

A Realistic Review of Cognitive Biases in Governance Decisions

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Abstract

In contemporary politics, decision-making in governance is a challenging task. The most significant factor contributing to the difficulty of decision-making for rulers is the prevention of cognitive biases. This study aims to qualitatively analyze scientific articles related to this topic using a systematic realist review method, which involves examining structures, contexts, and consequences. In this regard, by searching for the term "cognitive bias" in the titles of articles and their substantive relevance to governance in reputable international and domestic databases, 19 articles in English and Persian were identified based on the "PRISMA" criteria within the timeframe from July 23 to August 8, 2024.

Based on the research findings, the scope of the impact of cognitive biases can be articulated within the stages of the decision-making process in governance. This includes the initial stage where rulers confront information and data (the input and engagement stage), followed by their calculations based on that data (the processing and calculation stage), and finally, the output of decisions and their implementation (the action and execution stage). The mechanisms underlying cognitive biases in specific contexts indicate that cognitive bias factors can arise from individual aspects such as beliefs and convictions, organizational matters like strategies and actions, and broader issues such as economy, politics, culture, nationality, and ethnicity, which serve as environmental factors influencing biases. The consequences of each of these factors vary according to their mechanisms and contexts.

Keywords: Cognitive Bias, Governance, Decision Making, Realist Systematic Review

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Introduction

Decision-making in governance without falling prey to cognitive biases is of significant importance. This is because rulers must be prepared to pursue opportunities when facing transformations, complexities, and uncertainties (Sorrell et al., 2010: 46-57). Accordingly, new managers and agents who act as pioneers of transformative change (Caldwell et al., 2012: 175-187) must cultivate specific qualities and utilize them effectively in order to be influential and effective decision-makers at both micro and macro management levels.

Cognitive biases affect the decision-making process of rulers; thus, understanding the decision-making process is fundamental to the discussion of biases in decision-making. Various theories exist regarding the decision-making process, but the Dual Process Theory (DPT) has become prevalent in relevant academic circles, supported by increasing evidence, including functional MRI studies (Croskerry, 2009a: 27-35). Dual processing encompasses two systems: the intuitive system and the analytical system. The intuitive system is associated with Type 1 processes, while the analytical system is linked to Type 2 processes.

This pattern does not imply that a single reasoning mode—such as Type 2—should be considered the standard for sound decision-making or that one specific mode always prevails over the other (Croskerry, 2013: 58-64). Decision-making typically involves an interactive combination of intuitive and analytical processes to varying degrees. An optimal argument appears to be a blend of both reasoning modes in the intuitive and analytical realms (Croskerry, 2009a: 27-35). Furthermore, not all biases stem from Type 1 processing, but when a bias does occur, it can only be addressed by activating Type 2 processing. Therefore, a desirable balance between Type 1 and Type 2 processes is required for well-calibrated performance (Croskerry, 2013: 58-64).

The aforementioned balance requires the identification of cognitive biases, which is a complex task in the realm of public policy and governance. Scientific research related to the identification of cognitive biases in governance is limited due to the neglect of comprehensive qualitative systematic reviews that are considered effective in reducing this complexity. In some cases, it has also failed to establish a connection with reality due to an emphasis on quantitative methods. This limitation arises from the inability to understand the causal relationships between the mechanisms of cognitive biases and their outcomes in specific contexts.

Therefore, this study aims to reduce this ambiguity by employing a systematic realist review and to examine the mechanisms, contexts, and consequences of cognitive biases in governance. Consequently, this research seeks to address the question of what causal relationships exist between the factors giving rise to biases and the erroneous decisions made by rulers.

Theoretical Foundations

Background Research

Given the specific methodology and issue of this study, the following research has been identified as relevant background from reputable scientific databases:

First Article: Cognitive Biases and Decision-Making Strategies During Change: A Systematic Literature Review; Year of Publication: 2020; Authors: Chiara Acciarini, Federica Brunetta, Paolo Boccardelli. The aim of this study is to articulate specific situations regarding the impact of cognitive biases on strategic decisions in the context of environmental transformations. The findings of this research demonstrate how decision-making is influenced by internal factors (such as perception) and external factors (such as digitization).

Second Article: Corporate Social Responsibility (CSR) and Cognitive Bias: A Systematic Review and Research Directions¹; Year of Publication: 2023; Authors: Michael Odei Erdiaw-kwasie, Matthew Abunyewah and Charles Baah. The aim of this study is to demonstrate the expansion and impact of various types of cognitive biases in the formulation, implementation, and communication of CSR. In this article, the CSR framework has emerged as an area more susceptible to cognitive biases.

