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The Heuristics and Biases of Top Managers: Past, Present, and Future

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ABSTRACT Psychology-grounded research on heuristics and biases in decision making has become increasingly influential in the field of management studies. However, although this line of inquiry is recognized as a valuable perspective for advancing understanding of decision processes in the upper echelons of firms, extant research remains unbalanced, the bulk of previous endeavours having been focused on managerial overconfidence, with insights from more recent dual-process theory and ecological rationality conceptions of heuristics less explored. This introductory article to the special issue of the *Journal of Management Studies*, entitled 'the heuristics and biases of top managers: Past, present, and future', offers a reflective review of prior work addressing its focal theme and places the articles incorporated into the special issue within this broader context. In addition, it sets out a number of directions for future work, with a view to inspiring the continuing advancement of conceptual and empirical knowledge and management practice.

Keywords: decision making, heuristics and biases, managerial and organizational cognition, rationality, risk and uncertainty, upper echelons

INTRODUCTION

Efforts to incorporate insights from the field of psychology regarding the fundamental information processing capabilities and limitations of human decision makers into the field of management studies has a long history, dating back to the classic work of

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the Carnegie School (Cyert and March, 1963; March and Simon, 1958; Simon, 1947). Building on this foundation, managerial and organizational cognition (MOC) researchers have identified heuristics and cognitive biases (Tversky and Kahneman, 1974) as one of the most important psychological phenomena that influence the judgement and decision making of actors at all levels of seniority, throughout the organizational hierarchy (see, e.g., Bazerman, 1984; Hodgkinson and Healey, 2008; Markle, 2011; Wang and Wong, 2012). For the purposes of this essay, we define heuristics as rules of thumb that serve as potential aids to decision making by focusing decision makers' attention on particular aspects of information and we define biases as systematic deviations from rational judgement and thinking that can, and sometimes do, result from the adoption of heuristics (cf. Gigerenzer et al., 2022; Tversky and Kahneman, 1974).

Top managers are especially influential in shaping the strategic choices and direction of organizations, not least because they form the core part of the organization's dominant coalition and, by virtue of being placed at the top of the hierarchy, possess ultimate resource control (Cyert and March, 1963; March and Simon, 1958; Simon, 1947). Building on these Carnegie School insights, Hambrick and Mason (1984, p. 193) argued that organizational outcomes can be 'viewed as reflections of the values and cognitive bases of powerful actors in the organization,' notably the organization's top managers. Relatedly, introducing the notion of 'behavioral strategy', Powell et al. (2011, pp. 1377–8) highlighted 'complex executive judgments' as a key focus area. As Hambrick (2007, p. 334) notes: 'If we want to understand why organizations do the things they do, or why they perform the way they do, we must consider the biases… of their most powerful actors — their top executives'.

The importance of heuristics and biases of top managers in strategic decision making is reflected in the rapid growth of scholarly literature pertaining to this topic. Appendix 1, which illustrates the proliferation of relevant articles published in a representative cross-section of top-tier management journals over the past 40 years, shows a remarkable increase in the number of publications produced over the last decade. Although the influence of heuristics and biases pertaining to top managers has been of particular interest within the strategy domain, this topic is of increasing importance in a wide range of related subfields and research areas of management studies more broadly, including but by no means restricted to, entrepreneurship (Shepherd et al., 2015), innovation (Galasso and Simcoe, 2011), international business (Aharoni et al., 2011; Guercini and Milanesi, 2020), family firms (Fang et al., 2019), organization theory and design (Foss and Weber, 2016), corporate governance (Van Ees et al., 2009), and leadership (Haynes et al., 2015). Despite the considerable achievements to date, much additional work to advance understanding of top managers' heuristics and cognitive biases is both possible and desirable. Accordingly, the aim of this special issue is to advance management research by further elucidating how, when, and under what conditions top managers' heuristics and biases influence organizational decision processes and attendant outcomes, and to what effect.

The following section briefly lays out the scholarly origins and rationale of the heuristics and biases program in psychology that provided much of the initial impetuous for studying heuristics and biases in work-related contexts (e.g., Barnes, 1984; Bazerman, 1984; Das and Teng, 1999; Schwenk, 1984), garnered more recently

under the umbrella of dual-process theory conceptions of judgement and decision making. Next, we consider some particularly promising theoretical perspectives that variously extend, complement, and challenge the conventional orthodoxy of the heuristics and biases program that has dominated much of the management studies field, until comparatively recently. We discuss how the special issue articles build on and extend these perspectives. We conclude this introduction piece by delineating a number of directions for future work, with a view to inspiring the continuing advancement of conceptual and empirical knowledge and management practice. Table I presents an outline summary of the nine articles, which, together with this opening essay, comprise the special issue.

THE PSYCHOLOGICAL FOUNDATIONS OF HEURISTICS AND BIASES IN MANAGEMENT RESEARCH

Upper Echelons Research, Microfoundations, and Behavioural Strategy

Building on earlier, interrelated developments in the upper echelons, strategic decision making, and leadership literatures (e.g., Hambrick and Mason, 1984; Hollander, 1992; Schwenk, 1988), the study of heuristics and biases in strategic management and related management subfields has gathered considerable momentum over the past decade. The seminal, founding contribution of Hambrick and Mason (1984) established a link to heuristics and biases in top managers' decision making. In his update on upper echelons theory, Hambrick (2007) reinforced the importance of considering the biases of executives, on the grounds that such biases substantially affect their perceptions of the situations they manage, in turn, shaping their decision processes and the outcomes of those processes. Building on this theoretical argument, later work has demonstrated that top managers' heuristics (e.g., Wesley et al., 2022) and biases (e.g., Burkhard et al., 2022; Chen et al., 2015; Li and Tang, 2010) do indeed have a significant bearing on strategic decisions and organizational outcomes.

The emergence of the microfoundations movement (Barney and Felin, 2013; Felin et al., 2012, 2015; Foss, 2011; Gavetti, 2005; Helfat and Peteraf, 2015; Teece, 2007) over the last decade has added further momentum to the study of heuristics and biases in the context of upper echelons decision making. Microfoundations is a broad methodological stipulation encouraging scholars to eschew making macro-to-macro causal claims, but instead show how macro relations are mediated by micro (and meso) behaviours and mechanisms (Felin and Foss, 2005). The study of top managers' heuristics and biases has the potential to yield important bridging mechanisms between micro and macro perspectives on organizational behaviour and performance, not only by identifying bottom-up (micro-meso-macro) chains of emergence and causality (i.e., hierarchically reductive accounts), but also through the identification of top-down causal emergent mechanisms (see, e.g., Felin et al., 2015; Foss and Weber, 2016; Healey et al., 2018; Healey and Hodgkinson, 2014, 2015).

