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## | RESEARCH ARTICLE

# Cognitive Biases in Group Decision-Making Processes and Their Impact on Decision Quality

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## | ABSTRACT

This paper systematically explores the manifestations of cognitive biases in group decision-making processes and their impact on decision quality. As a decision-making form characterized by multi-agent participation and collective deliberation, group decision-making is widely applied in organizational management, public policy formulation, and social governance. However, cognitive biases inherent in individual members and their interactions significantly constrain decision effectiveness. The article begins by reviewing the basic processes and characteristics of group decision-making, as well as the psychological and social origins of cognitive biases. Building on this foundation, it focuses on analyzing the specific manifestations and mechanisms of typical cognitive biases—such as availability bias, selective attention, representativeness bias, anchoring effects, confirmation bias, and groupthink—during the three stages of information collection, information evaluation, and decision formation. These biases lead to fragmented information acquisition, distorted judgment, and opinion convergence, thereby reducing decision accuracy, increasing risks, and hindering team collaboration. To address these issues, the article proposes systematic strategies from three aspects: enhancing members' cognitive abilities, optimizing decision-making processes and mechanisms, and fostering an open and inclusive team atmosphere.

## | KEYWORDS

Group decision-making; Decision-Making Processes; cognitive biases; decision quality

## | ARTICLE INFORMATION

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## 1. Introduction

Group decision-making refers to a process in which a group composed of two or more individuals collectively participates in discussions on a decision-making problem and ultimately reaches a mutually agreed-upon solution (Sun & Xin, 2017). In today's complex and ever-changing social environment, group decision-making is ubiquitous across numerous fields such as politics, economics, healthcare, and scientific research. From the formulation of national policies to the planning of corporate strategies, and from determining treatment plans in medical teams to selecting research directions for scientific projects, group decision-making is pervasive. However, cognitive biases act like hidden reefs within the group decision-making process, threatening the quality of decisions. Cognitive biases refer to the systematic errors individuals or groups make when processing and interpreting information about the world around them, causing deviations from objective facts in information processing and judgment (Tversky & Kahneman, 1974). In the context of group decision-making, the cognitive biases of members can intertwine and amplify, leading to a series of decision-making issues. For example, group members may overestimate their own judgment capabilities due to overconfidence and neglect potential risks (Battaglio et al., 2019). The availability heuristic may lead group members to excessively rely on easily accessible information while overlooking more comprehensive and in-depth intelligence (Li et al., 2015). The anchoring effect may cause members to be overly constrained by initial information during decision-making, making it difficult to adjust their thinking flexibly (Palombi et al., 2024). Conformity pressure may lead some members to suppress their own differing views to align with the group's mainstream opinion, ultimately resulting in one-sided and rigid group decisions (Liu & Liu, 2022). However, existing research still has certain limitations. For instance, regarding the depth of

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theoretical exploration, the analysis of the underlying psychological mechanisms of some complex cognitive biases remains insufficiently refined. Concerning the validation of the effectiveness of countermeasures, there is a lack of long-term follow-up studies and comparative analyses across multiple scenarios, making it difficult to accurately assess the practical effectiveness of these strategies in various complex real-world situations. In light of this, this paper will focus on further deepening the construction of the theoretical system of cognitive biases and strengthening the exploration of targeted and practical countermeasures, aiming to provide more solid theoretical support and practical guidance for improving the quality of group decision-making.

## **2. Theoretical Foundations of Group Decision-Making and Cognitive Biases**

### **2.1 The Process and Characteristics of Group Decision-Making**

Group decision-making is not merely a simple aggregation of individual opinions. Rather, it involves mutual influence and inspiration among members through information sharing and the exchange of perspectives, integrating the collective wisdom. It brings together the knowledge, experience, and viewpoints of multiple individuals, which, in theory, can enhance the quality and efficiency of decisions (Liu et al., 2017). Particularly in situations requiring the processing of complex information, evaluating multiple alternatives, and predicting future trends, group decision-making is believed to encourage the consideration of a wider range of perspectives, thereby facilitating more comprehensive and balanced decisions (Xu et al., 2015). Group decision-making can be divided into three stages: problem identification, alternative generation, and analysis and selection (Rangel et al., 2008; Pajasmaa et al., 2024). In the problem identification stage, group members need to accurately define the problem at hand, clarifying its nature, scope, key influencing factors, and decision-making objectives. In the alternative generation stage, based on their understanding of the problem and drawing on their respective knowledge and experience, members propose diverse solutions. The analysis and selection stage is the most critical. Here, group members engage in in-depth discussion of the various alternatives, weighing their pros and cons, and decision-makers select the final solution from these options based on their preference information. Throughout this entire process, group members progress through information acquisition and evaluation, ultimately reaching a decision recognized by all.