Conceptualization

a) Cognitive Biases

Cognitive bias is generally defined as an irrational belief that affects the ability to make specific decisions based on facts and evidence (Schwenk, 1986: 298-310). This irrational belief arises from potential causes that influence the cognitive process, even though these factors are not inherently cognitive themselves. Therefore, these factors are examined

¹. Corporate social responsibility (CSR) and cognitive bias: A systematic review and research direction. Resources Policy. 86. 104201. 10.1016/j.resourpol.2023.104201.

with a focus on their impact on cognitive processes. Accordingly, biases stemming from these causes—considering their influence on cognitive processes—are classified as cognitive biases. These factors include: a) limited cognitive resources, b) the influence of motivation and emotion, c) social influence, and d) exploratory factors.

b) Governance

Governance is generally defined as the process of steering society and the economy through collective action aligned with common goals (Torfing et al., 2012).

The characteristic of this definition is that it does not narrowly define governance, unlike the World Bank's definition, which relates to aspects of economic development (World Bank, 1992: 3), or the definition of corporate governance, which pertains to financial investment matters (Becht et al., 2003: 3). Additionally, it does not leave the definition open to an infinite number of contextual interpretations, such as those that classify governance as a neoliberal language game, leading to various interpretations and institutionalizations in different political and cultural contexts (Bevir & Rhodes, 2003: 175-190).

Complementing Common Definitions

In addition to common definitions, it should be noted that governance from an Islamic perspective is "a specific concept based on spiritual foundations; the style of Islamic governance includes being people-oriented, religious, belief-based, non-aristocratic, non-wasteful, and non-oppressive; neither oppressor [nor oppressed]" (Imam Khamenei, 19/12/1400).

Theoretical Framework

Regarding the diversity of cognitive biases in governance, the scientific literature varies, and numerous types of biases related to decision-making in governance have been identified. However, what is commonly examined in the scientific literature, and sometimes includes emerging biases categorized under these, are: confirmation bias, optimism, framing effects, attention allocation, intergroup bias, intergroup hostility, and the illusion of control.

To explain, confirmation bias refers to the tendency to seek or interpret information in a way that confirms the preconceptions of the seeker or interpreter (Li and Cheung, 2020). Confirmation bias manifests as

confirmation heuristics when individuals selectively use data while testing hypotheses (Baron et al., 1988; Klayman and Ha, 1987). Additionally, information overload can also lead to confirmation bias (Goette et al., 2020).

Confirmation bias in economic affairs can involve financial planners or investors who hold preconceived beliefs about an investment (Glick, 2017; Çalıkli & Bener, 2013). According to economic research, among the biases identified in financial matters, confirmation bias is the most prominent (Talluri et al., 2018).

Among the common biases is optimism bias. This bias refers to the tendency to believe that an individual is relatively less exposed to risks or to overestimate their ability to avoid or prevent negative situations (Li and Cheung, 2020).

In the financial domain, investors, influenced by their numerous biases, tend to downplay the risks of financial decisions due to excessive confidence and optimism (Tan et al., 2021). Optimistic decision-making in personal finance, such as susceptibility to fraud (Modick and Lee, 2013) and overly optimistic growth assessments and improper lending policies in global finance, exemplifies optimism bias in economic contexts (Shiller, 2015).

Overconfidence bias can be framed as a subset of optimism bias. This bias is defined as a specific form of miscalibration, where the likelihood of accurately allocating responses provided exceeds the actual accuracy of those responses (Skala, 2008: 34).

Specifically, authors have claimed that entrepreneurs exhibit greater overconfidence than managers of large organizations (Aciarini, 2021: 644). Furthermore, overconfidence in male investors has been observed to be higher than in their female counterparts, and it increases with greater experience and education (Mishra and Methilda, 2015).

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The Dunning-Kruger effect posits that confidence does not always indicate competence. Kruger and Dunning (1999) found that individuals with a very superficial understanding of a subject tend to have excessive confidence in their own competence regarding that subject.

Among the common biases in governance is the framing effect bias. This bias is defined as "the process of removing several elements from the perceived reality and constructing a narrative that highlights the connections between them to promote a specific interpretation" (Entman, 2007: 164).

Accordingly, the framing effect occurs when choices are influenced by small changes in how options are presented (Kahneman & Tversky, 1984; Quattrone & Tversky, 1988; Tversky & Kahneman, 1981). This is because the decision-making process is subjective (Caldera et al., 2019) and is affected by human factors such as biases and framing influences (Tversky & Kahneman, 1983).

