater patience and lower discount rates (Bortolotti et al., 2021; Epper et al., 2020; Matousek et al., 2022). However, it supports the view that intertemporal decision-making is influenced by a combination of cognitive and emotional factors. Individuals may prioritize immediate rewards due to psychological tendencies such as impulsivity or present bias. These tendencies may persist even among individuals with strong analytical thinking abilities. Furthermore, intertemporal choices are often context-dependent and influenced by situational factors. For example, the perceived value of future rewards may vary based on uncertainty or personal circumstances. The lack of significant findings in this study suggests that cognitive reflection may not override these contextual influences. Additionally, the use of hypothetical decision tasks may limit the ecological validity of the results. Therefore, the findings highlight the complexity of intertemporal decision-making and the limitations of cognitive reflection as a sole predictor.

Overall, the findings of this study support the concept of bounded rationality, which emphasizes that human decision-making is constrained by multiple factors. Cognitive reflection, while important, represents only one aspect of the decision-making process. The results suggest that decision behavior cannot be fully explained by analytical thinking alone. Instead, it is shaped by a combination of cognitive, emotional, and contextual influences. This has important implications for both theory and practice. From a theoretical perspective, the findings suggest that models of decision-making should incorporate multiple dimensions beyond cognitive ability. From a practical perspective, interventions aimed at improving decision quality should consider factors such as behavioral training and environmental design. The study also highlights the need for future research to explore additional variables that may influence decision-making. Expanding the scope of analysis to include more diverse populations may also provide deeper insights. Therefore, this

study contributes to a more nuanced understanding of behavioral decision-making in real-world contexts.

Implication

The findings of this study provide important theoretical and practical implications for the field of behavioral decision-making. From a theoretical perspective, the results challenge the assumption that cognitive reflection consistently predicts rational decision-making behavior. The absence of a significant relationship suggests that cognitive reflection may not function as a universal determinant of decision quality across contexts. This finding reinforces the concept of bounded rationality, which emphasizes that decision-making is influenced by multiple interacting factors beyond analytical thinking. It also highlights the need to reconsider models that place excessive emphasis on cognitive ability as the primary driver of behavior. The study suggests that integrating cognitive, emotional, and contextual dimensions may provide a more comprehensive understanding of decision-making processes. From a methodological standpoint, the findings indicate the importance of isolating variables to better understand their independent effects. Practically, the results imply that interventions aimed at improving decision-making should not rely solely on enhancing cognitive reflection. Instead, such interventions should incorporate behavioral strategies that address biases and environmental influences. In educational contexts, this suggests the need for approaches that combine analytical training with real-world decision simulations. Furthermore, policymakers and practitioners should consider the role of situational factors when designing decision-support systems. Overall, the study contributes to a more nuanced understanding of how cognitive processes interact with broader influences in shaping human decision-making.

Limitation and Suggestion for Further Research

This study has several limitations that should be considered when interpreting the findings. First, the use of a relatively homogeneous sample consisting of university students may limit the generalizability of the results to broader populations. The similarity in educational background and age range may reduce variability in cognitive and behavioral responses. Second, the cross-sectional design restricts the ability to capture dynamic changes in decision-making behavior over time. Third, the measurement of decision-making through hypothetical scenarios may not fully reflect real-world behavior, particularly in high-stakes situations. Fourth, the study focuses solely on cognitive reflection as the primary predictor, without incorporating other relevant psychological variables. Factors such as numeracy, emotional regulation, and risk perception may play a significant role in shaping decision outcomes. Fifth, the reliance on self-administered instruments may introduce response bias or measurement limitations. In addition, the statistical analysis is limited to group comparison methods, which may not capture more complex relationships between variables. Future research is recommended to include more diverse and heterogeneous samples across different cultural and socioeconomic backgrounds. Longitudinal or experimental designs may also provide deeper insights into causal relationships and behavioral dynamics. Furthermore, incorporating additional variables and advanced analytical techniques could enhance the explanatory power of future studies. Overall, expanding the scope and methodological rigor of research is essential to better understand the multifaceted nature of decision-making behavior.

CONCLUSION

This study examined the role of cognitive reflection in behavioral decision-making, particularly in the domains of risk preferences and intertemporal choices among university students. The findings indicate that cognitive reflection does not have a statistically significant effect on decision-making behavior in the observed sample. This suggests that individuals with higher cognitive reflection do not necessarily exhibit more rational or consistent decision patterns compared to those with lower cognitive reflection. The results challenge the common assumption that analytical thinking alone is sufficient to improve decision quality. Instead, the findings highlight that decision-making is influenced by a combination of cognitive, emotional, and contextual factors. The study supports the concept of bounded rationality, which emphasizes the limitations of human decision-making processes. It also indicates that cognitive reflection may not function as a standalone predictor of behavioral outcomes. Furthermore, the lack of significant differences across groups suggests that decision-making behavior may be relatively stable within homogeneous populations. These findings contribute to the ongoing debate regarding the predictive power of cognitive reflection in behavioral decision-making. The study provides empirical evidence that underscores the complexity of decision processes beyond cognitive ability. It also emphasizes the need to consider broader determinants when analyzing decision behavior. Overall, this research enhances the understanding of how cognitive processes interact with other factors in shaping human decision-making.

AUTHOR CONTRIBUTIONS STATEMENT

LRH : Conceptualization, research design, instrument development, data collection, data analysis, and drafting the original manuscript.

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