

Working Paper

Amplifying uncertainty: Escaping the lemming's principle – Perception and reasoning capabilities in strategic decisions to deviate from the main field of competitors¹

Abstract:

When do strategic decision-makers follow their competitors and when do they deviate? While prior work in this the management and psychology literature has focused on social and cognitive pressures as well as framing of the decision situation as influencing factors on this strategic decision, we focus on the nature of strategic decision-makers' underlying mental activities. Building on prior work in managerial cognitive capabilities theory, we argue that the strategic decision to follow or deviate from competitors is contingent on how strategic decision-makers perceive uncertainty and on the way in which they reason. Thereby, our analysis suggests that when strategic decision-makers perceive less controllable sources of uncertainty and when they reason sensibly, the likelihood of them taking the strategic decision to deviate from the direction of their competitors increases. By contrast, when strategic decision-makers perceive more controllable sources of uncertainty and reason protectively, the likelihood for strategic decisions to follow competitors rises.

Key words: Uncertainty, strategic decisions, managerial cognitive capabilities, perception, reasoning

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Introduction

Whether to follow or deviate from the general direction of competitors represents a key strategic decision that managers have to take (Dean & Sharfman, 1996; Dobrev, 2007; Greve, 1998; Ross & Sharapov, 2015). Strategic decisions are managerial choices that (re)allocate resources, set important precedents, and shape a firm's general direction (Eisenhardt, 1989a; Fredrickson, 1984; Judge & Miller, 1991; Mintzberg et al., 1976; Mitchell et al., 2011; Nadkarni & Barr, 2008; White, 1981).

The strategic decision to deviate from competitors is argued to be particularly challenging because it takes place under conditions of uncertainty (Schwenk, 1984; Thompson, 1967). Uncertainty refers to “an individual's perceived inability to predict something accurately” (Milliken, 1987: 136) stemming from a lack of confidence in one's knowledge to resolve a decision-situation (Duncan, 1972; Lipshitz & Strauss, 1997). Because it can induce negative emotions, such as stress, doubt, and anxiety (Kiefer, 2005; Lipshitz & Strauss, 1997; McKenzie et al., 2009), as well as adverse performance effects (Michel, 2007; Miller, 1992), uncertainty represents a central challenge in strategic decisions.

There are different theoretical perspectives on why strategic decision-makers would choose to follow the direction of their competitors. These perspectives share the view that strategic decision-makers, when surrounded by peers, become subject to different social and cognitive pressures, such as conformity and legitimization pressures that lead them to herd (e.g., Banerjee, 1992; Dobrev, 2007; Hirshleifer & Teoh, 2003; Olusoga, Mokwa, & Noble, 1995; Olzak & Uhrig, 2001).

Yet, oftentimes, despite these pressures, strategic decision-makers deviate from the direction of their competitors. Prominent examples include, Volvo CEO's strategic decision to only produce electric vehicles from the beginning of 2019 onwards while other incumbents in the automobile industry decided to step-incrementally change propulsion systems (Ritchie, 2017) or Warren Buffett's refusal to invest in technology stocks with Berkshire Hathaway, while other fund managers invested heavily throughout the 1990s (Schroeder, 2008).

One potential explanation for this lies in behavioral decision theory under uncertainty (Kahneman & Tversky, 1979; Tversky & Kahneman, 1992). Absent social and cognitive pressures, this stream of research suggests that individuals are more likely to deviate from competitors when they expect a gain vis-à-vis their current situation

(Kahneman & Tversky, 1979). Similarly, when strategic decision-makers are confronted with a potential loss, they will seek to maintain the status quo (e.g., Bateman & Zeithaml, 1989, Fishburn & Kochenberger, 1979; Kahneman & Tversky, 1979; Laughhunn, Payne, & Crum, 1980; Tversky & Kahneman, 1992, 1986). Yet, while this perspective has contributed invaluable to our understanding of when some individuals are more likely to deviate from their competitors, it left open the question of *why* some individuals sense gains (or losses) while others do not. Furthermore, because this stream of research analyzed decisions of isolated individuals, it does not discuss *how* strategic decision-makers manage to overcome social and cognitive conformity pressures resulting from the presence of their peers (e.g., Dobrev, 2007; Olzak & Uhrig, 2001).

Therefore, a different line of thought that may reconcile these divergent theoretical perspectives lies in managerial cognitive capabilities theory. The managerial cognitive capabilities literature suggests that differences in strategic decisions stems from heterogeneity in strategic decision-makers' cognitive capabilities (Gavetti, 2012; Helfat & Peteraf, 2015; Kaplan, 2008a). A managerial cognitive capability refers to "the capacity of an individual manager to perform one or more of the mental activities that comprise cognition" (Helfat & Peteraf, 2015: 835). Thus, because managerial cognitive capabilities are distributed heterogeneously among individuals (Adner & Helfat, 2003; Gavetti, 2012; Helfat & Peteraf, 2015), some strategic decision-makers, due to their cognitive capabilities, shape the direction of their firm differently than others.

Building on this prior work, our study seeks to answer the following research questions: (1) Which managerial cognitive capabilities make strategic decision-makers follow or deviate from the general direction of competitors? And, (2) how do strategic decision-makers' cognitive capabilities influence their strategic decisions to follow or deviate from competitors?

Hence, the purpose of this study is to explore the nature and differences in managerial cognitive capabilities underlying the strategic decisions to follow or deviate from the general direction of competitors. Our central thesis is that strategic decisions differ because they are based on distinct managerial cognitive capabilities. This perspective entails that despite managerial cognitive capabilities being distributed heterogeneously among individuals, they may exhibit commonalities. Consequentially, shared patterns (cf. Eisenhardt & Martin, 2000) of mental activities that underlie specific strategic decisions may be identified.

We study our research question in the context of professional sailing races, the Volvo Ocean Races 2014-15 and 2017-18. Professional sail races represent an ideal context because they provide us with the opportunity to study strategic decisions within shorter time frames compared to other business settings. Through within and cross-case analysis at the decision-level, we study the nature of skippers' cognitive capabilities underlying strategic decisions to deviate from the general direction of competitors and compare them to those salient in strategic decisions to follow rivals.

Given this context and approach, our research attempts to contribute to literature in several ways: First, our study speaks to the literature discussing the role of cognition in strategic decision-making (e.g., Daft & Weick, 1984; Kaplan, 2008a; Nadkarni & Barr, 2008). By exploring the nature of managerial cognitive capabilities, we specify how strategic decision-makers' mental activities account for differences in their strategic decisions. And second, we contribute to the literature on managerial cognitive capabilities (e.g., Adner & Helfat, 2003; Gavetti, 2005; Helfat & Peteraf, 2015) by investigating the specific nature of managerial cognitive capabilities that drive differences in strategic decisions. This may enable managers to develop cognitive capabilities that help them to take more effective strategic decisions.

Theoretical background

Prior research already demonstrated that uncertainty plays a central role in decision situations (e.g., Cyert & March, 1963; Festinger, 1954; Pfeffer, Salancik & Leblebici, 1976; Thompson, 1967). Haunschild (1994: 408) acknowledged that "there are probably few situations, [...] in which absolutely no uncertainty exists" underlining the centrality of uncertainty in every decision-situation.