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Among the biases related to governance is the attention allocation bias. This bias affects officials and managers due to factors such as the necessity for quick action and the need to avoid friction with media and public sentiments. As a result, public employees may make decisions that align with the prevailing political narratives on hot-button issues in society, which reflects a deviation from moderation and a departure from reality (Douglas, 2024: 2).

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Another common bias in governance is intergroup bias. This bias was analyzed by Lewis (2011) in a study based on a survey, which showed how performance expectations of group members in a negotiation context can unrealistically increase, leading to evaluations of group performance based on these unrealistic expectations. This can influence the process of

selecting the counterpart, a phenomenon referred to as relationship bias, as articulated by Reb (2010).

Regarding intergroup bias, it is noteworthy that individuals tend to credit the group with which they feel more familiar, while blaming out-groups for failures (Taylor and Jaggi, 1974).

Group identities can be based on strong group characteristics such as race or ethnicity (Taylor and Jaggi, 1974), or weaker identities, such as membership in a sports team. Additionally, from an economic perspective, unfair reward policies—within organizations and companies—may arise from subjective performance evaluations influenced by intergroup bias (Hristoff, 2022: 1112).

From a political perspective, party rationalizations also have a significant impact on accountability judgments. This mechanism is defined as "selective attribution": supporters tend to attribute successes to their favored party while simultaneously exonerating it for poor performance (Arceneaux, 2006; Cutler, 2008; Malhotra and Kuo, 2008; Marsh and Tilley, 2010; Rudolph, 2003a, 2003b).

Methodology of the Research

This study aims to explore the causal links between factors influencing cognitive biases in the decisions of governors, necessitating the identification and qualitative review of biases related to governance within their specific contexts. Accordingly, a systematic realistic review is the appropriate method for this research, as it seeks to explain the connections between context and outcomes through the examination of mechanisms. Thus, a realistic review represents a relatively new strategy for synthesizing research that has an explanatory rather than a judgmental focus. This approach aims to elucidate the mechanisms underlying the functioning of complex programs, particularly regarding their failures, within particular contexts and settings.

The science of systematic review has significantly evolved from the traditional Cochrane review framework. The conventional steps outlined by Cochrane provide a useful starting point for realistic review processes; however, additional sub-steps are necessary in the realistic approach. Undoubtedly, the need to deconstruct interventions within theoretical frameworks adds complexity to the work involved.

At a certain stage in the evidence synthesis process, a quality filter must be applied, and incomplete studies should be excluded. The first stage of evidence quality assessment is relevance, which refers to the extent to which the obtained evidence supports the explanation or modification of the theoretical framework in question (Wong et al., 2013: 1-15). The second stage of evidence quality assessment is validity, which pertains to the credibility of the evidence (Wong et al., 2013: 1-15). Both relevance and validity are not absolute criteria upon which a study rises or falls; rather, they represent dimensions of consistency and appropriateness in relation to the goal of a specific synthesis (Pawson et al., 2005: 30).

In this study, we conduct a qualitative systematic review of scientific articles. To this end, we utilize the recommended guidelines for standardizing systematic reviews, following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework. Accordingly, the inclusion criteria for articles are as follows: (a) research studies must be available only as full-text published articles; (b) the articles must be indexed in reputable databases; (c) articles should be published in either English or Persian; (d) articles must employ qualitative methods—whether mixed with quantitative methods or purely qualitative—in processing information and data.

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Regarding the search strategy, this study utilized reputable data sources in English, referring to the academic search platforms Cochrane, Scopus, PubMed, Sage, ScienceDirect, Web of Science, and Emerald. In this context, the keyword "Cognitive Bias" was searched in the titles of articles, while the keyword "Governance" was examined within the content of articles related to decision-making in governance.

Persian articles were also extracted from reputable databases such as "Magiran" and "Noormags" using the keyword (bias). It is important to

note that due to the limited research on bias in governance, the chosen keyword aimed for broader inclusivity; thus, the focus was primarily on the substantive relevance of articles to the research topic. The identified articles were analyzed for content and major findings, categorized and indexed, and underwent qualitative assessment by two evaluators, achieving an agreement rate of 90%.

In the context of a realistic review, it should be added that explanatory theories are utilized to provide a framework for examining the phenomenon under study. This is because a realistic review, as a qualitative synthesis, aims to elucidate these frameworks by striving to understand each component or all components of the questions: "What is effective about this type of intervention? For whom? Under what conditions? From what aspects and why?" (Pawson et al., 2005: 21-34). Therefore, the method of a realistic review offers a way to conduct inquiries aimed at identifying and explaining the interactions between context, mechanisms, and outcomes (Wang et al., 2010: 10-12).