Group decision-making is characterized by distinct participation, where members with diverse knowledge backgrounds, professional skills, and work experiences engage in the decision-making process to varying degrees (Lü, 2023). Interactivity is another prominent feature of group decision-making, as members share and exchange information through communication and discussion, facilitating the convergence and integration of knowledge, and sparking new perspectives and ideas, thereby harnessing collective wisdom (Zhang et al., 2021). Finally, group decision-making is often time-consuming. Due to the need for repeated communication and coordination to reconcile differing opinions among members, such as in the formulation of global policies by international organizations, negotiations and consultations between countries—each with its own national conditions and interests—frequently involve prolonged processes, delaying the implementation of decisions. In a rapidly changing environment, this can lead to missed developmental opportunities. Consequently, it is essential for groups to manage the decision-making pace effectively, balancing efficiency with quality (Lehner et al., 1997). Drawing on Janis and Mann's Conflict Theory of Decision Making, this paper ultimately divides the decision-making process into three stages: information collection, information evaluation, and decision formation (Janis & Mann, 1977).

### **2.2 Causes of Cognitive Biases**

From a psychological perspective, the brain's information-processing capacity is inherently limited. When faced with vast amounts of complex information, the brain often resorts to heuristic strategies—such as representativeness heuristics and availability heuristics—to gather and process information. While these strategies enable quick decision-making in most situations, they can also easily trigger various cognitive biases. For instance, during public health emergencies, reliance on the availability heuristic may lead individuals to excessively focus on severe cases highlighted in media reports, overestimate their own risk of infection, fall into panic, and subsequently engage in irrational behaviors such as panic buying. At the cognitive level, long-established mental habits and an over-reliance on past experiences act as "shackles" on thinking, limiting an individual's ability to flexibly respond to new information and situations (Wu, 2018). At the socio-cultural level, social norms and conformity pressure compel individuals to yield to mainstream group opinions, suppressing their unique perspectives (Liu & Liu, 2022). For example, during collective decision-making meetings in certain organizations, even if some members harbor doubts about a proposed plan, they may choose to remain silent or follow the majority once most others have expressed support. This allows flawed decisions to pass easily within the group, missing opportunities for optimization and adjustment.

### 3. Specific Manifestations of Cognitive Biases in Group Decision-Making

#### 3.1 Biases in Information Collection

During the information collection phase of group decision-making, members strive to gather a wide range of information relevant to the decision problem. However, factors such as availability bias and selective attention significantly compromise the comprehensiveness and accuracy of the information collected.

##### 3.1.1 The Impact of Availability Bias

Availability bias refers to the tendency of individuals to rely on information that is most easily accessible or comes to mind first when making judgments and decisions, while neglecting other potentially more important or comprehensive information (Li et al., 2015). Firstly, availability bias can lead to information asymmetry in group decision-making (Wang, 2005; Stasser & Titus, 1985). For instance, when discussing the feasibility of a project, if a member has recently encountered a similar successful case, they may overly emphasize its significance while overlooking other potential risk factors. Secondly, when group members rely too heavily on readily available information, they may fail to explore other relevant data. In such situations, group decision-making is prone to falling into the trap of "groupthink," where members overlook dissenting or differing opinions in pursuit of consensus (Zheng et al., 2001).

##### 3.1.2 The Impact of Selective Attention Bias

The influence of selective attention bias in group decision-making cannot be overlooked. Selective attention bias refers to the tendency, during information processing, for individuals to focus on and recall information that aligns with their expectations or preferences while disregarding information that contradicts their viewpoints (Wang et al., 2017). In group decision-making, this bias can lead members to develop a one-sided understanding of the issue, thereby affecting their information collection. When group members collectively exhibit selective attention, the information gathered by the entire group may become narrow, resulting in decisions that lack diversity and innovation (Nemeth, 1986). Additionally, selective attention may cause members to focus only on information of personal interest, potentially leading them to overlook other critical factors and thus contributing to decision-making errors (Ling, 2013). For example, in a company's board of directors discussing a new investment proposal, if most members lean toward supporting the plan, they may disproportionately focus on and discuss positive information such as potential market growth and expected returns, while neglecting negative information that could reveal risks and challenges.

#### 3.2 Biases in Information Evaluation

When group decision-making enters the information evaluation stage, members must screen, analyze, and assess the vast amount of collected information to extract valuable insights that aid decision-making. However, this process is highly susceptible to interference from cognitive biases such as representativeness bias and anchoring effects, causing information evaluation to deviate from objective reality and thereby negatively impacting the quality of decisions.