Previous studies on behavioral decision-making under conditions of uncertainty (e.g., Kahneman & Tversky, 1979; Tversky & Kahneman, 1992) found that individuals tend to think of a decision in terms of gains and losses vis-à-vis a reference point that may be the status quo (Levy, 1992). Hence, individuals tend to evaluate decision situations in terms of changes of wealth rather than absolute values (Kahneman & Tversky, 1979).

According to this perspective, strategic decision-makers should be particularly prone to deviate from their competitors' direction when they expect a gain vis-à-vis a reference point (cf. Kahneman & Tversky, 1979). Similarly, the literature discusses the

effect of loss aversion (Tversky & Kahneman, 1992, 1986). Loss aversion leads strategic decision-makers to prefer inaction to action and maintenance of the status quo to change (Kahneman, Knetsch, & Thaler, 1991; Samuelson & Zeckhauser, 1988; Tversky & Kahneman, 1991). This is because other decision alternatives are misevaluated overestimating their potential for losses (e.g., Kahneman & Lovallo, 1993). As a consequence, strategic decision-makers pursue a similar direction to competitors in an attempt to reduce uncertainty surrounding the strategic decision. Prior research termed uncertainty reduction a “fundamental need” (Hogg & Mullin, 1999: 253), and a form of control (Case et al., 2004; deCharms, 1968; White, 1959), and therefore the primary guiding principal of human behavior. Hence, strategic decision-makers may only depart from their natural tendency to reduce uncertainty inherent in every decision situation (cf. Haunschild, 1994) when they expect a gain.

In a competitive context, this has two implications: First, strategic decision-makers should be more likely to deviate from their rivals, the more they are lagging behind (i.e., from market leadership). Inverted, this means that the more a strategic decision-makers is ahead of the competition, the less likely that strategic decision-maker will branch out from a reference group. And second, when promised higher rewards (e.g., through incentives), strategic decision-makers should be more likely to deviate from the direction of their competitors.

Yet, while this perspective specifies when some strategic decision-makers should be more likely to deviate from the general direction of their competitors, it leaves open the questions of *why* some strategic decision-makers sense gains or losses (e.g., Dutton & Jackson, 1987), while others do not. Furthermore, *how* do they overcome social and cognitive pressures from their peers (e.g., Dobrev, 2007; Greve, 1998), negative emotions (e.g., Kiefer, 2005; Lipshitz & Strauss, 1997; McKenzie et al., 2009), as well as uncertainty-induced tendencies to make prospective options appear less appealing (e.g., Yates & Stone, 1992)?

This suggests that strategic decision-makers’ underlying mental activities may play a central role in determining whether strategic decision-makers will follow or deviate from the general direction of their competitors.

Managerial cognitive capabilities underlying strategic decisions

Cognition is an important element in strategic decisions that causes regularity in the choices of individuals and organizations (Greve, 1998). Managerial cognition scholars suggest that bounded rationality prevents strategic decision-makers from developing a complete understanding of their environment (Daft & Weick, 1984). Thus, strategic decision-makers make choices based on their subjective representation of the environment (Adner & Helfat, 2003).

Managerial cognitive capabilities theory is concerned with the study of strategic decision-makers' mental activities. According to this perspective, individuals differ in their ability to perform mental activities comprising cognition (e.g., Helfat & Peteraf, 2015). Thus, managerial cognitive capabilities are distributed heterogeneously among strategic decision-makers leading to differences in resource allocation and consequentially strategic decision content (Barr, Stimpert, & Huff, 1992; Tripsas & Gavetti, 2000; Gilbert, 2006).

Helfat and Peteraf (2015) identified and described several distinct managerial cognitive capabilities underlying individuals' ability to sense and seize opportunities as well as reconfigure organizational resources. Among these are strategic decision-makers' perceptions and the way they reason. These two capabilities are particularly important in shaping strategic decisions (cf. Adner & Helfat, 2003; Gavetti, 2012).

Perception encompasses the "construction of meaningful information about a particular environment" (Gazzaniga, Heatherton, & Halpern, 2010: 180) that help in identifying patterns in the environment and interpreting data (Helfat & Peteraf, 2015). Therefore, through the mental activity of perception, strategic decision-makers construe a reality on which they base their strategic decisions. Perceptions enable strategic decision-makers to sense and create opportunities (Baron & Ensley, 2006), or strategic decision option spaces (McGrath, 1997; Trigeorgis & Reuer, 2017). More specifically, depending on how strategic decision-makers perceive uncertainty may affect their ability to identify an opportunity. For example, perception capabilities may support strategic decision-makers in sensing first-mover opportunities for early entry into a market prior to competitors (e.g., Klingbiel & Joseph, 2015; Lieberman & Montgomery, 1988).

Through reasoning, strategic decision-makers then evaluate the information they perceive and draw conclusions for strategic decisions (Adner & Helfat, 2003; Gazzaniga

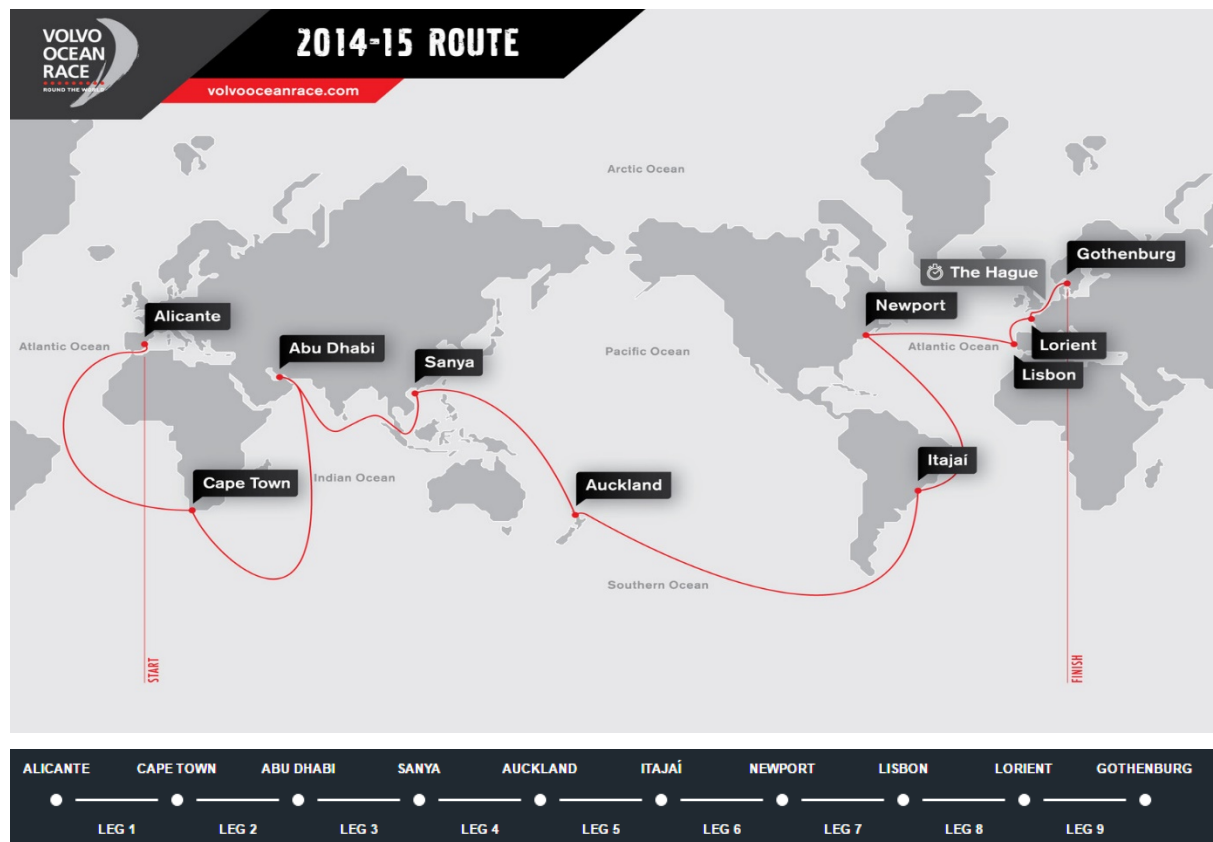
et al. 2010; Helfat & Peteraf, 2015). Thus, the cognitive capability of reasoning may support strategic decision-makers in finding solutions to decision problems (e.g., Colman, 2006; Nadkarni & Barr, 2008). Thereby, individuals rely more on controlled mental processing instead of short-cuts (Stanovich, 2009). Once different strategic decision option spaces have been identified, the cognitive capability of reasoning provides a rationale of why one strategic option should be superior to another. Like other cognitive capabilities, reasoning is heterogeneous among individuals. Thus, depending on how a strategic decision-makers reasons, he or she may be more effective in designing business models and more successful in investment decisions (Helfat & Peteraf, 2015).