It is noteworthy that in terms of validity, the results of this research, considering the method of a systematic realistic review that emphasizes gray literature alongside systematic reviews (Pawson et al., 2005: 29), were informed by experts and their interactions from the beginning to the end of the review. This included two cognitive science and psychology specialists, two governance experts and researchers, and two managers and executives related to governance. Their opinions regarding the two criteria of relevance and credibility of the systematic realistic review were gathered and integrated into the text and results of the research.

In relation to the quality assessment of sources and the criteria for inclusion and exclusion, the researcher employed triangulation methods. Additionally, in qualitative synthesis, triangulation through multiple perspectives is often utilized, based on the premise that disagreements are negotiated through consensus, thereby enhancing the precision of analytical processes. Triangulation serves as a useful indicator of various controls and balances, contributing to the credibility of the research process (Bearman & Dawson, 2013: 258).

Regarding the timeline for extracting articles from databases, it is important to note that the extraction was conducted from the first to the eighteenth of Mordad in the year 1403. No time limitation was imposed on the publication dates of the identified studies. A total of 382 articles were found. Among these, 92 articles had relevant titles, and from this number,

49 articles had relevant abstracts, with 32 articles containing relevant content. Finally, 19 articles were identified as having relevant methodologies. The flow diagram according to PRISMA is displayed below:

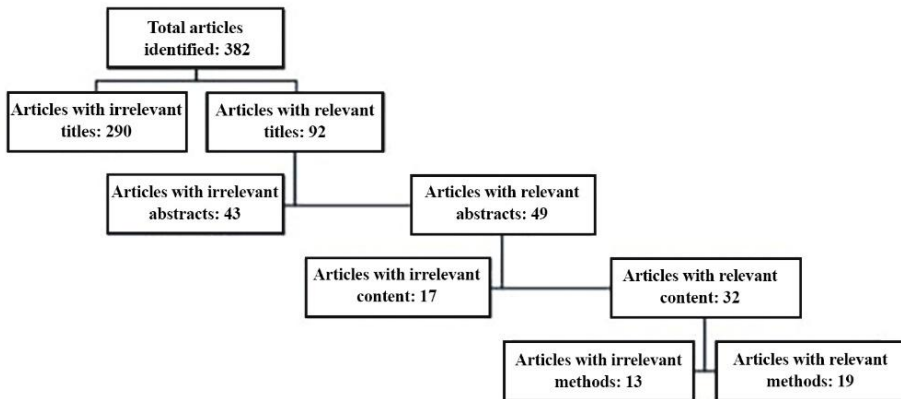


Figure 1. PRISMA Flow Diagram Labels

Data Analysis and Research Findings

A total of 19 scientific articles were extracted based on the aforementioned criteria, including 12 English articles and 10 Persian articles. The details of the articles are presented in the table below.

Table 1. Characteristics of Articles in the Systematic Review

Identifier	titel	Main Author	Year of Publication	Country of Origin
1	A literature review of cognitive biases in negotiation processes	Andrea Caputo ¹	2013	Italy
2	Buyer beware! How cognitive biases can influence the hiring of consultants by public servants	Scott Douglas & Tom Overmans ²	2024	Netherlands

¹. Caputo, Andrea. (2013). A literature review of cognitive biases in negotiation processes. *International Journal of Conflict Management*. 24. 374-398. 10.1108/IJCMA-08-2012-0064.

Douglas, Scott & Overmans, Tom. ². Douglas, Scott & Overmans, Tom. (2024). Buyer beware! How cognitive biases can influence the hiring of consultants by public servants. *Public Money & Management*. 1-6. 10.1080/09540962.2024.2351120.

3	Cognitive biases and decisionmaking strategies in times of change: a systematic literature review	¹ Chiara Acciarini	2021	Italy
4	Cognitive biases in implementing a performance management system: behavioral strategy for supporting managers decision-making processes	Ivo Hristov ²	2022	Italy
5	Cognitive biases that influence Lean implementation and practices in a multicultural environment	Purushothaman Babu Mahesh ³	2023	New Zealand
6	Corporate social responsibility (CSR) and cognitive bias: A systematic review and research direction	Michael Erdiaw-kwasie ⁴	2023	Australia
7	Differences in decisions affected by cognitive biases: examining human values need for cognition, and numeracy	Regis Kakinohana ⁵	2023	Brazil
8	Cognitive bias and how to improve sustainable decision making	J.E., Korteling ⁶	2023	Netherlands
9	Passing the buck? Responsibility attribution and cognitive bias in multilevel democracies	Sandra Leon ⁷	2017	United Kingdom
10	On the Interplay of Data and Cognitive Bias in Crisis Information Management	David Paulus ⁸	2022	Netherlands
11	Overcoming financial planners' cognitive biases through digitalization: a qualitative study	Vidya Athota ⁹	2023	Australia