Additional and complementary impetus for the study of top managers' heuristics and biases has come from the rise of the emerging subfield known as behavioural strategy

Table I. Outline summary of the nine special issue articles

Authors	*Sample and methods*	*Theoretical foundations*	*Focus of contribution*	*Selected findings*	*Originality and significance*[a]
Atanasiu et al. (2023)	A qualitative analysis of 31 semi-structured interviews	Fast and frugal heuristics/Simple rules	Process through which managerial heuristics emerge and develop	Based on experience, managers create and develop heuristics through the process of dissonancing, realizing, crystallizing, and organizing.	• Offers a more nuanced understanding of heuristics by examining how they emerge and develop
Baldacchino et al. (2023)	A protocol analysis and survey of 74 technology entrepreneurs	Dual-process theory (parallel-competitive)	Positive effects of simultaneous use of intuition and analysis	For experienced entrepreneurs, using high levels of both intuition and analysis is an effective way of creating new venture ideas.	• Offers a more nuanced understanding of heuristics by explicating the positive innovation consequences of using intuition and analysis in concert
Cerar et al. (2023)	An experimental vignette study of 1308 resource allocation decisions and follow-up managerial interviews	Microfoundations	The role of 'name-based heuristics' in headquarter-subsidiary resource allocation decisions	Managers use 'name-based heuristics' in an attempt to understand the context of the decisions they are facing when operating under uncertainty, which can lead to biased outcomes.	• Advances understanding of the functioning of heuristics and biases under different kinds of uncertainty by illuminating how managers use heuristics as contextual 'proxies' when more detailed information is not available • Uncovers novel and under-examined heuristics and biases through the explication of the concept of 'name-based heuristics'

Table I. (Continued)

Authors	*Sample and methods*	*Theoretical foundations*	*Focus of contribution*	*Selected findings*	*Originality and significance*[a]
Junge et al. (2023)	A quantitative analysis of secondary data pertaining to 281 CEOs	Microfoundations	The role of organizational-and individual-level influences in the development of managerial bias	Functional structures are associated with wider environmental perception gaps, compared with divisional organizations. Individual-level factors (e.g., CEOs' educational degree) mitigate the effect.	• Offers a more nuanced understanding of biases by examining a combination of organizational- and individual-level factors
Kruse et al. (2023)	A survey of 1046 German firms	Fast and frugal heuristics/Simple rules	The role of CEOs' use of heuristics and decision standards in new product development	CEOs' use of heuristics and 'higher decision standards' are linked to positive new product development outcomes.	• Offers a more nuanced understanding of heuristics through the explication of positive innovation outcomes
Resick et al. (2023)	A historiometric study of 106 CEOs of US public companies	Microfoundations	Environmental moderators of CEOs' core self-evaluations and the risk-taking strategies of their firms in resource allocation decisions	CEOs with higher core self-evaluations are more responsive and adaptive to environmental cues.	• Offers a more nuanced understanding of biases through the analysis of environmental moderators

(Continues)

Table I. (Continued)

Authors	*Sample and methods*	*Theoretical foundations*	*Focus of contribution*	*Selected findings*	*Originality and significance*[a]
Shi et al. (2023)	Computer-aided text analysis of 2424 US firms' quarterly earnings conference call transcripts to examine CEOs' (N = 3977) decision making	Attribution theory	The effects of 'executive internal attribution tendency' on corporate downsizing in response to performance shortfalls	Strong internal attributions on the part of CEOs increase downsizing under performance shortfalls relative to weak internal attributions. The impact of such attribution tendencies is moderated by external monitoring and key features of the external environment.	• Uncovers novel and under-examined biases through an examination of the varied impact of strong versus weak CEO internal attribution tendencies on strategic decisions • Offers a more nuanced understanding of biases through the understanding of environmental moderators
Smit (2023)	Internet-based decision making scenario study, with experimental control based on a sample of executive managers (N = 147)	Fast and frugal heuristics/Simple rules and heuristics and biases	The effect of Knightian uncertainty (experimental treatment) versus predictability (control treatment) on managerial decision makers' selection of control and prediction heuristics	Managers persist in, and even increase their use of, predictive heuristics as Knightian uncertainty unfolds. This effect is moderated by how Knightian uncertainty is framed: Framing Knightian uncertainty as a threat enhances a preference for prediction, whereas framing Knightian uncertainty as an opportunity facilitates top managers shifting to control heuristics.	• Offers a more nuanced understanding of heuristics by examining a shift in the types of heuristics deployed over time in response to Knightian uncertainty, moderated by how such uncertainty is framed, either as an opportunity or threat

Table I. (Continued)

Authors	*Sample and methods*	*Theoretical foundations*	*Focus of contribution*	*Selected findings*	*Originality and significance*[a]
Vuori et al. (2023)	Multiple-case studies based on 87 interviews with multiple informants from each of the five participating companies	Fast and frugal heuristics/Simple rules	The evolution and interplay of heuristics and causal knowledge in 'infrequent and heterogeneous organizational processes'	Some managers possess and use "rough heuristics" (i.e., "heuristics developed via limited or non-existent first-hand experience") with negative consequences, whereas other managers combine such heuristics with causal knowledge, resulting in higher quality decision making and superior performance.	• Offers a more nuanced understanding of the (in) effectiveness of heuristics by examining their negative and positive consequences in relation to wider organizational knowledge processes • Enhances understanding of socio-cultural processes pertaining to heuristics and biases

[a]We further elaborate on the originality and significance of each article incorporated into the special issue in the Future Directions section of this essay.

(Hambrick and Crossland, 2018; Hodgkinson and Healey, 2011; Levinthal, 2011; Powell et al., 2011). Behavioural strategy represents a coordinated effort to understand better why organizations act and perform in particular ways, in line with the ultimate goal of all strategy research. Drawing on cognitive and social psychology, members of the behavioural strategy research community are variously building on, but also challenging, the central foundations of behavioural decision theory, with a view to: '[strengthening] the empirical integrity and practical usefulness of strategy theory by grounding strategic management in realistic assumptions about human cognition, emotion, and social interaction' (Powell et al., 2011, p. 1369). Although the label of behavioural strategy is relatively new,[1] much of its subject matter dates back to the aforementioned Carnegie School. Recent citation mapping studies (Anwar et al., 2022; Urío et al., 2022) attest to the foundational importance of behavioural decision theory (e.g., Simon, 1955), especially the heuristics and biases approach (e.g., Hodgkinson et al., 1999; Kahneman and Tversky, 1979; Schwenk, 1984; Tversky and Kahneman, 1974) and the 'behavioral theory of the firm' (Cyert and March, 1963; Levinthal, 2011).

The Heuristics and Biases Program

Herbert Simon contributed a number of classic insights into the fundamental information processing limitations of human decision makers, in particular through his notion of bounded rationality, which centres on the basic idea that human decision makers strive for rationality within the limits of their finite cognitive capacities and information availability (Simon, 1955, 1956, 1957). Simon's work suggests that because organizational decision makers lack the processing capacity to make fully informed decisions, they often rely on cognitive shortcuts as a basic strategy for reducing the effort associated with the task at hand (Shah and Oppenheimer, 2008; Simon, 1956, 1957). By way of illustration, one such shortcut, known as satisficing, entails decision makers choosing the first available alternative that meets their minimum requirements in respect of a given set of criteria (Simon, 1957). Relative to computationally more intensive approaches that necessitate comparing the various alternatives under consideration on a more systematic basis, satisficing is much simpler in terms of its cognitive operations, thus making fewer demands on decision makers' scarce mental resources. Unfortunately, however, given that once an 'acceptable' option is found, the search for and evaluation of further, potentially better, alternatives ceases, all-too-frequently this approach to decision making results in suboptimal outcomes.

Building on Simon's work, Tversky and Kahneman (1974) led the development of the extensive body of literature that has come to be known as *the heuristics and biases program* (for detailed overviews, see Gilovich et al., 2002; Kahneman, 2011; Kahneman et al., 1982; Shah and Oppenheimer, 2008). Advanced primarily through laboratory experiments, this program of research has favoured a sceptical attitude toward intuitive judgement and identified numerous decision heuristics (i.e., basic rules of thumb), which, like satisficing, involve less mental effort, but also can, and often do, result in systematic deviations from rationality (i.e., cognitive biases). Among other prominent examples are the 'representativeness heuristic', which focuses decision makers' attention on only what is typical, with the attendant danger of a 'representativeness bias', and the 'availability heuristic', which favours what comes easily to mind, with the attendant risk of an 'availability bias'.