In summary, strategic decisions are shaped by how managers perceive and then make sense of changes in their environment (e.g., Child, 1972; Eggers & Kaplan, 2013; Weick, 1995). This suggests that studying how strategic decision-makers perceive uncertainty and then make sense of it may provide insights into our research questions. Thereby, we argue that the managerial cognitive capability of perception informs the capability of reasoning by providing the information available for evaluation. As Knight (1921: 201 emphasis in original) put it “we *perceive* the world before we react to it, and we react not to what we perceive, but always to what we *infer*”. Consequentially, despite managerial cognitive capabilities being separate processes (Helfat & Peteraf, 2015), they may interact with one another.

4.3. Methods & data

Our dataset stems from two editions of a head-to-head professional sailing competition, the Volvo Ocean Race 2014-15 and 2017-18. The Volvo Ocean Race (VOR) is one of the world’s longest professional sailing competitions taking sailors around the world in nine months. Seven boats with one skipper each participated in the both of the races respectively. Overall, the races are divided into several legs that equal stages of the race sailed continuously (i.e., without an intermediate stop on land to, e.g., fill up supplies and rest). The race starts and terminates in different countries in Europe while stopping on all continents in between. Figure 1 provides an overview of the 2014-15 edition route as an example:

Figure 1: VOR 2014-15 route and legs (Volvo Ocean Race, 2017)



Study context

Sailing contexts are already well-established in empirical research and have rendered valuable theoretical contributions to management literature (e.g., Boumgarden, et al., 2012; Bouty & Drucker-Godard, 2018; McGrath et al., 2004; Ross & Sharapov, 2015). Hence, there are several reasons why a sailing race also represents an ideal context to develop our theory around managerial cognitive capabilities in strategic decisions:

First, the Volvo Ocean Race is one of the world's longest professional offshore sailing competitions. This offered us two advantages: On the one hand, the duration of the race allowed for a sufficient timeframe to study different occasions where skippers decided to part from the main field of competitors, while others followed competitors. Thus, professional sailing races are characterized by an accelerated pace of decision-situations compared to other business settings, because skippers need to select and adjust the general direction of their boats (i.e., through tacks and gybes)

within short periods of time, sometimes on a daily basis, to sail towards their target destination. And, on the other hand, both races were characterized by the skippers staying close to each other with their boats. This held two advantages for our research: It ensured that all skippers were exposed to the same objective environment to study differences in their cognitive capabilities. And, it allowed us to more easily identify cases of different strategic decisions where skippers decided to part from the fleet.

Second, the context provided us with the opportunity to study the managerial cognitive capabilities of perception and reasoning of highly experienced strategic decision-makers (cf. Heerkens & van der Heijden, 2011; Helfat & Peteraf, 2015), professional sailing boat skippers. As this race is one of the most physically challenging sailing races in the world, participants require ample sailing experience and long-winded training prior to the start of the competition to be able to endure the conditions of this around-the-world race. Skippers participating in the Volvo Ocean Race are highly knowledgeable and skilled in their domain due to prolonged practice and rapid feedback to their judgments (i.e., performance implications against their competitors, speed). Thus, they are likely to command skilled intuition (Kahneman & Klein, 2009). Skippers are the ultimate decision-makers onboard and carry the responsibility for their teams. Thus, their hierarchical position is similar to that of a CEO, a strategic decision-maker, whose perceptual frames are crucial in determining the organization's strategic choices (Gavetti, 2012; Helfat & Peteraf, 2015; Kaplan, 2008a; Knudsen, 2001).

And third, as with other sports, sailing races have pre-defined boundary conditions and rules that are enforced as soon as an incident occurs. Sports offer the advantage of a controlled setting where participants are not being made aware of the context of study. Sport settings allow to eliminate noise created by differences in institutional settings as influencing factors (Holcomb et al., 2009). Hence, the race enabled us to focus on the cognitive capabilities of skippers to their nature in the strategic decision to part from the main field of competitors and to compare them to those of skippers who followed the fleet. Thereby, all participating boats are made of one design and equipped with the same technology. Crew sizes are fixed with a pre-defined age range of participants and maximum crew weight (resource similarity). In addition, skippers are restricted in their information acquisition and supplied with the same information at pre-defined points in time (information symmetry). In this

respect, they are not allowed to search for information online or interact with others outside the race. They only receive position reports on their competitors from Race Control every six hours. Hence, the context of the Volvo Ocean Race eliminated noise created from heterogeneous information and resources from our data.

Furthermore, as the race enjoys public attention around the world through diverse channels, such as live-broadcasting, TV documentaries, and press reports, skippers have an interest in performing well. Not only is winning the Volvo Ocean Race considered highly prestigious among sailors, it may also help skippers obtain future sponsorship for campaigns. These are often based on performance in past races. Thus, all skippers share an aspiration to obtain a podium position.

Tables 1 and 2 provide overviews of the participating teams and skippers in the race as well as boundary conditions that allowed us eliminate noise in our data analysis.

