

Bounded Rationality a Prelude to Ecological Rationality: A Deeper Look at the Fast and Frugal Heuristic in Leadership

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ABSTRACT

This article examines literature that shows why the fast and frugal heuristic is an appropriate decision-making approach for leaders. Unlike traditional decision-making methods, the fast and frugal heuristic uses mental shortcuts and systematic reasoning when there are time constraints and a lack of information available. In general, whether a leader elects to use the fast and frugal heuristic depends on their mental model, a compilation of experiences and perceptions that influence how individuals make decisions. The fast and frugal heuristic approach, ingrained in the ecological rationality theoretical framework, specifies that leaders adapt how they make decisions based on the context and complexity of the environment (Goldstein & Gigerenzer, 2002). Leaders face multi-faceted challenges and the agility to employ the fast and frugal heuristics fosters greater cognitive flexibility, holistic thinking (Hallo & Nguyen, 2022), more robust leadership and problem-solving abilities.

Introduction

Effective leadership is quintessential in navigating decisions in times of uncertainty, risk, and stability. According to Yukl (2013), formal leadership requires making decisions about objectives, strategies, operational tactics, procedures, and the allocation of resources. He details how emotions directly impact decisions, making rationality difficult to respond to risks, threats, change, and greater job demands. Leaders must use a combination of decision-making strategies (Ejimabo, 2015) to include statistical and probability modeling for classical decision-making when risk is involved (Hastie & Dawes, 2010; Kurdoglu & Yasin, 2022) and heuristics. Classical decision-making involves time-intensive strategies such as linear regression, correlations, hypothesis testing, decision matrices, cost-benefit analysis, forecasting, and techniques to determine maximum utility.

The opposite of using statistical data and probability modeling to inform decisions is fast and frugal heuristics, a process involving using people's available information (Katsikopoulos & Canellas, 2022). The decision-making process is simple, faster, and feasible for humans and organizations (Lejarraga & Pindard-Lejarraga, 2020, p. 289). To illustrate this point, Gigerenzer et al. (1999), a thought leader of fast and frugal heuristics, surmises that the notion of speed, frugality, and accuracy in decision-making performance is contingent upon two factors the environment and social context. Leaders must be adaptive and equipped with the skills to know what specific decision-making strategies are appropriate and effective for the type of problem in which a solution is sought.

Although classical decision-making using statistical modeling differs theoretically and in utility from heuristics, they are equally as crucial in an organization (Basel & Bruhl, 2013; Cristofaro, 2017; Hallo & Nguyen, 2022; Huikkola et al., 2022). Fast and frugal heuristics improve effort and accuracy during times of uncertainty (Hafenbrädl et al., 2016; Kurdoglu & Yasin, 2022) in turbulent environments when probability and modeling will not address the problem (Huikkola et al., 2022; Kurdoglu & Yasin, 2022). Additionally, they are appropriate when issues are ill-defined and complex (Hallo & Nguyen, 2022), and when there are many possible solutions to the problem (Lejarraga & Pindard-Lejarraga, 2020). The unifying thesis around the saliency of fast and frugal heuristics is uncertainty, when

decision-makers are unaware of outcomes. Moreover, during uncertainty, the leader's mental model identifies heuristic cues in the environment that triggers a mental shortcut when making a decision (Kurdoglu & Yasin, 2022).

Mental Models

In addition to using multiple decision-making approaches, Charles Munger, a famous entrepreneur, explained, "if you want to make better decisions, you need to use more than one mental model to look at the problem" (Bruyne, n.d.). Comparatively, Jones et al.'s (2011) research on mental models and decision-making found:

Mental models are personal, internal representations of external reality that people use to interact with the world around them. They are constructed by individuals based on their unique life experiences, perceptions, and understandings of the world. Mental models are used to reason and make decisions and can be the basis of individual behaviors. They provide the mechanism through which new information is filtered and stored (p. 493).