The heuristics and biases program of research soon extended its influence well beyond the confines of psychology laboratories, with applications across the full spectrum of the social and behavioural sciences, including management studies — where many MOC researchers adopted this body of work as a foundation for analysing organizational decision processes. Three key features of the decision environments confronting the upper echelons of firms — uncertainty (Cyert and March, 1963), complexity (Busenitz and Barney, 1997), and urgency (Forbes, 2005) — render the study of heuristics and biases an especially fruitful context for advancing MOC theory and research. Behavioural decision theory suggests that, in these situations, organizational decision makers will typically fall back on heuristics like the ones outlined above. A considerable volume of work in management studies has demonstrated that many of the biases identified in the heuristics and biases program of research are highly applicable in the context of upper echelons strategic decision making (see, e.g., Barnes, 1984; Bateman and Zeithaml, 1989a, 1989b; Das and Teng, 1999; Maule and Hodgkinson, 2002, Schwenk, 1984, 1986, 1988).

Dual-Process Theories

The heuristics and biases program of work, and related work in the field of management heavily influenced by it, is predicated on a set of theories known as dual-process theories, emanating from the related subfields of cognitive (e.g., Evans, 1984; Schneider and Shiffrin, 1977; Shiffrin and Schneider, 1977) and social (e.g., Chaiken, 1980; Petty and Cacioppo, 1986) psychology. Mindful of the fundamental information processing limitations of human decision makers, encapsulated in Simon's (1955, 1956, 1957) notion of bounded rationality, researchers have long recognized the importance of the twin imperative of having to process information deliberatively and in detail, but also being able to cut through such detail with minimal cognitive effort to perform tasks more efficiently.

Although a wide range of terms have evolved in an effort to characterize with greater precision the mechanisms in play, dual-process theories are united by the common core assumption that two complementary sets of mechanisms enable human decision makers to process information skilfully, namely, a set of processes that lie largely beyond conscious awareness and control (i.e., Type 1, automatic processes), and a set of processes that lie within the realms of conscious awareness and control (i.e., Type 2, controlled processes). Automatic (Type 1) processes enable individuals to cut rapidly and effortlessly through large quantities of information, whereas controlled (Type 2) processes entail detailed analysis and are volitional in nature (Evans and Stanovich, 2013). The body of research falling under the umbrella of the heuristics and biases program ascribes the deployment of heuristics and associated cognitive biases arising from such deployment to the operation of automatic, Type 1 processes, which enable rapid-fire judgement and choice (see, e.g., Evans, 2008; Kahneman, 2011; Stanovich and West, 2000). Unfortunately, as demonstrated earlier, these sorts of processes risk suboptimal outcomes. The attendant remedy is to adopt tools and procedures that trigger controlled, more effortful, Type 2 processes, in an attempt to compensate for the limitations of their Type 1 counterparts (for

representative examples, see Arkes, 1991; Hodgkinson et al., 1999, 2002; Russo and Schoemaker, 1989; Sieck and Yates, 1997).

EXTENDING, COMPLEMENTING, AND CHALLENGING THE PSYCHOLOGICAL FOUNDATIONS OF HEURISTICS AND BIASES RESEARCH

Over the course of the past three decades, several theoretical developments have occurred that variously extend, complement, and challenge the conventional dual-process theory orthodoxy underpinning the heuristics and biases program. These developments similarly extend and problematize the psychological foundations underpinning the main body of MOC theory and research outlined in the previous sections, thus affording significant opportunities for the advancement of theory, research, and practice pertaining to the development and deployment of heuristics and biases in managerial contexts.

Default-Interventionist versus Parallel-Competitive Accounts of Dual-Processing

In the field of psychology, Evans (2007) has differentiated two fundamentally different categories of dual-process theory: default-interventionist and parallel-competitive (see also Evans and Stanovich, 2013). Default-interventionist dual-process theories (e.g., Kahneman and Frederick, 2002; Stanovich and West, 2000; Tversky and Kahneman, 1981) assume that the default position of human decision makers is to rely on less costly Type 1 processes, so as to conserve the scarce cognitive resources required for Type 2 processes, deploying the latter only as and when essential (see also Kahneman, 2011). In contrast, parallel-competitive dual-process theories (e.g., Barbey and Sloman, 2007; Epstein, 1994; Epstein and Pacini, 1999; Sloman, 1996; Smith and DeCoster, 2000) assume that Type 1 and Type 2 processes operate in parallel, and, in the event of conflicts between them, these varied processes literally compete for the control of thinking and behaviour. As noted by Hodgkinson and Sadler-Smith (2018), management researchers have not paid sufficient attention to the importance of this distinction, thus risking the development of a body of work that is fundamentally incoherent, based on a blend of incommensurable psychological assumptions.

Hodgkinson and Healey (2011) maintain that parallel-competitive formulations offer a more nuanced and realistic depiction of organizational decision makers as thinking and feeling beings, the logic of which points to a need for tools and practices that augment not only the cognitive capabilities of organizational decision makers, but also their affective capabilities, on both an individual and collective basis. To this end, Hodgkinson and Healey (2011) advocate the modification of cognitive mapping and related decision aiding techniques, in order to enable the elicitation and representation of decision makers' feelings and affective reactions to strategic issues and choices, rather than the more common practice of focusing on the mapping of strategists' conceptual knowledge per se (e.g., Eden and Ackermann, 1998; Hodgkinson et al., 2004; Huff, 1990). This new

generation of knowledge elicitation and decision aiding techniques, based on 'hot cognition enhancing principles', integrates multiple modalities of thought and can be used both for research and intervention purposes (see, e.g., Healey and Hodgkinson, 2017; Hodgkinson et al., 2015).

In this special issue, the study of Baldacchino et al. (2023) builds on the insights of a prominent parallel-competitive dual-process theory — Epstein's cognitive-experiential self-theory (Epstein, 1994; Epstein and Pacini, 1999) — in conjunction with the growing literature on managerial and entrepreneurial intuition. Based on a think-aloud protocol analysis and accompanying survey of 74 technology entrepreneurs, Baldacchino et al. (2023) find that, in the process of new venture creation, experienced technology entrepreneurs employ a combination of intuitive and analytical information processing strategies, extensively, in a cognitively versatile manner, switching back and forth as necessary. This research contributes to the literature on dual-process theory in management studies by showing that prior entrepreneurial experience in a given domain enhances the ability of entrepreneurs to make effective use of intuition and analysis in concert, thus enabling them to generate more and better quality (i.e., more innovative) new venture ideas than novices. Baldacchino et al.'s (2023) findings extend earlier work suggesting that experience facilitates the development and deployment of context-dependent heuristics that aid decision making (Day and Lord, 1992), effectively turning them into performance-enhancing managerial capabilities, rather than detrimental rules of thumb (Maitland and Sammartino, 2015), as commonly viewed by heuristics and biases researchers.