Table 1. Characteristics of Articles in the Systematic Review

Identifier	titel	Main Author	Year of Publication	Country of Origin
12	Cognitive Biases andOrganizational Correctives: Do Both Disease and Cure Depend on the Politics of the Beholder?	Philip Tetlock ¹⁰	2000	USA
13	The Impact of Economic and Accounting Variables on Managers' Financial Decisions with the Role of Cognitive Errors	Shokrallah Khajavi	1400	Iran

¹. Acciarini, Chiara². Hristov, Ivo³. Mahesh Babu, Purushothaman⁴. Erdiaw-kwasie, Michael⁵. Kakinohana, Regis⁶. Korteling, J.E.⁷. Leon, Sandra⁸. Paulus, David⁹. Athota, Vidya¹⁰. Tetlock, Philip

	Based on System Dynamics Approach			
14	Measuring Cognitive Biases on the Quality of Justice in Decision-Making by Criminal Court Judges	Zahra Sakiani	1401	Iran
15	An Islamic Model for Cognitive Bias Mitigation in Decision-Making in Governance from the Perspective of Nahj al-Balagha	Habibollah Danesh Shahraki	1402	Iran
16	Designing a Model of Behavioral Anomalies Caused by Customers' Cognitive Biases in the Financial Industry: A Case Study of Bank Customers and the Stock Market	Seyed Fathollah Amiri Aqdai	1401	Iran
17	Designing and Validating a Model to Examine the Role of Managers' Cognitive Biases on the Performance of Companies Listed on the Tehran Stock Exchange	Mehrdad Ghambari	1402	Iran
18	Understanding Biases Based on Cognitive Science Approach (Case Study: Management Consulting Industry)	Hamidreza Yazdan	1401	Iran
19	Identifying Cognitive Biases of Policymakers in Strategic Governance Decision-Making with a Meta-Synthesis Approach	Mostafa Esmaeili	1402	Iran

The articles collectively mentioned 210 titles of biases, among which 52 biases were analyzed based on the objective of this research, which aimed to examine the eight common biases. Each of the mentioned common biases accounted for the following percentages: Attention Bias (5.76%); Emphasis Bias (21.15%); Framing Bias (17.30%); Groupthink Bias (9.61%); Illusion of Similarity (3.84%); Intergroup Opposition Bias (9.61%); Illusion of Control (7.69%); and Optimism Bias (25%).

The articles can be categorized into three methodological types: a) Experimental, b) Survey-based, and c) Theoretical. The percentage of articles using survey methods was 52%, while the remaining articles used experimental and theoretical methods (48%). Regarding how many of the eight assumed biases each article addressed, the following figure illustrates this.

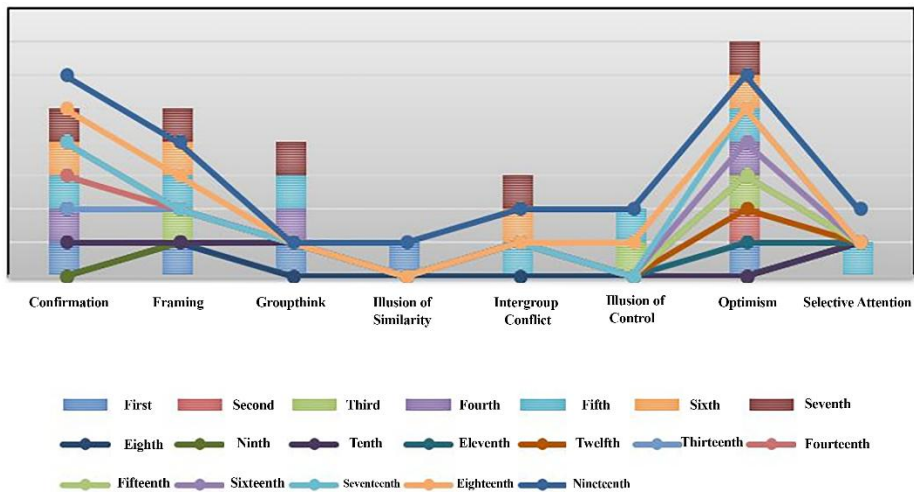


Figure 2. Frequency of Selected Cognitive Biases in Scientific Articles

In this section of the research, the main results, as well as the primary and secondary components in the studies, are presented:

Table 2. Primary and Secondary Components of Articles

Article ID	Main Component	Sub-Component
1	Types of Biases	Biases Leading to Poor Decision-Making: Anchoring, Overconfidence, Framing, Status Quo, and Self-serving Bias Biases Affecting Negotiation Processes: Base Rate Fallacy, Inconsistency Bias, Intergroup Bias, Relationship Bias, and Hardship Bias
2	Types of Biases	Attention to a Multilevel Approach The Role of Individual Decision-Making in Shaping Consultation Participation Methods
3	Types of Biases	Lack of information significantly affects the decision-making process. The presence of cognitive biases impacts the decision-making process, especially during environmental changes.
4	Types of Biases	The impact of cognitive biases on the decision-making process of managers, especially when their authorities increase.
5	Types of Biases	Controlling biases with knowledge related to cognition and the ability of cognitive biases in Lean performance.
6	Types of Biases	Identifying cognitive biases in the implementation of CSR in the extraction industry. Managing cognitive biases in the implementation of CSR in the extraction industry.

Article ID	Main Component	Sub-Component
7	Types of Biases	Various psychological mechanisms in individual-level biases are relatively effective. Psychological mechanisms in biases beyond the individual level also play a role in terms of cultural differences.
8	Types of Biases	Cognitive biases lead to incorrect decisions in the long term and in complex matters. Cognitive biases lead to incorrect decisions in complex matters.
9	Types of Biases	Partisanship plays a significant role in the distribution of responsibilities in federal countries. The greater power of older federal members compared to other members in terms of partisanship.
10	Types of Biases	Data bias is one of the biases during a crisis. Confirmation bias is one of the biases during a crisis.
11	Types of Biases	Utilizing artificial intelligence to confront the unconscious biases of financial employees is a suitable option. Managers tend to prefer artificial intelligence and the digitalization of tasks over their employees.
12	Types of Biases	Intuitive opinions stemming from political ideologies are influential at the levels of analysis and decision-making. Intuitive opinions arising from individuals' cognitive styles are influential at the levels of analysis and decision-making.
13	Types of Biases	Economic managers become biased due to the prevailing conditions in the economy. Biases in economic managers affect their decisions and behaviors. The biases of economic managers lead to a decrease in the desired efficiency.
14	Types of Biases	Individual differences in judges' opinions leave unique effects. Cognitive biases leave non-unique effects in judges' opinions. The impacts of biases can be reduced with certain strategies.
15	Types of Biases	The biases of economic managers affect their decisions and behaviors. Cognitive biases arise based on the limits of reason in the decisions of rulers. Potential causes of biases can be mitigated with strategies derived from Islamic context.
16	Types of Biases	Cognitive biases in the judgments of stock market and bank customers Sensory cognitive biases of stock market and bank customers Belief-based cognitive biases of stock market and bank customers
17	Reasons of Biases	The intellectual capital of managers leads to bias. The unconscious mental dynamics of managers cause bias. The decision-making styles of managers result in bias.
18	Reasons of Biases	Personality is a factor in cognitive biases. Mindset is a factor in cognitive biases. Weakness in analyzing information sources is a factor in biases.
19	Types of Biases	Some cognitive biases affect the decision-making and judgment of policymakers. Certain biases disrupt information processing. Some biases influence the awareness and perception of policymakers. A category of biases dominates the moods and thoughts of policymakers. Some biases stem from social and group influences.

After presenting the main results and the secondary and primary components, we will explain the mechanisms that effectively contribute to the emergence of biases in specific contexts. By "mechanisms," we refer to the reasoning, attitudes, and reactions of individuals, as well as the factors that lead to the consequences of biases in specific areas. These mentioned contexts can be divided into three levels: a) Individual, b) Organizational, c) Environmental.

Table 3. Mechanisms Influencing Cognitive Bias from the Perspective of Scientific Articles

ID	Mechanisms	Contextual Factors
1	Centralization on Concepts Influence of Culture Impact of Individual Temperament	Individual and Environmental
2	Information Overload Limited Meanings Pressure for Quick Action Issues with Recall and Memory	Individual, Organizational, and Environmental (Social)
3	Negative Impact of Analytical Planning Methods Cognitive Shortcomings in Understanding Defined Policies Effects of Decision-Making and Implementation of Organizational Processes Environmental Instability Poor Quality of Decision Implementation	Individual and Environmental
4	Excessive Managerial Discretion and Strategy Adoption Due to the Absence of Constraints such as criteria, internal agreements, best practices, and legal contracts. Cultural Drivers and Cultural Factors.	Organizational
5	Impact of Administrative Automation Without Human Intelligence. Organizational Policies and Policy-Making and Their Interpretation at the Discretion of Stakeholders. Chain Reaction of Stakeholders and Agents Without Reflecting on Events.	Organizational
6	Impact of Corporate and Personal Values and Managerial and Organizational Interests. Organizational Interests. Budgetary Constraints. Issues with Information Availability and Training.	Individual, Interpersonal, and Organizational
7	Direct Relationship Between the Belief in the Value of Power (as a Human Value) and the Increase in Framing Bias. Direct Relationship Between the Belief in the Value of Globalization and the Reduction of Framing Bias.	Individual