Other scholars agree with this definition of mental models (Serrat, 2021; Palmunen et al., 2021). Serrat (2021) goes a step further to explain that a mental model is a schematic description of a phenomenon that individuals use to make decisions (Palmunen et al., 2021) and predictions from perceptions, serving as the impetus for behaviors (Serrat, 2021). Additionally, mental models are subject to change with the addition of new knowledge or a change of misconceptions in existing knowledge (Palmunen et al., 2021). According to Paoletti et al. (2020), mental models allow for the cognitive simulation of possible outcomes. "By reducing gaps in information, a leader can bolster their own mental model to make more informed and, presumably, better decisions" (p. 276).

Considering the empirical definitions of mental models by scholars (Jones et al., 2011; Paoletti et al., 2020; Pulmanunen et al., 2021, Serrat 2021), an individual's mental model provides the lens through which problems and their underlying patterns are applied to problems, which can sometimes involve gut feelings (Hallo & Nguyen, 2022). The fast and frugal model is sequential and uses recognition; recognizing one of the possible solutions takes precedent over others (Goldstein & Gigerenzer, 2002). The combined approach of rationality and bounded rationality, inclusive of heuristics and understanding how mental models impact individuals and organizational decisions, is the key to dealing with limited cognitive functioning, human fallacy, and how leaders operate in a social environment (Cristofaro, 2017) is known as ecological rationality.

Kurdoglu & Yasin (2022) cited several studies that discussed "irrational" ideologies that reduce anxiety and stress when making decisions solidifying that irrationality is a vital part of being human. They elucidate that spirituality and positivity can help one cope during times of uncertainty. Notably, these belief constructs are intertwined in one's mental model. Mental models like heuristics operate consciously and unconsciously as they are deeply rooted intrinsically (Kurdoglu & Yasin, 2022).

Calabrese et al. (2017) conducted a qualitative study using seven case studies of innovation projects, and they found a three-step process for managing intuition and rationality tension through paradoxical thinking. Their findings purported that an effective way to manage rational and other types of thinking to thwart tension would include mixing individuals with different information-processing preferences in decision-making teams. To do this successfully, leaders must be self-aware in recognizing gaps in the mental models and seeking talent with differing perspectives and knowledge to join the team to close that gap (Paoletti et al., 2020).

Self-awareness, listening to other perspectives, seeking input into decisions, and a leader's knowledge of when they may lack the experience to inform an effective conclusion impact an organization's mental models (Calabrese et al., 2017; Hammond et al., 2006). The level of the leader's self-awareness can prevent groupthink, and enable them to know when to implement appropriate decision-making strategies instead of ascribing to one specific strategy in all instances, thereby strengthening the mental models within the organization. Moreover, Hammond et al. (2006) found that self-awareness is the key to preventing poor decision-making and falling prey to hidden traps.

Decision-Making Theoretical Models

From classical economics, rational decision-making using mathematical modeling, such as the theory of expected utility, can effectively generalize new data (Martignon & Hoffrage, 2002) and make predictions (Briggs, 2019). According to Jonassen (2012), decision-making involves the selection of one or more alternatives or satisfying options from a larger set of alternatives. Decisions fall into four categories: choices, acceptances/rejections, evaluations, or constructions.

Yates and Tschirhart (2006) expounded on the definitions of the decision categories. First, choices are the multiple options available to address a problem. Second, acceptances or rejections are binary options in which one is accepted, and the other is rejected. Third, evaluations are statements of worth backed up with commitment. Finally, constructions attempt to create an ideal situation using the available resources (as cited in Jonassen, 2012, p. 343).

Consequently, although there is a solid framework and conceptualization for rationality, it is impossible due to the human element of values, feelings, memory, and psychological capacities and the lack of ability to understand all the possible consequences of a decision. Hastie and Dawes (2010) elucidated that the assumption of rational decision-making is challenged by three concepts: habit, conformity, and religion or cultural mandates. Scholars (Briggs, 2019; Morton, 2019) supported this assertion by explaining that maximizing expected utility is not mathematically feasible even using a computer with a limitless memory. Under certain conditions, it is irrational.