Alternative Conceptions of Bounded Rationality and Heuristics

A second set of developments, which challenge the psychological foundations underpinning dual-process theories of all forms, posits an alternative conception of heuristics that runs counter to the notion of heuristics as depicted by Kahneman and Tversky and the wider heuristics and biases research community. Gigerenzer and colleagues (Gigerenzer, 1991; Gigerenzer and Goldstein, 1996) maintain that many of the basic laboratory tasks employed in standard behavioural decision theory experiments lack ecological validity (cf. Kahneman and Tversky, 1996). Predicated upon a conception of Simon's bounded rationality notion known as ecological rationality, which differs fundamentally from the manner in which this notion is construed by traditional behavioural decision researchers, this stream of research emphasizes the upsides of heuristics, of the sort deployed in real world contexts by skilled and experienced decision makers.

Gigerenzer and colleagues have identified a set of heuristics known as 'fast and frugal heuristics', or equivalently, 'simple rules' (Bingham and Eisenhardt, 2011; Gigerenzer et al., 2022), which they maintain are adaptively matched to the informational structure and demands of decision makers' everyday work environments, in ways that are more likely to lead to faster and more effective outcomes, relative to more complex statistical procedures (for overviews, see Artinger et al., 2015; Gigerenzer and Gaissmaier, 2011; Gigerenzer et al., 2022). This body of work deviates markedly from dual-process theories, aligning instead with a single-system view

of information processing. Gigerenzer and colleagues maintain that: (a) intuitive processing and deliberative processing are both rule-based, (b) a common set of rules underpins intuition and deliberation, and (c) the important question is one of rule selection (Kruglanski and Gigerenzer, 2011).

The study of ecologically rational, fast and frugal heuristics in organizations is still at an early, but rapidly developing, stage of development (Gigerenzer et al., 2022; Hodgkinson and Healey, 2008). There have been considerable efforts to differentiate this emerging body of work from the body of work falling under the umbrella of the heuristics and biases program discussed earlier (see, e.g., Bingham and Eisenhardt, 2014; Gigerenzer, 1991; Gigerenzer and Goldstein, 1996; Hodgkinson and Healey, 2008; Hodgkinson and Sparrow, 2002; Kahneman and Tversky, 1996; Lejarraga and Pindard-Lejarraga, 2020; Vuori and Vuori, 2014).[2] Only recently, however, has empirical research addressing this important line of inquiry been conducted beyond the confines of the laboratory, or employed real, as opposed to simulated, data to test the performance of fast and frugal heuristics against their conventional counterparts, thus leaving open important questions regarding the generalizability of this body of work to the realities of the corporate world and wider organizational field settings. For these reasons, it is still too early to discern the extent to which top managers actually rely on fast and frugal heuristics and with what effect. Hence, there is a need for further validation of the fast and frugal heuristics notion and the theory of ecological rationality underpinning it, in both controlled and organizational field settings, presenting rich opportunities for new work that seeks variously to extend and contest this important line of inquiry.

Four of the papers published in this special issue advance understanding of fast and frugal heuristics in managerial settings. In the first of these pieces, Atanasiu et al. (2023) explore how CEOs develop 'simple rules', through a complex series of changes to their cognitive schemas, which are then diffused and adopted on a collective basis. Their findings, based on 31 semi-structured interviews, illustrate a four-phase process of CEO schema change: dissonancing (shifting from a broken schema to the lack of having any schema), realizing (shifting from the absence of a schema to the creation of a new schema), crystallizing (moving from the possession of a younger, emerging schema to holding a mature schema), and organizing (progressing from the CEO personally possessing a mature schema to the creation of a collective schema that is shared by the top management team and/or, indeed, the wider organization). The findings also reveal how a combination of decision makers' feelings, the interplay of intuition and reflection, and the nature of the task environment are important enablers of this process.

In the second of these pieces, Kruse et al. (2023) explicitly position their study of new product development (NPD) decisions on the part of the CEOs of 1046 German firms as a response to calls for additional generalizable evidence pertaining to the ecological rationality of heuristics in managerial contexts. The authors develop and test the theoretical claim that the speed and innovativeness of NPD mediates the impact of CEOs' decision styles on the performance of their firms. Differentiating two important dimensions of the decision styles construct, namely, the use of heuristics and 'decision standards', a key insight of this study is that firms led by CEOs who make greater use of heuristics in the context of NPD decision making exhibit superior performance, because these cognitive shortcuts enable such firms to accelerate the development of new products.

However, the deployment of heuristics by CEOs has no impact on NPD innovativeness. Kruse and colleagues' study also finds that higher decision standards on the part of CEOs promote both the faster development of new products and greater innovativeness in such development, in turn driving up their firms' performance. However, the results also suggest that CEOs marked by a stronger tendency to make the best decisions possible (i.e., CEOs whose decision styles drive them to promote higher decision standards) are less inclined to deploy heuristics in their decision making. Nevertheless, the positive link, overall, between CEOs' use of heuristics and the superior performance of their firms indicates that heuristics are an effective decision tool in the context of NPD decision making, thus strengthening the evidence base supporting a more positive view of heuristics in management studies.

Further addressing the important question of how fast and frugal heuristics emerge at the individual level and evolve into shared organizational knowledge, like Atanasiu et al.'s (2023) piece, the article by Vuori et al. (2023) examines the interplay of heuristics and causal knowledge at individual and collective levels. Adopting a multiple case study approach, comprising interview and archival data from five companies, the authors identify alternative pathways to the development of shared cognition. Their findings reveal that whereas some managers develop and deploy 'rough heuristics' (i.e., heuristics based on only limited or non-existent first-hand experience), which result in faulty decisions, other managers combine the use of such heuristics with causal understandings somewhat akin to the schemas studied by Atanasiu et al. (2023), which can sometimes lead to higher quality decision making and superior performance. However, unlike the shared schemas identified by Atanasiu et al. (2023), the causal knowledge representations studied by Vuori et al. (2023) were found to often evaporate during attempts at collective articulation and codification, leading to mistakes when decision makers attempted to apply the resulting insights in fresh contexts. Departing from Atanasiu et al. (2023), who argue that heuristics developed by CEOs are automatically institutionalized into organizational-level policies, the findings of Vuori et al.'s (2023) study suggest the process of attempting to deliberately transfer individual-level heuristics and, relatedly, causal knowledge, to the organizational level, is fraught with difficulties, posing significant challenges in respect of collective articulation and codification (cf. Hodgkinson, 2003; Hodgkinson and Sparrow, 2002; Tsoukas, 2003; Tsoukas and Vladimirou, 2002).

Although much thinking about bounded rationality (in particular, the ecological rationality approach) is centered on decision situations that are complex, uncertain, and requiring urgency, surprisingly little attention has been devoted, thus far, to the analysis of uncertainty in theorizing the nature and significance of top mangers' heuristics and biases (cf. Huff et al., 2016; Kay and King, 2020; Milliken, 1987). One form of uncertainty, in particular, known as Knightian uncertainty (after Knight, 1921), is especially worthy of investigation. Smit's (2023) article, takes an important step toward meeting this agenda by investigating the dynamics pertaining to the deployment of heuristics by top managers confronted with this particular form of uncertainty, which arises when, as is the case with many of the issues faced by top managers, it is not possible to characterize the decision alternatives at hand in probabilistic terms (Huff et al., 2016; Kay and King, 2020; Knight, 1921). Specifically, Smit (2023) theorizes and then empirically investigates the transition from the use of predictive heuristics

to control heuristics in response to Knightian uncertainty and examines the role of 'environmental framing' (i.e., framing uncertainty as an opportunity vs. framing it as a threat) in such transitions. The author designed and ran a scenario-based experiment, manipulating the extent to which executives faced an uncertain (i.e., the experimental treatment) or predictable (i.e., the control treatment) environment. The analysis of data gathered from a sample of 147 top managers shows that executives use predictive heuristics (forecasting, planning) to cope with Knightian uncertainty, particularly when the situations confronting them are framed as threats. However, when these situations are framed as opportunities, executives are more inclined to adopt control heuristics (i.e., non-predictive heuristics). Post-hoc analyses suggest that experience may offer managers a stock of control heuristics that help them in their adaptive efforts. Overall, this article extends the current literature by demonstrating that managers do not mechanically apply control or prediction heuristics in the face of Knightian uncertainty. Instead, the selection of particular types of heuristics is nuanced, changes over time, and is moderated by framing.