Table 1: Participating boats and skippers in the VOR 2014-15

Boats 2014-15 edition	Skipper	Abbrevia- tion	Color	Gender	Crew size (incl. OBR)	# of legs won	Overall standings (based on points)	Comment
Abu Dhabi Ocean Racing	Ian Walker	ADOR	Yellow	Male	9	2	1	
Alvimedica	Charlie Enright	AVIM	Orange	Male	9	1	4	
Brunel	Bouwe Bekking	TBRU	Green	Male	9	2	2	
Dongfeng Race Team	Charles Caudrelier	DFRT	Red	Male	9	2	3	
Mapfre	Iker Martínez*/	MAPF	White	Male	9	1	4	
	Xabi Fernández**							
SCA	Sam Davies	TSCA	Magenta	Female	12	1	6	Received 3 additional crew members as an all-female team
Vestas Wind	Chris Nicholson	VEST	Blue	Male	9	0	7	Grounded shore during leg 2, only re-entered the race for legs 8 and 9

* Skipper during legs 1, 2, 5, 7, 9 ** Skipper during legs 3, 4, 6, 8

Table 2: Participating boats and skippers in the VOR 2017-18

Boats 2017-18 edition	Skipper	Abbrevia- tion	Color	Gender	Crew size (incl. OBR)	# of legs won	Overall standings (based on points)	Comment
Alkzo Nobel	Simeon Tienpont	AKZO	Violet	Mixed	10	0	4	
Dongfeng Race Team	Charles Caudrelier	DFRT	Red	Mixed	10	0	3	
Mapfre	Xabi Fernández	MAPF	White	Mixed	10	0	2	
Sun Hung Kai Scallywag	David Witt	SHKS	Grey	Mixed	9	0	5	
Team Brunel	Bouwe Bekking	TBRU	Yellow	Mixed	10	0	6	
Turn the Tide on Plastic	Dee Caffari	TTOP	Blue	Mixed	11	0	7	
Vestas 11th Hour Racing	Charlie Enright	VS11	Orange	Mixed	10	1	1	Only crew with 50-50 male-female team

Dataset

We used two main sources of qualitative data from the Volvo Ocean Races 2014-15 and 2017-18 to answer our research questions:

Our dataset encompasses log book entries written by onboard reporters (OBR) sailing with the teams in both editions and skippers, and strategic reviews of each leg written by race experts. Drawing on Miles and Huberman's (1984) suggestions for analyzing data from multiple sources, we triangulated our dataset by numeric data of the Volvo Ocean Race tracker, a tool where boats' positions and courses can be observed at defined intervals and in retrospect, daily blog entries ("tweets") from the boats and the race administration, and video interviews as well as quantitative data from the races, including rankings of the boats at six hourly intervals.

In the Volvo Ocean Race 2014-15 edition, the sailors spent approximately 160 days at sea creating a total of 18 strategic decisions in which skippers decided to part from the main field of competitors whereas the Volvo Ocean Race 2017-18 yielded 19 strategic decisions in which this happened. The Race was characterized by the skippers staying close to each other in both editions. Thus, the rare occasions on where some skippers decided to deviate from competitors represent an ideal context of study to answer our research questions. Table 3 provides an overview of the case data:

Table 3: Description of the case data

Characteristics	Volvo Ocean Race 2014-15	Volvo Ocean Race 2017-18
Number of strategic decisions studied*	18	19
Number of boats in the race	7	7
Informants	Onboard reporters Skippers Sailors	Skippers Onboard reporters Navigators Sailors
Number of log book entries	156	93
Database	Log book entries Strategic reviews Race rankings Race videos	Log book entries Strategic reviews Race rankings Race videos

** Strategic decision to deviate from the main field of competitors*

Log book entries. We used log book entries by onboard reporters and skippers on a total of seven boats taking part in both, the Volvo Ocean Race 2014-15² and the 2017-18³ edition, to study our research questions. Onboard reporters may be considered “neutral” observers of life onboard. They are part of the crews and day-to-day observe skippers’ perceptions and reasoning as well as consequent strategic decisions, which they reflect in log book entries. This allowed an up-close perspective of what happened onboard. Furthermore, while onboard reporters sailed with the crews, they were not permitted to interfere with the racing. They were only allowed to support daily life onboard in terms of cooking, cleaning, pumping water for the sailors and themselves, and preparing meals. Onboard reporters’ accounts were created on the day of observation. Therefore, ex-post reasoning and biases are limited. We used the log book entries to identify skippers’ strategic decisions to part from the fleet on the one hand, and to analyze the nature of their perceptions and reasoning prior to the strategic decision on the other hand.

Strategic reviews. We triangulated our data from the log book entries with official Volvo Ocean Race strategic reviews by race experts identifying and analyzing key strategic decisions made during each leg of the Race. These accounts helped us in making sure to only include strategic decisions in our dataset where skipper consciously decided to part from the main field of competitors.

Study design

We conducted our data analysis following a two-step approach: We first analyzed the data from the Volvo Ocean Race 2014-15 to develop propositions on the nature of managerial cognitive capabilities using a synthesized strategy approach (Langley, 1999). We contrasted the managerial cognitive capabilities of perception and reasoning

² One team, Team Vestas Wind, in addition to the six boats mentioned, was forced to terminate the race early after the second leg (stage of the race) as their boat was destroyed when hitting a reef due to a navigating error. They re-entered the race in leg 8. Therefore, our dataset for this skipper and his team only comprises legs 1 and 2 as well as 8 and 9.

³ One team, Team Vestas Wind, in addition to the six boats mentioned, was forced to retire from leg 4 and did not participate in legs 5 and 6 due to an accident with a Hong Kong fishing vessel during leg 4. They re-entered the race in leg 7. Furthermore, Team Scallywag had to retire early from leg 7 due to a man-over-board incidence.

of the skipper(s) that deviated from the direction of their competitors with the skippers that followed the fleet's direction. Hence, our unit of analysis is the strategic decision of skippers to leave their main field of competitors compared to strategic decisions of skippers that followed the general direction of competitors in the same decision situation.

Consistent with our interpretative research approach, we relied predominantly on how onboard reporters and skippers (as well as other informants within the different teams, if available) described perceptions and reasoning in the strategic decision skippers took. Interpretative research of these rare accounts provides the researcher with the opportunity to further interpret and structure the information of the informants considering the context and contingencies in which they happened (Corbin & Strauss, 1990). Through the ranking data, we were also able to control for skippers' ranking at the point the strategic decision was made.

We then triangulated the developed propositions based on data collected from the Volvo Ocean Race 2017-18. The Volvo Ocean Race 2017-18 edition is characterized by a different incentive structure than the previous edition. This allowed us to substantiate our findings from the Volvo Ocean Race 2014-15 as some key dimensions changed in the 2017-18 edition. While the 2014-15 race granted equal points for each leg completed to the respective winner, the 2017-18 edition provided double points for legs that include ocean crossings and extra point for passing specific geographic points, such as Cape Horn⁴. Thus, some legs offered skippers more points than others.

According to our literature review and due to their shared aspiration of obtaining a podium position, the further away skippers are from fleet leadership, the more likely that they deviate from the main field of competitors during these legs (cf. Kachelmeier & Shehata, 1991; Tversky & Kahneman, 1992). Therefore, the 2017-18 edition of the race was ideal because it offered skippers higher rewards for deviating from their competitors' general direction than the previous race in three of the eleven legs sailed. We were thus able to substantiate our propositions in a similar context that relaxed the

⁴ In the Volvo Ocean Race 2017-18, bonus points were awarded to the winner of every leg, while the two Southern Ocean legs and the transatlantic leg score double points. An additional bonus point is awarded at the end of the race to the team with the best overall elapsed time. The respective legs with additional points are marked in the table summarizing our analysis of the Volvo Ocean Race 2017-18 data.

assumption of equal overall rewards per leg. This two-step approach allowed to us to strengthen the inferences on the managerial cognitive capabilities responsible for following or deviating from the general direction of competitors drawn from the different datasets. This provided us with a rich context to derive even more robust propositions than drawn from a single setting.