##### 3.2.1 The Misleading Effect of Representativeness Bias

Representativeness bias refers to the tendency of individuals to excessively rely on typical or easily recognizable information to make judgments while overlooking broader and more comprehensive data. In the context of group decision-making, this bias can lead to serious consequences (Tversky & Kahneman, 1974). Representativeness bias can affect communication and collaboration among group members. When judgments are based on representative features, members may misunderstand or develop biases against those with differing viewpoints, leading to internal disagreements and conflicts within the group and ultimately reducing the overall efficiency and quality of group decision-making.

##### 3.2.2 The Interference of Anchoring Effect

The anchoring effect was initially proposed by Tversky and Kahneman (1974), referring to the tendency of decision-makers to rely excessively on initially acquired information or data when evaluating and selecting options, even when such information may not be entirely accurate or relevant. When a group faces a decision, if a member first proposes a viewpoint or suggestion, it is likely to become the "anchor" for the entire group. Other members may unconsciously refer to this initial viewpoint during discussions and decision-making processes. Furthermore, once a group is "anchored" by an initial viewpoint, it becomes difficult to break free from its influence. Even if stronger evidence or more reasonable suggestions emerge later, they may be overlooked. This reduces the flexibility and openness of group decision-making. For instance, in project evaluation, if the initial budget estimate is high, even if more economical alternatives are discovered later, group members may still tend to favor the higher budget option due to the anchoring effect.

### **3.3 Biases in Decision Formation**

The decision formation stage of group decision-making is the critical concluding phase of the entire process. During this stage, cognitive biases such as confirmation bias and groupthink are highly likely to arise, significantly impacting decision quality. Confirmation bias leads decision-makers to preferentially seek information that supports their own views while disregarding contradictory evidence, resulting in a one-sided basis for decisions (Nickerson, 1998). Groupthink fosters an atmosphere of conformity within the group, suppresses critical thinking among members, and hinders the full exchange of differing opinions. Ultimately, this can lead to irrational decision outcomes, causing group decision-making to deviate from the optimal path (Baron, 2005).

#### **3.3.1 The Role of Confirmation Bias**

Confirmation bias refers to the tendency of individuals to seek, interpret, or remember information in a way that confirms their pre-existing beliefs or hypotheses, while disregarding or resisting information that contradicts their own views (Nickerson, 1998). In group decision-making, the role of confirmation bias shares certain similarities with that of selective attention. It may exacerbate group polarization, as each member tends to seek and disseminate information that supports their own perspective, making the group's internal views more homogeneous and increasing the divergence from the perspectives of other groups or external sources. Additionally, confirmation bias can lead individuals to hold prejudiced views toward others' opinions and behaviors, thereby intensifying tensions and conflicts among group members. For instance, in politics or religious beliefs, individuals with differing views may find it difficult to understand and accept opposing perspectives due to focusing only on information that supports their own stance, leading to heightened opposition and conflict (Nickerson, 1998). However, it is worth noting that moderate confirmation bias may, in certain contexts, also have some positive effects on group decision-making. For example, in situations with high environmental uncertainty, moderate confirmation bias can help group members focus more quickly on seemingly more promising options, thereby enhancing the efficiency of group decision-making (Bergerot et al., 2024).

#### **3.3.2 The Adverse Effects of Groupthink**

Groupthink in group decision-making refers to the phenomenon where members, in order to maintain internal harmony and consistency within the group, tend to suppress dissent and strive for consensus (Chen & Xu, 2021). This phenomenon has multifaceted impacts on group decision-making. Firstly, it can lead to a diffusion of responsibility. When issues arise with a decision, often no one is willing to take responsibility, as each individual perceives themselves as merely following the group consensus. This diffusion of responsibility undermines the group's ability to reflect on and improve decision outcomes, thereby increasing the risk of decision-making errors (Baron, 2005). Secondly, groupthink can cause the group to overestimate the probability of success when evaluating decisions. For example, in a construction project, influenced by groupthink, team members may overconfidently predict that the project will be completed on time and within budget, while overlooking various unexpected circumstances and delay risks that may arise during construction. Ultimately, this can lead to project delays and cost overruns.