According to scholars (Briggs, 2019; Hastie & Dawes, 2010; Jonassen, 2012; McFall, 2015), decisions fit either a normative (i.e., how people should make decisions using logic and reasoning-expected utility), descriptive (i.e., how and why people actually make decisions-prospect theory), or a predictive (i.e., how people make decisions using value-focused thinking, mathematical and probability-expected utility and expected value) theoretical models. Importantly, psychologists and behavioral economists have disagreed with classical economics that relied predominantly on mathematical models in the evolution of rational decision-making. Behavioral economists and psychologists contended that decisions violated the assumptions of maximizing expected utility, thereby contradicting rationality (Hastie & Dawes, 2010).

In addition to normative, descriptive, and predictive theories of decision making, Gigerenzer & Gaissmaier, 2011; Gigerenzer & the ABC Research, 2012 expanded these theories to include ecological rationality, which implies that heuristics are not second best to rationality and that better decisions are made with less information (as cited in Luan, Reb, & Gigerenzer, 2019, p. 1735). The revised conceptualization of heuristics emerged in the 1960s when statistical procedures such as analysis of variance (ANOVA) and Bayesian methods became entrenched as the psychologist's tools (Goldstein & Gigerenzer, 2002, p. 75). This empirical work strengthened the validity of bounded rationality using heuristics.

Ecological Rationality

Scholars Gigerenzer et al. (1999) and Todd et al. (2012) found in bounded rationality that the environment defines the problems and that rationality must be used to address the situation, making effective decisions with the mechanisms that exploit or leverage the structure of the environments (as cited in Todd & Brighton, 2016). As reported by Luan et al. (2019), the earlier theoretical premise of bounded rationality was confined to limited cognition. Still, the work of Gigerenzer and Gaissmaier (2001) modified the theory recoinning it as the ecological theory of rationality, which is a framework to study performance in the external world, using heuristics as ecologically rational to the degree that it is adapted to the structure of the environment (p. 911). Finally, the recognition heuristic is primarily used in ecological rationality; it specifies if a construct is recognized in the decision option, then infers that the recognized object has a higher value concerning the criterion (Goldstein & Gigerenzer, 2002).

Bounded Rationality

Herman Simon's who studied organizational decision-making and was a Nobel Peace Prize winner (Hastie & Dawes, 2010), created the theory of bounded rationality and satisficing, which is known as the perfect solution for problems because the mind is limited in its capacity (Basel & Bruhl, 2013). Simon's seminal work was the precursor for Kahneman and Tversky's (1979) prospect theory, which explained how bounded rationality occurs in human behavior and personal judgment based on mental shortcuts and heuristics (Battaglio et al., 2019; Cristofaro, 2017). Heuristics can be an efficient way of decision-making and can be as reliable as elaborate calculations (Del Campo et al., 2016) and other logical approaches.

In fact, there is no way to avoid the heuristics, as Hastie & Dawes (2010) explained that attempts to train people not to rely on or be influenced by them have been unsuccessful. They further argued that making judgments based on experience is reasonable and essential. Likewise, bounded rationality and the utility of heuristics are leaders' most appropriate decision-making approaches since decisions are often made with limited information among stakeholders with different perspectives, preferences, values, and interests (Cristofaro, 2017; Del Campo et al., 2016). Finally, stakeholders elect satisficing alternatives or taking the best approach to resolve conflicts and actualize organizational goals (Cristofaro, 2017).

Fast and Frugal Heuristics-Take the Best Approach Method

Hallo & Nguye's (2022) qualitative research on heuristics and analysis in leadership decision-making and problem-solving created a model using intuition to solve complex problems. In their research, they cited literature from Gigerenzer that surmised using the strategies from the adaptive toolbox of methods, including taking the best heuristic tactic. Gigerenzer (2002) and Gigerenzer et al. (1999) researched fast and frugal heuristics and found under limited resources and constraints such as time and money, quick decision strategies are more efficacious and fruitful than complete utility mathematical modeling (as cited in Basel & Bruhl, 2013) in noisy, stressful, chaotic conditions (Hastie & Dawes, 2010). Notably, over the years, scholars have agreed with this notion. For example, Martignon and Hoffrage (2002) touted the benefits of taking the best approach. Similarly, Hastie and Dawes (2010) acclaimed that the fast and furious heuristic was studier and more robust when constraints were present and that these decisions are not only fast but frugal since they were made with little information about alternatives.