Analytic approach

In a first step, we analyzed each strategic decision of skippers participating in the Volvo Ocean Race 2014-15 in detail. We coded the log book entries of each strategic decision separately on the basis of in-vivo terms or phrases used by the informants. Thereby, we relied on constant comparison across multiple informants (if available) and over time to detect concept patterns (Glaser & Strauss, 1967). First order, *in vivo* codes reflecting skippers' perceptions of the environment were derived by analyzing how they key informants described their perceptions of the environment immediately prior to a strategic decision in the log book entries using the language of the informants whenever possible. Furthermore, we coded for how strategic decision-makers reasoned and thus evaluated the information they had at hand for making a strategic decision. As we identified codes that were similar, we aggregated them into second-order concepts (Gioia et al., 2012) to derive broader categories of perceptions and reasoning.

Once preliminary analyses had been conducted based on the respective data from the 2014-15 edition, we combined the analyses and induced initial propositions using methods for building theory from written accounts (Eisenhardt, 1989b; Eisenhardt & Graebner, 2007; Glaser & Strauss, 1967). Propositions were derived from us contrasting perceptions and reasoning of strategic decisions where skippers deviated from the direction of competitors with those that took the strategic decision to follow the competitor group. This allowed us to identify similarities and differences between the skippers' strategic decisions.

In a final step, we collected and coded data from the Volvo Ocean Race 2017-18 to further substantiate our findings. We followed the same data coding process as described for the 2014-15 edition. Thus, based on the derived data structure, we triangulated our previously developed propositions in this new context. We used existing literature to sharpen the insights from this inductive process following several iterations between data and literature. The result of our analyses of the two datasets is a

set of propositions about the interaction between different sources uncertainty, strategic decision-makers' reasoning, and the content of their strategic decisions.

Results

Our research focuses on the question of how differences in strategic decision-makers' cognitive capabilities influence strategic decisions to follow or deviate from the general direction of competitors. Because strategic decisions inhibit uncertainty, we study how strategic decision-makers perceive uncertainty and reason when taking the strategic decision to deviate from the main field of competitors and compare these mental activities to those who decided to follow the general direction of competitors. We controlled for differences in ranking of the individual skippers during these decisions.

While our research context eliminated noise from differences in environmental context as well as heterogeneous resources and information of strategic decision-makers from our data, prior research highlights the role of gains/losses vis-à-vis a reference point (e.g., Kahneman & Tversky, 1979; Tversky & Kahneman, 1992) as a driver of strategic decisions to deviate from the general direction of competitors.

In this respect, our data cautions the use of a more fine-grained perspective to understand this mechanism. Skippers, independent from their ranking took the strategic decision to deviate from their main field of competitors. Hence, our analysis of skippers' strategic decisions in the Volvo Ocean Race 2014-15 derived that strategic decision-makers' perceptions of uncertainty and the way in which they reasoned were crucial determinants of strategic decision-makers' choices. Therefore, strategic decisions need to be evaluated in light of strategic decision-makers' cognitive capabilities.

Perceptions of different sources of uncertainty in strategic decisions

We identified five main sources of uncertainty that skippers were confronted with as they sailed around the world: internal, supply, competitor, strategic, and environmental uncertainty. While internal uncertainty is related to the team and boat, supply uncertainty is concerned with an inability to predict sufficiency of supplies. By contrast, competitive uncertainty relates to skippers' own ability to compete vis-à-vis their rivals. Strategic uncertainty describes an inability to find an appropriate course of action in a decision situation and environmental uncertainty entails an inability to predict how skippers' general environment will develop.

Table 4 provides an overview of our conceptualization of skippers' perceptions and depicts the way in which the coding proceeded.

Table 4: Progression of analysis in identifying perceptions of uncertainty

First-order (informant) concepts	Second-order themes	Aggregate (theoretical) dimension
Inability to predict whether one will be able to obtain a podium Inability to predict the impact of an environmental condition on the ranking Inability to predict utility of competitors' move Inability to predict whether one will be able to catch up	<i>Uncertainty relating to the ranking</i>	Competitive uncertainty
Inability to predict where the competitors are Inability to assess whether one is able to compete effectively	<i>Uncertainty relating to controllability of the competition</i>	
Inability to predict change in and impact of weather conditions Inability to predict direction of the current Inability to assess a pattern to the waves	<i>Uncertainty regarding environmental forces</i>	Environmental uncertainty
Inability to assess the impact of obstacles on their course Inability to assess the identity of obstacles on their course	<i>Uncertainty regarding obstacles</i>	
Inability to predict whether the intactness of the boat will remain in place Inability to assess the cause of a boat-related issue (e.g., water streaming into the boat) Inability to assess whether one is able to repair important, but broken equipment Inability to assess whether a problem has been finally resolved (e.g., provisional repair)	<i>Uncertainty relating to the boat</i>	Internal uncertainty
Inability to predict how strenuous conditions will affect team members' ability to stay healthy Inability to predict when a crew member will recover to full strength from illness Inability to predict the safety of the crew	<i>Uncertainty relating to the crew</i>	
Inability to identify or decide between several/conflicting strategic options Inability to predict the utility of the different options	<i>Uncertainty relating to a strategic decision</i>	Strategic uncertainty
Inability to predict duration of a leg Inability to assess whether supplies will last for this leg	<i>Uncertainty relating to the availability of supplies for duration of the</i>	Supply uncertainty

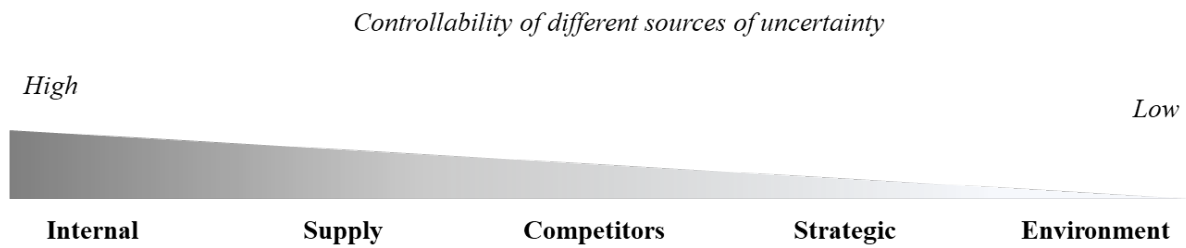
We found that strategic decisions were contingent on the degree of controllability of the source of uncertainty. At the point in time when skippers made a strategic decision whether to follow their competitors or whether to deviate from the fleet, they either seemed reassured that their decision was the right one or they perceived sources of uncertainty that were similar in terms of their controllability depending on which strategic decision they took.

We mapped the different sources of uncertainty according to their controllability by strategic decision-makers (e.g., Beckman et al., 2004; McGrath et al., 2004). Whereas internal, supply, and competitive sources of uncertainty are relatively easier to control by strategic decision-makers, strategic and environmental uncertainty are more difficult to control. This is due to strategic decision-makers in the races having tools and means available to manage internal, supply, and competitive uncertainty. For example, they may reduce competitive uncertainty through watching their competitors directly through binoculars, the AIS⁵ on board, or are updated through reports on their rivals' positions every six hours by race control.