Taken together, these four interrelated special issue articles illustrate the theoretical promise and practical value of more carefully considering the question of how fast and frugal heuristics/simple rules emerge, evolve, and ultimately spread in organizational settings. However, more work is urgently required to deepen and extend the embryonic insights afforded by each of these pieces.

Attribution Theory

Like heuristics, causal representations of knowledge can be cognitively biased (see, e.g., Calori et al., 1992, 1994; Hodgkinson et al., 1999; Hodgkinson and Maule, 2002; Kelley, 1972; Maule et al., 2003; Schwenk, 1986). Acknowledging this reality, a third set of developments offer complementary insights into the reasons why top managers' causal explanations for the conduct and performance of their organizations frequently depart from the objective realities prevailing, stemming from the application of attribution theory.

Attribution theory researchers are united by a common focus on the tendency of people to draw causal inferences in respect of the events they encounter, an essential prerequisite for evolution and survival, and a primary motivating force for adaptive behaviour (Heider, 1958; Martinko et al., 2006). Attribution theorists maintain that, in seeking causal explanations, in their quest to make sense of the important events they observe and experience, people often fall prey to a number of fundamental attributional biases, not least the self-serving attribution bias; i.e., the tendency to attribute favourable outcomes and events to dispositional (i.e., internal) causes (e.g., one's own personality and ability), and unfavourable ones to situational (i.e., external) causes, such as the lack of suitable equipment (Heider, 1958; Weiner, 1985). Inter alia, such biased attributions protect and maintain decision makers' self-esteem, and shape their subsequent cognitive, affective, and behavioural responses (Heider, 1958; Kelley and Michela, 1980; Weiner, 1985).

Attribution theory researchers have variously studied the front end information processing requirements (consensus, consistency, and distinctiveness) for making causal

inferences, the dimensions that differentiate the varying assortment of attributions (e.g., internal vs. external, controllable vs. uncontrollable, stable vs. unstable), the consequences of such inferences for expectancies, emotions, and behaviour, and the nature and role of attributional styles and individual differences in respect of a wide range of work-related phenomena (for a comprehensive overview of these developments, see Martinko et al., 2006). Strategy scholars have drawn on the insights of this body of work to advance understanding of how some of the widely studied attributional biases that have been found to distort causal perceptions undermine strategic decision processes and outcomes (see, e.g., Bingham and Haleblian, 2012; Clapham and Schwenk, 1991; Parker, 2009; Vaara et al., 2014).

In this special issue, the study reported by Shi et al. (2023) contributes directly to the advancement of attribution theory in the strategy domain, through the development and application of the new construct known as 'executive internal attribution tendency' (EIAT). The results, based on an analysis of conference call transcripts pertaining to 2424 US firms, show that when confronted with performance shortfalls, CEOs with a strong EIAT will increase the number of downsizing actions, reflecting a heightened sense of awareness and responsibility for the performance outcomes of their firms, relative to their counterparts with a weak EIAT. Conversely, the results show that CEOs with a weak EIAT decrease the number of downsizing actions in the face of such shortfalls. In addition, the findings indicate that the moderating effect of EIAT is heightened when CEOs have the motivation (e.g., scrutiny from financial analysts) and/or the capability (e.g., the existence of an unfavourable external environment) to avoid taking responsibility for the performance shortfalls of their firms.

In sum Shi et al.'s (2023) article contributes to the growing body of work developing attribution theory insights into the cognitive biases of CEOs and upper echelons leaders more generally by establishing the importance of EIAT as a cognitive bias that transcends the particular situational contingencies prevailing, thus having the potential to misdirect firms' strategic actions to a considerable extent.[3] In advancing a person-specific perspective, it paves the way for future contributions that can capitalize on this underutilized theoretical approach to the analysis of the origins and effects of top managers' cognitive biases on organizations' strategic decision processes and outcomes.

The Interpretivist Perspective

Like the ecological rationality perspective championed by fast and frugal heuristics researchers, the interpretivist perspective challenges the classical bounded rationality orthodoxy of behavioural decision theory. However, it does so in a manner that clashes with the objectivist conception of environment underpinning both the classical and ecological rationality notions of bounded rationality.

Interpretivist approaches build on the highly influential work of Karl Weick, in particular his related concepts of enactment (Weick, 1969, 1979) and sensemaking (Weick, 1995), which challenge the notion that the environment is an objective entity that is only partially comprehended due to limited processing capacity. Weick's work problematizes this particular view of the environment (which he terms 'the perceived environment'), and the limited

capacity information processing model of cognition accompanying it, arguing that theories stressing the notion that reality is selectively perceived over-emphasize the object → subject relationship, at the expense of the idea that often the subject exerts considerable influence on the object. To a certain extent, the insights of this perspective resonate with those of the attribution theory perspective outlined in the previous section; for as Tourish and Robson (2006, pp. 725–6) observed: 'the sense-making approaches of both managers and non-managers tend to be self-serving in nature, and are more likely to reinforce the status quo than stimulate change.' Supporting this observation, Tourish and Robson (2006) found that the sensemaking heuristics of top managers led them to overcommit to specific actions, partly by disregarding upward communications that challenged those actions. Conversely, they found that the sensemaking heuristics of non-managers muted the upward flow of information, due to fears that it might be deemed unduly critical by their senior colleagues.

In view of its relativistic stance, as noted at the outset of this all-too brief section, the work of Weick and colleagues points to some problematic elements of the notion of ecological rationality, which, despite departing significantly from the cognitive foundations of the heuristics and biases program, nevertheless embraces an essentially objectivist conception of environment (cf. Atanasiu et al., 2023). The relative merits of each of these perspectives, and related alternatives, concerning the nature of cognition and reality are, of course, the subject of longstanding debate, with a range of theorists variously championing the virtues of computational and interpretivist approaches to the study of human cognition, in varied combinations (see, e.g., Chater et al., 2018; Lant and Shapira, 2001; Meziani and Cabantous, 2020; Smircich and Stubbart, 1985; Sutcliffe and Weick, 2008).

The Microfoundations Perspective

The 'microfoundations movement' in strategy and organization theory (Barney and Felin, 2013; Felin and Foss, 2005; Foss, 2011; Gavetti, 2005; Helfat and Peteraf, 2015; Teece, 2007), mentioned earlier, has gathered momentum over the past decade. Managerial decision making is an inherently complex and multilevel process, influenced by a host of contingent intra-, inter-, and extra-personal factors (Hodgkinson and Sparrow, 2002; Hodgkinson and Starbuck, 2008; Powell et al., 2011). Contrary to some of the critiques of microfoundations concerning excessive reductionism and individualism, the aim of this approach is to bridge the theoretical gaps between levels of analyses and, in so doing, bring theorizing closer to the realities of managerial work, through a basic acknowledgement that the micro level is inherently linked to the meso and macro levels, because individuals are embedded in particular meso and macro contexts, not least, teams, organizations, institutions, and markets (cf. Felin et al., 2015, p. 599). Microfoundational work thus contributes to the analysis and understanding of managerial decision making on a more systemic basis.