Wang et al. (2022) investigated fast and frugal heuristics to depict conditions in which they proved as accurate as other more logical and complex models, and they found that the take the best approach was equally as effective as linear regression modeling, a similar finding of Martignon and Hoffrage (2002). Thus, further supporting the validity and utility of leaders. Moreover, the pathway for leaders to implement the fast and frugal take the best approach for comparing two possible alternatives involves three steps: (1) searching for the cues that come to mind in the order of their validity or importance, (2) stopping on the first cue in which a difference in the two objects emerge, (3) make a decision based on the assumption if a cue is positively related to the criterion and which option has the more significant cue value, and (4) finally, choose randomly if the search does not top after reviewing all cues (Wang et al., 2022).

Banks et al. (2020) conducted an experiment to determine the efficacy, accuracy, and predictability of fast and frugal heuristics by measuring the three cues associated with the technique in military decision-making. They found that the fast and frugal heuristics were faster, more accurate and parsimonious to implement, and that 80 percent of decisions were predictable among the experimental groups. More importantly, they discovered that the fast and frugal heuristics require less mental demand and, although not implied in their research, could be related to the decision maker's mental models and how they perceive the context of the situation making the decision.

These sequential steps provide a systematic approach of comparison for possible alternatives, countering arguments by Kurdoglu & Yasin (2022), who explained that heuristic decision-making is subjective and lacks objectivity—insinuating that the approach is haphazard. Huikkola et al. (2022) cited literature from Kahneman, 2011, who

noted that heuristics lead to inadequate results. Alternatively, according to Kurdoglu & Yasin (2022), the quantity and strength of the heuristic cues available during the process increase the leader's confidence in a potential decision during times of uncertainty. That perspective aligns with Hallo and Nguyen's (2020) perspective that when leaders recognize patterns and draw upon themes from unrelated events, they can take rapid and adequate action.

Fast and frugal heuristics enable leaders to dig deeper and rely on their expertise and the accessibility of cues. Logical systems can be applied to test decisions made using heuristics, which have been proven accurate (Hallo & Nguyen, 2020). To illustrate this, scholars (Kurdoglu & Yasin, 2022; Martignon & Laskey, 1999), in their research on decision-making during times of uncertainty, found that Bayesian approaches to reason encompass subjective probability inferences and confidence levels instead of objective probabilistic data. Additionally, Martignon & Laskey (1999) discussed the complexity measures of inference strategies and Bayesian approaches benchmarks for fast and frugal take the best approach heuristics.

Reflections and Conclusion

Bounded and ecological rationality strategies such as the fast and frugal heuristic are the most appropriate decision-making strategy. This modern approach incorporates human limitations while considering present environmental factors and using the representative heuristic. The fast and frugal decision strategy embodies the heuristic concept as an empirical tactic to choose more accurate options in uncertain times and not so much when the problem is risk-laden. In these instances, leaders should be adaptive enough to know the environment as described in ecological rationality to determine when to use bounded rationality or mathematical models that are predictive in nature. The fast and frugal heuristic has been tested with ANOVAs and Bayesian statistics, (Goldstein & Gigerenzer, 2002, p. 75), although it does not rely solely on mathematical modeling.

Leaders face complex problems, and being agile in determining when to employ various decision-making techniques is a core function of effective leadership. Specifically, Tariq et al. (2021) conducted a qualitative case study with leaders to explore a balanced approach that combines classical mathematical modeling and heuristics for more deliberate and comprehensive decision-making. They argue that these two techniques work in tandem for optimal results, giving credence to leadership programs to consider training in fast and frugal heuristics alongside classical decision making. Similarly, other scholars espouse the need for new paradigms or mental models that allow leaders to use a combination of decision-making approaches. For example, Hallo and Nguyen (2022) cited literature positing this type of decision making relying on intuition could lead to greater cognitive flexibility and holistic thinking. A strong foundation in both types of decision making coupled with a leader's self-awareness and ability to understand an organization's mental models can help a leader build skill and agility by using heuristics during times of uncertainty and classical decision making when risks are involved.

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