By contrast, strategic and environmental uncertainty are more difficult to manage. For example, while skippers possess different forecasting tools in order to map the fastest route towards the respective destination they are aiming at, these models were often reported by sailors to be inaccurate and unreliable, particularly in remote areas of the ocean and for long-term predictions. Therefore, skippers only have limited ability to reduce these sources of uncertainty. Figure 2 depicts the different degrees of controllability assigned to the respective sources of uncertainty perceived by skippers during both races:

⁵AIS refers to Automatic Identification System, an onboard software that is installed for safety reasons, but that was frequently used by sailors to detect and follow surrounding competitors within 20 nautical miles range.

Figure 2: Controllability of different sources of uncertainty



High degrees of controllability enable strategic decision-makers to reduce uncertainty (e.g., March & Simon, 1958; Simon, 1976). Because uncertainty reduction is a guiding principle of human behavior (Hogg & Mullin, 1999; Hogg & Terry, 2000), the controllability of different sources of uncertainty plays a central role in determining strategic decisions. The following log book entry from the Volvo Ocean Race 2014-15 by the onboard reporter of Abu Dhabi Ocean Racing (ADOR) illustrates how his skipper, Ian Walker, longed for control during the race after one of his competitors, Charles Caudrelier from Dongfeng Race Team has managed to slip away during leg 7:

“The most stressful moment was last night in the shadow when we could see the other boats coming and we had no wind,” said Charles (skipper). Like one of those dreams where you open your mouth to speak but nothing comes out and it’s the most hopeless feeling in the world. Boom. Boom..Boom... Splash. “It’s still very complicated and still very random where you don’t control the race because you don’t know what’s going to happen,” he says. (DFRT, 13 January 2015)

Our data indicates that depending on the source of uncertainty that skippers experienced, their strategic decisions differed. Skippers that perceived more controllable sources of uncertainty, such as internal, supply, and competitive uncertainty, followed their main field of competitors, whereas they deviated when they perceived less controllable sources of uncertainty, namely strategic and environmental uncertainties.

Perceptions play a crucial role in determining whether strategic decision-makers are able to identify and create strategic decision option spaces to select from (e.g., McGrath, 1997). For example, Charles Caudrelier, skipper of Dongfeng Race Team (DFRT) decided to pass off the coast of Sri Lanka along India more north than

the other skippers. Thereby, Charles Caudrelier was confronted with strategic uncertainty on how high to pass as illustrated by the following log book entry written by himself:

“One thing that is obsessing me at the moment is how far off India should we pass – an almost impossible decision. The island of Sri Lanka is more than 2000 metres high, and creates a wind shadow to its south of more than 200km... we can head south but we'll sail many more miles, and there isn't much wind in the south either.” (DFRT, 11 January 2015)

When facing the same decision, other skippers were more concerned with competitive uncertainty as illustrated by the log book entries from the onboard reporters of teams Abu Dhabi Ocean Racing (ADOR) and SCA (TSCA):

“Yes, there have been subtle differences in mode and sail changes but everybody has pretty much sailed the same route. It is disappointing that we haven't gained more on Brunel as we thought we had passed them before, but one very light period cost us everything we had gained. Still we are happy to be in touch with them and have them on AIS for company. As we approach the end of the second section we have some work to do to catch Dongfeng. In reality we are only two hours behind with two weeks of racing to go so it isn't insurmountable.” (ADOR, 11 January 2015)

“We've been moving south but also across in order to line ourselves up better with the fleet. As a result, we haven't always been in the best wind. However, we are all still together in our little square of Volvo Ocean Race boats. Before leaving, our coaches said we had to remain with the fleet until at least Sri Lanka; if we lose them before then it will be a challenge to make up for it.” (TSCA, 11 January 2015)

These three log book entries demonstrate that being focused on more controllable competitive uncertainty may prevent skippers from identifying strategic decision option

spaces, such as Dongfeng Race Team (DFRT). Thus, these skippers, different from Charles Caudrelier of Dongfeng Race Team (DFRT), fell subject to negative effects of uncertainty, such as foregoing prospective options (cf. McMullen & Shepherd, 2006), and followed the direction of the majority of competitors. Thus, more controllable sources of uncertainty led skippers to reduce and thereby control uncertainty, whereas less controllable sources of uncertainty led strategic decision-makers to consider different strategic option spaces and thereby generate the opportunity to deviate from the main field:

Proposition 1a: Perceptions capabilities that induce strategic decision-makers to experience more controllable sources of uncertainty increase the likelihood of them following their main group of competitors.

Proposition 1b: Perception capabilities that induce strategic decision-makers to experience less controllable sources of uncertainty increase the likelihood of them deviating from their main group of competitors.

Protective and sensible reasoning in strategic decisions

The data from our research produced several forms of reasoning that skippers demonstrated over the course of the race. Generally, there may be additional forms of reasoning depending on environmental context. However, several different forms already emerged from our analysis: control-oriented, competition-oriented, safety-oriented, legitimization-oriented (external and internal), chance-attributing, long-term, and opportunity-oriented reasoning.

When reasoning in a control-oriented way, skippers focused on factors they could regulate to take a strategic decision. Competition-oriented reasoning was motivated by rivals (e.g., matching an individual rivals' move or not letting a specific skipper escape). Furthermore, skippers focused on safety of their teams when taking strategic decision or on legitimization by external (e.g., group of competitors) or internal (e.g., skippers' team support) parties to justify their strategic decisions. Chance-attributing reasoning was applied when skippers attributed the rationale of their strategic decision to luck or fate. When reasoning long-term-oriented, skippers focused on benefits that would only materialize in the long-run – often acknowledging that a strategic decision would make

them loose out in the short-term. Opportunity-oriented reasoning was applied when skippers became aware of a unique occasion that they deemed favorable to seize.

Overall, the forms of reasoning diverged in the way that strategic decision-makers evaluated and drew conclusions from the information they had at hand. Whereas some forms of reasoning were associated with strategic decision-makers being open-minded about new ideas and alternative courses of action, independent from their main field of competitors, others induced strategic decision-makers to arrive at a supportive conclusion about the status quo. Thus, we clustered the different forms of reasoning along two categories: *protective* and *sensible* reasoning.

Table 5: Progression of data analysis in identifying different types of reasoning

First-order (informant) concepts	Second-order themes	Aggregate (theoretical) dimension
Focusing on controllable factors Avoiding to make any mistakes	Reasoning based on what one can control short-term	Control-oriented reasoning
Covering key competitors Comforting presence of competitors	Reasoning based on following or remaining with competitors	Protective reasoning (maintaining status quo)
Not committing too early to something that could endanger competitive position	Reasoning based on protection of competitive position	
Protecting own boat and crew	Reasoning based on preserving boat intactness and crew health	
Being in the lead/ among the race leaders Assuming that others will follow	Reasoning based on external legitimization	Legitimization-oriented reasoning
Team standing behind the decision Sailing in a way that the skipper feels particularly experienced/skilled with	Reasoning based on internal legitimization	Sensible reasoning (change status quo for the better)
Belief in luck or chance rather than experience or skill	Reasoning based on phenomena that are outside of control of strategic decision-maker	
Belief in long-term benefit/ favorable outcome	Reasoning based on beneficial outcomes that are distant	
Following simple rules based on experience Following a plan	Reasoning based on pursuing long-term goals	
Anticipation of favorable weather/environmental phenomena Following more risky routing, assuming the picked lane is the most beneficial one	Reasoning based on seizing immediate opportunities	

Reasoning was found to either be *protective* of the status quo or *sensible* to new ideas or opportunities. Whereas strategic decisions to follow the main field of competitors were associated with strategic decision-makers reasoning in a protective way, sensible reasoning increased the likelihood of strategic decisions to part from the main field of competitors.