Three of the articles published in this special issue illustrate the virtues of microfoundational approaches. Junge et al.'s (2023) article exemplifies this line of inquiry by demonstrating how top-down causal emergents in organizations — i.e., higher-level factors such as norms, routines, and structures that emerge from lower-level processes — can ultimately influence the cognitive processes and behaviour of senior decision makers. The authors of this piece investigate how variations in organizational structure — i.e., functional versus divisional forms — are associated with systematic variations in CEOs'

perceptions of their extra-organizational competitive environments, relative to objective, accounting-based assessments of those environments. Analysing data gathered over a period of 13 years, from a sample of 216 S&P 500-listed US companies and 281 CEOs, Junge and colleagues demonstrate that functional structures are associated with wider environmental perception gaps, whereas divisional structures are associated with narrower gaps. CEOs' independent reasoning ability moderates the extent to which their perception gaps vary as a function of these contextual influences, especially in relation to the impact of structural variations along functional lines. Overall, this article extends the current literature by demonstrating, in line with microfoundational thinking, how the quality of top managers' judgements are not only a function of individual-level factors but also of organizational-level influences.

Relatedly, the special issue article by Cerar et al. (2023) examines the impact of subsidiary country context on the cognitive processes of decision makers responsible for allocating headquarters' financial resources to entrepreneurial initiatives proposed by the subsidiaries of multinational corporations. Cerar and colleagues designed and ran an experimental vignette study of 1308 resource allocation decisions, which they followed up with an interview-based study of relevant senior managers to contextualize their experiment-based findings. Their findings overall reveal how biased decisions can arise from the deployment of 'name-based heuristics'; that is, cognitive shortcuts based on the names of the subsidiary managers associated with the proposals in question. More specifically, Cerar and colleagues find that when subsidiary managers' names are potentially indicative of expatriate status and thus imply greater levels of psychic distance between the manager and the subsidiary country, the less the likelihood of a positive resource allocation decision. Conversely, positive resource allocation outcomes are more likely when the subsidiary manager's name is potentially indicative of local status. Linking closely to central themes in the international business literature, this work advances understanding of the role of the broader institutional context and institutional misalignment in decision making, which can arise from the cognitive biases of key decision makers drawn from divergent sociocultural backgrounds.

Finally, the study reported in the special issue article by Resick et al. (2023) investigates the contingent role of firms' competitive environments in moderating the impact of their CEOs' core self-evaluations and positive self-regard traits in respect of risk-taking strategies. More specifically, the authors examine the moderating effects of concentration, dynamism, and munificence — three widely theorized dimensions of external competitive environments — on the relationships between the theorized individual differences of CEOs and their firms' risk-taking strategies in respect of resource allocation decisions and strategic non-conformity. The findings of the six-year longitudinal historiometric study of 106 CEOs of US public companies, reported in this article, reveal that CEOs characterized by high core self-evaluation differentially pursue risks, dependent on the form of risk (resource allocation decisions vs. strategic non-conformity) and the degree of concentration and dynamism inherent in their firms' competitive environment, but not based on variations in the extent of environmental munificence. Broadly, these findings suggest that CEOs whose personalities reflect higher core self-evaluations are more responsive and adaptive to environmental cues. The findings thus challenge the traditional view of high core self-evaluation

CEOs as undiscriminating bold decision makers, who pursue high-risk, high-return strategies, irrespective of the contingencies prevailing, borne of a misplaced sense of their own capabilities for managing such risks.

Taken together, these three articles highlight the importance of contextual factors, both objective and perceived, as determinants of organizational decision processes, at individual and collective levels. The articles lend significant empirical credence to the notion that top managers' heuristics and biases ultimately result from a combination of individual- and collective factors embedded in the wider socio-material fabric of their intra- and extra-organizational environments (Felin et al., 2012, 2015; Hodgkinson and Sadler-Smith, 2018).

FUTURE RESEARCH DIRECTIONS

In the previous sections, we have illustrated how the articles selected for inclusion in this special issue connect with and, in varied ways, extend, complement, and/or challenge, a diverse array of theoretical perspectives. However, they also highlight the fact that there is still much that remains unknown about the origins, nature, and significance of top managers' heuristics and cognitive biases, affording ample opportunities for further work. Before concluding this introduction article, we want to offer some additional thoughts on the pieces incorporated in the special issue and make some suggestions for future lines of inquiry, with a view to capitalizing on the present momentum.

Generate a More Nuanced Understanding of Heuristics and Biases

Although most research examining decision processes within the upper echelons of organizations has tended to highlight the negative consequences of heuristics (Chen et al., 2015; Elfenbein et al., 2017), as we have seen, a growing number of researchers whose work is predicated on the ecological rationality perspective are investigating the potential upsides that can arise when these basic rules of thumb are adaptively matched to the decision environment (Gigerenzer and Gaissmaier, 2011; Luan et al., 2019; Maitland and Sammartino, 2015). Researchers adopting this approach are beginning to demonstrate the success of fast and frugal heuristics in complex environments characterized by uncertainty, as opposed to calculable risk (Artinger et al., 2015; Gigerenzer et al., 2022).

Additional recent work is similarly highlighting upsides for organizational decision processes and outcomes that can arise from cognitive biases such as CEO overconfidence (Burkhard et al., 2022; Galasso and Simcoe, 2011) and executive hubris more generally (Tang et al., 2015). Resick et al.'s (2023) study, reported in this special issue, contributes significantly to this research stream by showing that CEOs' core self-evaluations can lead to adaptive, as opposed to maladaptive, strategic behaviour, as a function of several contingent features of the competitive environment in which their firms are embedded. Similarly, the study by Kruse et al. (2023) makes a significant contribution to this line of inquiry by demonstrating that in the domain of NPD, top managers' heuristics can be an effective decision aid, helping to create value for firms by accelerating the development of new products.

Two further articles published in this special issue illustrate the significant progress that has been made in studying the role of contextual factors in amplifying and attenuating the effects of top management heuristics and biases, addressing respectively the impact of organizational design (Junge et al., 2023) and the international context (Cerar et al., 2023), as contingent sources of variation that have a major bearing on organizational decision processes and outcomes. Yet more research is required along these lines, to explore further how, why, and when particular cognitive processes yield beneficial and/or detrimental outcomes (cf. Burkhard et al., 2022; Chen et al., 2015; Graffin et al., 2013; Li and Tang, 2010). Advancing this line of inquiry necessitates a deeper exploration of the underlying mechanisms (cognitive, motivational, and social) that link the judgements and decisions of senior executives to the contingency factors (intrapersonal, intra-organizational, and extra-organizational) that shape them.

While recognizing the importance of differentiating the theoretical foundations underpinning particular bodies of work, we also want to encourage researchers in future work to develop integrative perspectives on top managers' heuristics and biases in organizations. In particular, we would like to see work that highlights the complementarities of the heuristics and biases and ecological rationality perspectives (cf. Bingham and Eisenhardt, 2011, 2014; Vuori and Vuori, 2014), with a view to identifying with greater precision the conditions under which the varied heuristics identified within each of these streams of work are more and less beneficial and detrimental for organizational decision making and strategic adaptation.