8	Effects of Experimental Ambiguity. Long-Term Effects and Fear of Future Risks. Complexity and Uncertainty. Threat to the Status Quo. Threat to Social Position. Preference for Personal Interests Over Collective Interests. Group Pressure.	Individual (Biological and Social), Environmental
9	Partisanship Leads to In-Group Bias. Opportunity Structures Such as Selective Choice	Individual (Political) and Organizational
10	Time Pressures and Information Input in Rapid Decision-Making During Crises. Destruction of Infrastructure and Its Impact on Data Processing in Crises. Lack of Hardware for Crisis Information Analysis. Uncertainty in Crisis Information Processing. Volume, Speed, and Diversity of Incoming Data and Information Overload. Excessive Reliance on Social Norms and Emotional and Group Indicators.	Organizational
11	Speed in Decision-Making and Avoiding Time Waste in Algorithmic Data Processing. Rejection of Technologies by Employees. Information Overload Leads to Confirmation Bias.	Individual and Organizational
12	Impact of Fundamental Assumptions About Human Nature and the Surrounding World.	Organizational
13	Impact of Inflationary Uncertainty on Investment.	Organizational and Environmental

Table 3. Mechanisms Influencing Cognitive Bias from the Perspective of Scientific Articles

ID	Mechanisms	Contextual Factors
14	The Impact of Narrative Patterns on Decision-Making and Judgment in Criminal Courts The Influence of Emotions on Decision-Making	Individual
15	The Impact of Rationality Limitations The Susceptibility and Lack of Regulation of Emotions and Feelings The Influence of Social Pressure and Its Lack of Regulation	Individual and Environmental
16	The Impact of Cognitive or Judgmental Factors (Biases Arising from Incorrect Judgments) The Impact of Sensory or Preference Factors (Biases Arising from Emotional Responses or Personal Preferences)	Individual

	The Impact of Value or Belief Factors (Biases Arising from Religious Beliefs or Moral Values)	
17	The Influence of Intellectual Capital and Unconscious Mental Activities on Managers' Cognitive Biases The Influence of Decision-Making Styles on Managers' Biases	Organizational
18	Information Overload The Need for Rapid Action Lack of Meaning (Context of Ambiguity)	Organizational
19	The Influence of Values and Beliefs The Influence of Personal Experience and Perceptions Emphasis on Available Data Modes of Reasoning and Specific Thought Processes Social Influence	Individual and Environmental

After discussing the mechanisms that influence the emergence of cognitive biases in various individual, organizational, and environmental contexts, we will now examine the consequences of cognitive biases in governance.

Table 3. Consequences of Cognitive Cognitive Bias from the Perspective of Scientific Articles

ID	Cosequences
1	The Complexity of Tasks Due to the Interaction and Interrelation Among Cognitive Biases in Negotiation and Bargaining Processes
2	Adopting a Comprehensive Approach at Various Individual and Organizational Levels Regarding the Influence of Cognitive Biases and Stressful Conditions in the Selection of Advisors by Officials and Managers
3	Environmental Changes That Can Disrupt the Cognition of Officials and Significantly Impact Strategic Decision-Making (Determined by Data Analysis)
4	Research Findings Indicate That as Managers' Authority Increases, Cognitive Biases Become More Pronounced and Damaging, with Cultural Factors Playing a Significant Role
5	Cognitive Biases Affect Human Factors and Create Conditions for Reduced Economic Productivity; They Influence Collaboration Arising from Aligned Attitudes and Lead to Cognitive Stress
6	Cognitive Biases Lead to Conflicts and Violence, Resulting in Poor Participation Quality in the Extractive Industry
7	The Relationship Between Biases and Human Values Such as Self-direction, Adaptability, Universality, Need for Cognition, and Calculative Thinking Varies, Indicating the Potential Involvement of Psychological Mechanisms
8	Cognitive biases stem from the deep-rooted neuro-evolutionary characteristics of our evolved brain (in the form of natural and intuitive thinking). This neuro-evolutionary framework provides fundamental explanations for human

	decision-making compared to most social and psychological studies. It is based on structural (neural network) and functional (evolutionary) mechanisms that give rise to cognitive biases, elucidating why they are systematic, stable, and pervasive, as well as explaining their apparentness.
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Table 4. Consequences of Cognitive Bias from the Perspective of Scientific Articles