## **4. Strategies to Mitigate Cognitive Biases in Group Decision-Making**

### **4.1 Enhancing Team Members' Cognitive Abilities**

In the process of group decision-making, the cognitive abilities of members play a foundational and decisive role. If members can accurately discern the existence of cognitive biases and adeptly identify them in practice, they can establish a solid foundation for high-quality decision-making. Firstly, designing scientifically sound cognitive bias training programs (Liu & Liu, 2022) is a key step in enhancing team members' cognitive abilities. The curriculum should include fundamental theoretical knowledge of cognitive biases, elaborating on the concepts, characteristics, and causes of various cognitive biases to provide members with a clear understanding. Representative cases should be selected, and carefully organized simulated decision-making exercises should be conducted to replicate different scenarios. This allows members to personally experience the impact of cognitive biases in practice and hone their skills in identifying and addressing them. Secondly, encouraging members to actively engage in self-directed learning and reflection serves as a sustainable approach to improving cognitive abilities. Motivating members to extensively read professional literature and deeply grasp relevant domain knowledge provides robust theoretical support for recognizing cognitive biases, thereby driving group decision-making toward a more scientific and precise direction.

### **4.2 Optimizing Decision-Making Processes and Mechanisms**

Scientifically sound decision-making processes and mechanisms can effectively guide group decisions away from cognitive biases and enhance the quality of outcomes (Battaglio et al., 2019). Firstly, establishing a structured decision-making process is crucial for improving the quality of group decision-making (Battaglio et al., 2019). During the information collection phase,

broadening information channels by integrating methods such as market research, industry reports, expert consultations, and internal data mining enables comprehensive information gathering, thereby avoiding biases arising from reliance on a single source (Liu & Liu, 2022; Zheng et al., 2001). In the evaluation stage, requiring members to conduct in-depth analysis of information based on their professional knowledge and experience fosters independent perspectives, preventing premature interference from groupthink.

#### 4.3 Fostering a Conducive Team Decision-Making Atmosphere

In the complex process of group decision-making, fostering a positive team atmosphere can facilitate the mutual exchange and integration of diverse perspectives (Battaglio et al., 2019). This provides essential environmental support for accurately identifying and mitigating cognitive biases, thereby laying a solid foundation for high-quality decision-making. Firstly, it is crucial to advocate for an open and inclusive culture (Liu & Liu, 2022; Zheng et al., 2001), which plays a decisive role in shaping team culture. Leaders should proactively embrace differing opinions and encourage members to boldly express unique viewpoints, cultivating an atmosphere of openness and inclusivity within the team. Secondly, establishing equitable communication mechanisms ensures the efficient and precise transmission of information among members (Sun & Xin, 2017), avoiding information blockages and cognitive biases caused by hierarchical structures or authority. Finally, mechanisms such as incentives or social accountability can be employed to encourage decision-makers to think more carefully, thereby ensuring the quality of decisions (Battaglio et al., 2019).

### 5. Conclusion and Outlook

This paper explores cognitive biases in the group decision-making process and their impact on decision quality. By systematically reviewing relevant theoretical foundations, it clarifies the connotation, processes, and characteristics of group decision-making, as well as the concepts, types, and causes of cognitive biases, establishing a robust theoretical framework for subsequent research. At different stages of group decision-making, cognitive biases manifest in diverse forms. During the information collection phase, availability bias and selective attention bias result in one-sided information acquisition, undermining the solidity of the decision-making foundation. In the information evaluation stage, representativeness bias and anchoring effects interfere with rational judgment, leading decisions away from the optimal path. In the decision formation stage, confirmation bias and groupthink suppress diverse opinions, fostering unreasonable decision outcomes. These biases intertwine, significantly compromising decision accuracy, substantially increasing decision risks, and imposing multiple obstacles to team collaboration and communication, thereby greatly diminishing the quality and efficiency of group decision-making. To address these issues, this paper proposes systematic strategies focused on enhancing cognitive abilities, implementing training programs, and fostering self-directed learning and reflection.

Future research on cognitive biases in group decision-making can delve into the following key directions. First, it is essential to deepen the study of the dynamic evolution of cognitive biases. By leveraging advanced technological tools—such as real-time tracking of information flow, member interactions, and psychological shifts during the decision-making process—researchers can construct dynamic models to uncover the transformation patterns of cognitive biases across different decision stages. Exploring their interactive relationship with real-time changes in the external environment will provide robust support for the dynamic prevention and control of decision risks. Second, there is a need to strengthen research in cross-cultural contexts. Investigating the unique manifestations of cognitive biases, differences in their causes, and their varied impacts on decision quality across diverse cultural backgrounds can enhance the decision-making quality of multinational teams and promote cross-cultural communication and collaborative innovation. Third, integrating emerging technologies to explore new pathways is crucial. By fully utilizing cutting-edge technologies such as big data, artificial intelligence, and neuroscience, and deepening their integration with cognitive bias research, hidden insights within vast datasets can be uncovered. Developing intelligent tools for identifying and mitigating biases, along with analyzing their neural and cognitive origins, will inject new momentum into the optimization of group decision-making. These efforts will drive the field to continuously reach new heights and better serve the complex and ever-evolving demands of real-world decision-making.

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