For example, when the skippers sailed from France towards Sweden during leg 9, they needed to pass Point du Raz close to France. While Sam Davies, skipper of team SCA (TSCA), decided to take the inshore option to pass Point du Raz, the other skippers took the offshore route. Thereby, Sam Davies reasoned based on an opportunity-oriented perspective as demonstrated by the following log book entry by team SCA's onboard reporter:

"We were the only team to choose to go this close to Point du Raz. The rest of the fleet took a route further offshore. (...) Sam Davies explains: "For me, and all the sailing I have done, no matter how much tide there is and how many attempts you have to make you still get around quicker compared to sailing all the way around on the outside, because there you have lots of rocks and islands and quite a strong tide as well. We'll see whether our decision comes out right or not." (TSCA, 17 June 2015)

By contrast, other skippers that passed offshore with the main fleet reasoned in more protective ways and thus "insensibly" as illustrated by the following log book entry by the onboard reporter of Dongfeng Race Team (DFRT):

"When we got to the Raz de Sein, there were already 3 knots of adverse tide. To let our main competitors go to pass on the outside, and risk being alone on the inside, against the strong tides, was too risky," says Charles Caudrelier." (17 June 2015)

This quote demonstrates how Charles Caudrelier, due to his focus on competitors, was insensitive to the opportunity to pass inside as the skipper SCA (TSCA) did. Eventually, the skipper from team SCA (TSCA) came out faster than the

other skippers from Point du Raz. Therefore, sensible reasoning can support strategic decision-makers in taking a strategic decision that entails irreversible resource commitment and altering the general direction they were heading previously.

Proposition 2a: Reasoning capabilities that induce protective argumentation increase the likelihood of strategic decision-makers following their main group of competitors.

Proposition 2b: Reasoning capabilities that induce sensible argumentation increase the likelihood of strategic decision-makers deviating from their main group of competitors.

Our study uncovered that strategic decision-makers often altered the form of reasoning depending on the source of uncertainty they experienced. More controllable sources of uncertainty were associated with protective reasoning, whereas less controllable sources of uncertainty lead to sensible reasoning.

For example, during leg 4 of the Volvo Ocean Race 2014-15, when approaching the Philippines on their way from Sanya in China to Auckland, New Zealand, the skippers were confronted with the strategic decision whether to cross the Philippines north via Taiwan or whether to sail straight through the islands. The skippers of teams Brunel (TBRU) and SCA (TSCA) decided to split from the main fleet and head north via Taiwan towards Auckland. Whereas the other skippers were concerned with internal and competitive uncertainty and competitor-oriented reasoning, the skippers of team Brunel (TBRU) and SCA (TSCA) experienced no uncertainty at all or strategic uncertainty respectively at the point of the strategic decision. Furthermore, they reasoned in a sensible way.

This suggests that the managerial cognitive capabilities of perception and reasoning may be related. Thus, when strategic decision-makers are confronted with less controllable sources of uncertainty, this also increased the likelihood of them reasoning in a sensible way. However, they may also reason in a sensible way without perceiving less controllable sources of uncertainty. Hence, our research suggests a mediating role of reasoning in the relation between perceptions of uncertainty and strategic decision content.

A summary of the evidence regarding this decision situation is illustrated in Table 6 that depicts evidence and quotes from the log book entries relating to the strategic decision taken as the skippers approached the Philippines during leg 4:

Table 6: Perception and reasoning in strategic decision on 10/11 Feb 2015

Informant	Skipper	Boat	Rank	Source of uncertainty	Reasoning	Quote
Onboard reporter	Sam Davies	TSCA	6	Strategic	Opportunity-driven	"It's always difficult to get east in the Pacific Ocean but that's what we need to do and we got an opportunity with a low pressure and a northerly push coming down the east of Taiwan that will give us a better angle to head south. ""It will appear at first that we taken a massive loss but in about 6 days time we will see exactly how the cards has played out. We estimated that either we would gain or come out in exactly the same position as the rest of the fleet, that's why it was worth taking the risk."
Onboard reporter	Bouwe Bekking	TBRU	5	N/A	Legitimization-oriented (internal)	"All the men of the team, however, stand firmly behind the decision! "This makes it interesting," says Rokas Milevicius. "Nothing ventured, nothing gained. " And skipper Bekking? He is convinced that the investment of 300 miles will pay out before we reach the Equator. "
Onboard reporter	Ian Walker	ADOR	2	Competitive	Competitor-oriented	"Dongfeng is only 4 miles upwind from us at the moment and every watch change it seems that number either goes up or goes down. Though AIS says we should be able to see them, it's difficult to spot anyone through the 4-5 meter waves."
Onboard reporter	Charlie Enright	AVIM	4	Internal	Competitor-oriented	"Routing agrees on tacking up the coast of Luzon (that will be fun), so for now the brief is simple: go east until the wind begins to shift from the coast. We've still got Brunel in sight behind us so we know we're going just fine in this test of attrition, everyone's just trying to stay conservative and keep the boat as fast as possible but more importantly: in one piece."
Onboard reporter	Charles Caudrelier	DFRT	1	Competitive	Competitor-oriented	"It was a mistake," admitted Charles. "We wanted to go north but no one else was so we stayed with the group. " I didn't say anything, only gave him the look, which has become code for give me something better than that. "It was a lack of courage," he admitted. "Like lemmings!" I added maybe a bit too brightly. He gave me a blank stare."
Onboard reporter	Iker Martinez	MAPF	3	Internal	Competitor-oriented	"The six Volvo Ocean 65s in the fleet keep sailing upwind in the start of a tough fourth leg. It's like rodeo bull riding, really. At times we sail against 30 knots of wind, in spite of which the boat remains in one piece and we have good speed as well. We have Abu Dhabi Ocean Racing in sight to leeward, Dongfeng Race Team in front, and Team Alvimedica to windward."

After the strategic decision of Brunel and SCA had been made, Charles Caudrelier, skipper of Dongfeng race team admits that he had also thought about parting from the fleet. However, he eventually lacked the “courage” to do so as illustrated by a log book entry from the on board reporter from Dongfeng Race Team (DFRT):

““It was a mistake,” admitted Charles (skipper). “We wanted to go north but no one else was so we stayed with the group.” I didn’t say anything, only gave him the look, which has become code for give me something better than that. “It was a lack of courage,” he admitted. “Like lemmings!” I added maybe a bit too brightly. He gave me a blank stare.” (DFRT, 12 February 2015)

This log book entry also demonstrates how skippers needed to overcome perceptual pressures (seeing that no one else is turning north) to take strategic decisions that altered the current course of action vis-à-vis their peers, and how they tended to seek out factors that they could control.