ID	Cosequences
9	The real difference between parties appears in countries with multi-level (federal) democracies, where regional governments are more independent and prominent, thus becoming credible "blame actors"; therefore, in-group bias is activated when the institutional environment opens opportunities for blame.
10	Cognitive biases can threaten Crisis Information Management (CIM) in relation to digital resilience and hinder its utilization in rapidly improving crises; furthermore, the combination of data biases with cognitive biases significantly amplifies these biases.
11	All financial planners (the subjects of the study) were affected by biases, although a few of them did not accept this fact.
12	Fundamental epistemological assumptions such as anthropology, cosmology, and ontology have a significant impact on the emergence of cognitive biases.
13	Biases influence managers' behavior when facing external environmental factors, thereby weakening the overall performance of companies and causing them to miss opportunities for value creation and wealth generation.
14	Cognitive biases influence various parts of the judicial decision-making process, including the discovery of case facts, attribution of criminal responsibility, and especially the determination of sentences for offenders.
15	Cognitive biases in Islamic governance arise from the lack of moderation in decisions based on reason and Islamic law.
16	Given the unique cultural conditions in Iran, a set of value-based and belief-related biases has been identified that are prevalent among clients in the financial industry.
17	This research concludes that cognitive biases impact the empowerment of managers and have a direct effect on the organization in question.
18	In the consulting and management industry, consultants take projects from various organizations, and if they fall prey to biases and errors, the quality of projects deteriorates, affecting both employer and personal branding, and diminishing organizations' trust in this industry.
19	Cognitive biases in the policymaking domain disrupt the decision-making process in governance within five categories (decision-making and judgment of policymakers, information processing, awareness and perception, self-centeredness, and social and group influence).

Conclusion

The articles found do not follow a unified order. This is evident both in the naming of biases and in their diversity and classification. Accordingly, the definition of cognitive bias can be examined in three categories: a) in a general sense, b) in a specific sense, and c) in a more specific sense. It is explained that based on evidence, theorists regarding bias have sometimes included discussions of cognition (mind) and emotions and feelings within it. Consequently, they consider the term cognitive bias to encompass biases arising from emotions and feelings. On the other hand, theorists have separated these two, namely cognition and emotions, and have used the term cognitive bias exclusively in relation to mental and computational matters. Ultimately, some theorists, in line with their specific research, have only regarded mental shortcuts, that is, heuristics, as cognitive biases. Most definitions of cognitive bias emphasize, either implicitly or explicitly, two characteristics: being systematic and non-random.

The mechanisms discovered regarding the emergence of cognitive biases indicate that research on cognitive biases has highlighted various levels according to their specific contexts. Accordingly, some of the identified articles have emphasized matters related to individual aspects such as beliefs, convictions, preferences, and personal temperament, while others have focused on organizational issues like organizational hierarchy, budgeting, strategic planning, and policies. Additionally, some articles have considered broader matters, such as economics, global politics, culture and civilization, nationality, and ethnicity, as environmental and structural factors. Therefore, the consequences of these mechanisms are undoubtedly different in terms of quantity and quality, reflecting various dimensions and scopes specific to their contexts.

Based on the results of this research, the scope of the influence of cognitive biases can be articulated within the stages of the decision-making process in governance, specifically from the initial stage of rulers confronting information and data (the stage of confrontation and data input), followed by their calculations based on the data (the stage of processing and calculations), and ultimately the output of decisions and their implementation (the stage of action and execution). In this context, each of the eight discussed biases is particularly relevant at a specific stage of governance decisions.

It should be noted that the biases of "attention allocation, confirmation bias, and framing" occur in the stage of confrontation and data input, while

the biases of "groupthink, illusion of similarity, and intergroup bias" manifest in the stage of processing and calculations. Finally, the biases of "illusion of control and optimism bias" arise in the stage of action and execution, creating disruptions in governance decisions.

The results of this research, using a realistic review method, highlight that merely identifying, categorizing, and naming cognitive biases does not suffice to reduce and control cognitive biases in governance without exploring their mechanisms and consequences in specific contexts. This is because systematic disruptions in governance calculations stem from the failure of complex programs and interventions that require realistic analysis and case studies. Therefore, it is suggested that researchers in the field of cognitive sciences related to governance, particularly concerning cognitive biases, engage in studies that examine the mechanisms of biases in the failure of governance decisions and the consequences of these mechanisms within their specific contexts.

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