Uncover Novel and Under-Examined Heuristics and Biases

Although researchers have identified a wide-ranging assortment of heuristics and cognitive biases that influence strategic decision processes in interesting and varied ways (Bazerman and Moore, 2013; Das and Teng, 1999; Maule and Hodgkinson, 2002; Schwenk, 1984, 1986, 1988), our search of the literature revealed that CEO overconfidence has disproportionately occupied the attention of management studies researchers. While studying CEO overconfidence is certainly interesting and relevant to the analysis of decision making in the upper echelons of organizations, we believe that many other phenomena that are similarly interesting and relevant to the topic at hand, as outlined in earlier sections, demand equally high levels of scholarly attention.

There are doubtless a good number of additional interesting and relevant psychological phenomena that have a major bearing on the judgement and decision making of top managers that have yet to be discovered, exemplified by the 'survivability' and 'affordability' heuristics identified in 'risky industries' by Meszaros (1999), and the heuristics deployed by strategists in making market entry decisions, discovered more recently by Mac Cawley et al. (2019), which vary as a function of the prevailing industry lifecycle dynamics. The Cerar et al. (2023) and Shi et al. (2023) articles published in this special issue have paved the way for further work along these lines, by examining two important but understudied phenomena: 'name-based heuristics' and 'executive internal attribution tendency'.

Additional work is now required to uncover further examples of novel heuristics, particularly in relation to contemporary work-related issues, such as digitalization, machine learning, and artificial intelligence (Gigerenzer et al., 2022; Neuhaus et al., 2021).

Potential interaction effects arising from varied combinations of heuristics and biases (Abatecola, 2014; Schwenk, 1986) are also deserving of further investigation. More specifically, such work is required to elucidate how, why, and when particular combinations of heuristics yield 'superadditivity' effects in the form of improvements and/or decrements to strategic decision processes and outcomes, at individual and collective levels (cf. Gigerenzer et al., 2022, p. 184).

Advance Understanding of the Role of Emotionality and Socio-Cultural Processes in the Development and Deployment of Heuristics and Biases

We believe that more research is also warranted to understand the interactions between heuristics and emotionality. In recent years behavioural decision researchers have devoted increasing attention to the analysis of the nature and significance of affect and discrete emotions in judgement and decision making (see, e.g., Lerner et al., 2015; Loewenstein, 1996; Loewenstein et al., 2001), building on the increased understanding of the inseparability of emotion and cognition in all but the least consequential of tasks and situations (Ashton-James and Ashkanasy, 2008; Damasio, 1994; Elfenbein, 2023; Forgas, 1995; Grichnik et al., 2010; Lazarus, 1991; LeDoux, 2000; Smith and Ellsworth, 1985; Welpe et al., 2012). Viewed from the perspective of parallel-competitive dual-process theories, these advances suggest that, rather than acting simply as a disturbance to effortful, Type 2 processes, which should be suppressed at every available opportunity, affect and emotion are integral to the very nature of cognition, infusing reasoning, learning, decision making, and action (Hodgkinson and Healey, 2011). For these reasons, alleviating cognitive bias and related strategic persistence- and escalation-inducing tendencies requires well-developed self- and emotion-regulation capabilities on the part of decision makers (Sivanathan et al., 2008; Wong et al., 2006), pointing to a need for tools and practices that augment the cognitive *and* affective capabilities of individuals and teams (Healey and Hodgkinson, 2017; Hodgkinson et al., 2015). An interesting extension to this important line of inquiry would be to examine how varied combinations of affect and discrete emotions contribute to the emergence and deployment of heuristics by upper echelons decision makers, and ascertain the attendant impact of those heuristics, for better or worse, on the outcomes of strategy making processes and strategic adaptation (cf. Elsbach and Barr, 1999; Finucane et al., 2000; Slovic et al., 2004; Sivanathan et al., 2008; Wong et al., 2006). Building on general theories of affect and emotions (e.g., Feldman Barrett and Russell, 1998; Forgas, 1995; Lazarus, 1991) could offer a fruitful means of further theorizing about why and how some senior executives develop heuristics that bias decision making and fuel strategic persistence and escalation, whereas other executives develop heuristics that significantly improve matters (cf. Schwenk, 1986).

Another potentially profitable direction for future work is to explore further the role of socio-cultural and group processes (e.g., Cooke et al., 2013; Healey et al., 2015) in the development and deployment of heuristics, and their attendant consequences, building on previous work demonstrating that heuristics (and biases) both influence and are influenced by such processes (Ashton-James and Ashkanasy, 2008; Bingham et al., 2019; Gigerenzer et al., 2022). The articles by Atanasiu et al. (2023) and Vuori et al. (2023)

published in this special issue demonstrate the untapped potential of this approach, by examining in detail how heuristics developed and deployed by senior decision makers on a personal basis come to be adopted more widely, or otherwise, through an assortment of collective psychological processes. We encourage further work along these lines to investigate the effects of varied socio-cultural contexts on the development of heuristics and biases in top management and entrepreneurial teams, building on the present developments and earlier work that has elucidated the processual nature and temporality of strategic decision making (Schwenk, 1984, 1986). Additional studies are required to tease out how such processes unfold beyond the confines of the top management team, and in so doing, shape the conduct and performance of lower-level teams, departmental units, and individuals. Future research might also profitably further explore how such team-level processes are influenced by broader cultural and institutional factors, in line with the microfoundations thinking that transcends traditional levels of analysis (Barney and Felin, 2013; Felin et al., 2012, 2015; Felin and Foss, 2005; Foss, 2011; Gavetti, 2005; Healey et al., 2018; Healey and Hodgkinson, 2014, 2015; Helfat and Peteraf, 2015; Teece, 2007). In addition, the role of social heuristics, such as imitation, wisdom-of-crowds, and word-of-mouth, could be explored further in this connection (Gigerenzer et al., 2022).

Examine the Development and Impact of Heuristics and Biases under Different Kinds of Uncertainty

As noted earlier, the nature and role of uncertainty in shaping the dynamics pertaining to the deployment of top managers' heuristics is an under-researched issue deserving of further scholarly attention. The related fields of decision theory and economics have made elaborate distinctions between different kinds of risk (e.g., various Bayesian and non-Bayesian interpretations), uncertainty, ambiguity, and ignorance. However, the decision situations confronting top managers can rarely be characterized as risky in the standard probabilistic sense because the state spaces they face are not 'given' (cf. Sutcliffe and Weick, 2008). Indeed, top management action is very much about creating such spaces (see Ehrig and Foss, 2023).

Simon (1955, 1956, 1957) did not make much of the distinction between 'risk' and 'uncertainty', and in general preferred to couch his arguments in terms of complexity, which is conceptually separate from both of these equally important constructs. The core research falling under the umbrella of, and building on, the heuristics and biases program and its associated conception of bounded rationality is predicated, fundamentally so, on a probabilistic view of uncertainty (i.e., 'risk'); for example, prospect theory (Kahneman, 2003) is essentially a reformulation of (subjective) expected utility theory. Although research predicated on the ecological rationality conception of bounded rationality has attempted to grapple with uncertainty more explicitly and deeply (Kozyreva and Hertig, 2021), much of the reasoning underpinning it is similarly based on standard probabilistic arguments.

In the light of these observations, in future work researchers might usefully examine how top managers develop and deploy heuristics when confronted with situations in which it is impossible to quantify in probabilistic terms how the future might unfold, not only in respect of situations where the state spaces are known (but probabilities are

not), but, more fundamentally, in respect of situations where the state spaces are not fully known but managers are aware of this reality, perhaps to differing degrees. How are such situations framed? What are the heuristics that are deployed to deal with the possible emergence of only vaguely anticipated contingencies (cf. Huff et al., 2016; Kay and King, 2020; Maghzi et al., 2023; Milliken, 1987; Sarasvathy, 2001)? Smit's (2023) study reported in this special issue has paved the way for future contributions that might profitably meet this agenda, by exploring how top managers develop and deploy heuristics when confronted with these different kinds of uncertainty.

CONCLUSION

The *Journal of Management Studies* has played a pivotal role in establishing MOC as a vibrant, interdisciplinary subfield of management studies (see, e.g., Argote and Ren, 2012; Bromiley et al., 2019; Eden, 1992; Felin et al., 2012; Fiol and Huff, 1992; Hodgkinson and Thomas, 1997; Miller et al., 2012; Porac and Thomas, 1989; Stubbart, 1989; Tsoukas et al., 2020). A number of influential papers that the journal has published over the past 30+ year period have focused directly on the subject matter of the present special issue, addressing variously the nature and importance of heuristics and/or cognitive biases in managerial and organizational decision making (e.g., Das and Teng, 1999; Day and Lord, 1992; Felin et al., 2012; Hodgkinson and Johnson, 1994; Mac Cawley et al., 2019; Meziani and Cabantous, 2020; Molloy and Schwenk, 1995; Porac et al., 1989; Schwenk, 1988; Sundermeier et al., 2020; Tourish and Robson, 2006; Wang and Wong, 2012). The articles accepted for publication in this special issue build on this rich heritage by showcasing the abundance of different theoretical perspectives and empirical methods that can be used to address novel and interesting research questions pertaining to the heuristics and biases of top managers and, indeed, organizational decision makers in general.

Our ultimate aspiration in editing this special issue was to inspire researchers to continue advancing understanding of how organizational decision makers' heuristics and biases — and their cognitive (in)capacities more generally — enable and impede them variously in their efforts to sense, seize (and shape) opportunities and adapt to the many significant challenges afflicting the world (cf. Helfat and Peteraf, 2015; Hodgkinson and Healey, 2011; Teece, 2007). We hope you enjoy reading it as much as we enjoyed compiling it.

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NOTE

[1] In offering their definition of behavioural strategy, Powell et al. (2011, p. 1371) also noted that 'conceptual unity has been hard to achieve and the domain of possible research is, to say the least, varied'. Other scholars' conceptions of this emerging subfield reflect this fundamental lack of consensus. For example, Hambrick and Crossland (2018) differentiate behavioural strategy 'tents' of varying sizes, which reflect varied definitions. Their small tent interpretation 'amounts to a direct transposition of the logic

of behavioral economics (and behavioral finance) to the field of strategic management', whereas their larger tent conception includes 'all forms and styles of research that consider *any* psychological, social, or political ingredients in strategic management' (Hambrick and Crossland, 2018, p. 25). The midsized tent conception, favoured by Hambrick and Crossland (2018, p. 31), views behavioural strategy as a 'commitment to understanding the psychology of strategists'.

[2] Unfortunately, however, the differences between these fundamentally incompatible bodies of work are not always rendered explicit by the authors of scholarly works. Indeed, during the course of editing this special issue, we encountered several instances where they were misguidedly discussed as a unified whole, with key references pertaining to each of them cited concurrently, in the absence of critical reflection on the importance of the many varied ways in which they differ.

[3] This notion departs markedly from the self-serving attribution bias studied more commonly by strategy researchers, which, as demonstrated by Clapham and Schwenk (1991) and Vaara et al. (2014), tends to be triggered by situational factors. In contrast, the EIAT represents a general attribution tendency, somewhat similar to the notion of a stable attributional style (see Martinko et al., 2006). Although the latter notion has been studied extensively by attribution theory researchers, through the development of a wide-ranging assortment of psychometric instruments and observational coding schemes (see, e.g., McAuley et al., 1992; Munton et al., 1999; Thomson and Martinko, 2004; Peterson and Villanova, 1988), in an attempt to ascertain the extent to which people more generally display cross-situational consistencies (i.e., biases) in the manner in which they make causal attributions, this line of inquiry is less common in the analysis of top managers' strategic decision processes.

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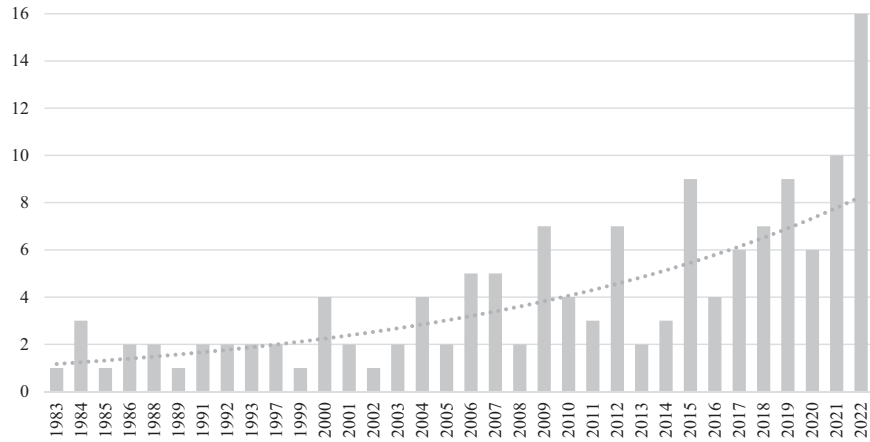
APPENDIX 1
Evolution of Research on Top Managers' Heuristics and Cognitive Biases



This Figure shows the number of publications pertaining to the heuristics and biases of top managers that have appeared year-on-year in a representative cross-section of leading peer reviewed journals over the past 40 years. Each bar represents the number of relevant articles published in the corresponding year, whereas the dotted line depicts the overall (exponentially smoothed) trend pertaining to these data. To map the evolution of research on the focal topic of this special issue, we searched the Clarivate Web of Science™ database for academic articles containing the terms 'heuristics', 'simple rules', 'rule of thumb', 'cognitive bias', 'overconfidence', 'hubris', 'illusion of control', 'escalation of commitment', 'hindsight bias', 'self-serving bias', 'status quo bias', 'confirmation bias', 'availability bias', and/or 'attribution bias', in combination with the terms 'manager*', 'CEO' and/or 'executive' in the title, abstract, and/or keywords (Boolean search). We limited our search to a representative cross-section of the major general management and field journals that address top manager issues, namely: *Academy of Management Journal*, *Academy of Management Review*, *Administrative Science Quarterly*, *Entrepreneurship Theory & Practice*, *Family Business Review*, *Journal of Business Venturing*,

Journal of International Business Studies, Journal of Management, Journal of Management Studies, Leadership Quarterly, Management Science, Organization Science, Organization Studies, Strategic Entrepreneurship Journal, and *Strategic Management Journal*. We are aware that heuristics and biases research has also been published in other journals. However, a search revealed that their focus is not on addressing top manager issues and therefore we left out these journals. Because the database for some of the journals incorporated in our search only provided the details of potentially relevant publications from 1992 onwards, we also performed a manual search of the contents of each journal, with a view to uncovering applicable work that had appeared prior to this date.