Tables 7 summarizes this study’s evidence on perception and reasoning capabilities associated with the strategic decision to part from the main field of competitors from the Volvo Ocean Race 2014-15:

Table 7: Strategic decisions to split taken during VOR 2014-15

Strategic decision #	Date	Leg	Informant	Skipper	Boat	Rank	Decision description	Source of uncertainty	Reasoning	Quote
1	18.10.2014	1	Onboard reporter (Yann Riou)	Charles Caudrelier	DFRT	2	When sailing down the African coast, Dongfeng's skipper decides to remain inshore when all other skippers head further offshore and enjoy better winds.	Strategic	Long-term oriented	"For example, this morning, the latest "position report" showed that three boats had a very different wind offshore, and more favourable at the time... What to do? Sail away from the coast to control them, or follow our initial strategy, which we believe is better long term? "If you invest everything in the left, it's not to cash it immediately!" (Pascal).
2	19.10.2014	1	Onboard reporter	Chris Nicholson	VEST	2	When approaching the Cap Verde islands, the skippers had the options of going through the center, south between the east and central islands, or north.	N/A	Long-term oriented	"Our decision to cross east was taken before the Cape Verde Islands," explained Wouter in a phone call to the boat. "We saw a tropical storm developing with good wind ahead of us, and light spots too. We went further east to avoid these calms, and managed to get the new wind from the east first."
3	23.11.2014	2	Onboard reporter	Ian Walker	ADOR	5	There is a high pressure developing and the skippers have to place their bets on which way is the best to cross it.	Environmental	Opportunity-oriented	"The rest of the fleet who have opted to sail further east did not match our gybe to the north in the middle of the night. (...) However, in the Nav Station Ian points out that there's a circle of red on the routing giving him optimism. "I think that what's happened is the currents are playing a major factor in what type of wind everyone's got." (...) The longer this trend holds over the next few hours, the longer we'll have a slight edge on the other six teams."
4	30.11.2014	2	Onboard reporter	Iker Martinez	MAPF	2	The skipper of team Mapfre decided to head east, away from the other boats, in order to catch the trade winds.	Strategic	Long-term oriented	"(...) We're heading east to try and catch the new trade winds which are starting to rebuild. "I think the best place to cross the two Doldrums in the Indian Ocean is to try and be in the east close to Diego Garcia – that's why we decided to make a separation from the fleet." But it was a ballsy manoeuvre, and one that wouldn't pay off for a few days, if at all. It meant that Abu Dhabi Ocean Racing grabbed the lead, opening up a 6nm advantage on Dongfeng and Brunel in the runner-up spots."
5	11.01.2015	3	Onboard reporter (Sam Greenfield)	Charles Caudrelier	DFRT	1	The skippers have to decide on which side they will pass Sri Lanka. They eventually end up passing Sri Lanka as the most northern boat.	Strategic	Long-term oriented	"One thing that is obsessing me at the moment is how far off India should we pass – an almost impossible decision. This could be the key to winning this leg and unfortunately one probably needs more luck than skill to get it right. We don't like that."
6	19.01.2015	3	Onboard reporter	Charlie Enright	AVIM	3	The skipper of team Alvimedica decides to split from the fleet as they enter the Malacca Strait.	Strategic	Long-term oriented/ Opportunity-oriented	"It seems at least a little ironic that our first day in the AIS-hectic Malacca Strait is the first day of this leg we break from convention and consciously sever our own AIS dependencies; we've split with the fleet and can no longer see the competition on the computer. It is as much a belief in the early game plan as it is a bit of good fortune from a beneficial wind shift last night that was too good to pass up. (...) It's energizing and makes the trip south to Singapore, rife with obstacles and hurdles, less chore and more opportunity."

Table 7: Strategic decisions to split taken during VOR 2014-15 (continued)

Strategic decision #	Date	Leg	Informant	Skipper	Boat	Rank	Decision description	Source of uncertainty	Reasoning	Quote
7	11.02.2015	4	Onboard reporter	Sam Davies	TSCA	6	As the skippers approach the Luzon Strait in the Philippines, they face two options to head to New Zealand: Either tack north towards Taiwan (in the opposite direction of New Zealand, but with often more favorable weather features) or continue across the Philippines. The skippers of TSCA and BRUN decide to split with the fleet.	Strategic	Opportunity-oriented	"It's always difficult to get east in the Pacific Ocean but that's what we need to do and we got an opportunity with a low pressure and a northerly push coming down the east of Taiwan that will give us a better angle to head south. ""It will appear at first that we taken a massive loss but in about 6 days time we will see exactly how the cards has played out. We estimated that either we would gain or come out in exactly the same position as the rest of the fleet, that's why it was worth taking the risk."
8	11.02.2015	4	Onboard reporter	Bouwe Bekking	TBRU	5	As the skippers approach the Luzon Strait in the Philippines, they face two options to head to New Zealand: Either tack north towards Taiwan (in the opposite direction of New Zealand, but with often more favorable weather features) or continue across the Philippines. The skippers of TSCA and BRUN decide to split with the fleet.	N/A	Legitimization-oriented (internal)	"All the men of the team, however, stand firmly behind the decision! "This makes it interesting," says Rokas Milevicius. "Nothing ventured, nothing gained." And skipper Bekking? He is convinced that the investment of 300 miles will pay out before we reach the Equator."
9	19.03.2015	5	Onboard reporter	Charlie Enright	AVIM	2	There is a high pressure approaching that the skippers try to avoid. While some skippers go south to avoid the high pressure, but Charlie Enright decides on pursue a different path.	Environmental	Opportunity-oriented	"We're following the path of Pam and as it fades so too will the winds, but the sea state will worsen as it destabilizes. (...) They're our limiting factor, the waves, and regardless of how much or how little wind we have, we're always fighting the sea state. Will feels the faster we get east the better our chances of avoiding the High are, so we're pushing hard—very hard. Some of the other boats have gone south, upwind with smaller jibs probably looking to get underneath it all, but Will is confident with our course so long as we can keep going fast so we're hammer down with the bigger Fractional-Zero."
10	27.03.2015	5	Onboard reporter	Charles Caudrelier	DFRT	3	While the other boats climbed further north, Charles Caudrelier decided to gybe south towards the exclusion zone in the ice limits.	N/A	Opportunity-oriented	"Last night when we got the positions in I saw a big smile on Pascal's (navigator) face. The others climbed further north, probably all just covering each other, while we gybed along the exclusion zone line. This morning they came back to our line, but behind us! "You are at your best when you take decisions for yourself, without worrying about the others." - Pascal Bidegaray
11	03.04.2015	5	Skipper	Iker Martinez	MAPF	3	A favorable wind shift made the skipper of Mapfre tack on port so that they are now positioned further to the west compared to the other boats	Environmental	Opportunity-oriented	"The dice has rolled. Now it's down to a high-speed race for the last few miles, while we wait for a right wind shift to sail on starboard tack again. There are 750 miles left, around three days, and we are further west than anybody else, so the last shift's favoured us, but the next won't. The boat in front always plays with advantage, but as we are close to land, there are a lot of thermal effects influencing the wind and there's room for short term strategies."

Table 7: Strategic decisions to split taken during VOR 2014-15 (continued)

Strategic decision #	Date	Leg	Informant	Skipper	Boat	Rank	Decision description	Source of uncertainty	Reasoning	Quote
12	25.04.2015	5	Onboard reporter	Charlie Emright	AVIM	1	On their way from Brazil, the skippers have to decide on which lane to choose for their path up north towards Newport in the United States.	Environmental	Legitimization-oriented (external)	"It's funny how having a conservative game plan and generally trying to stay with the leaders, how quickly that can change with just a few clouds. We're relatively happy with our boatspeed and gambling this early in a leg with so few fleet-compressions seemed unnecessarily risky. (...) But then we tacked north 40 miles before the fleet and now we've lost control of the situation. We are by ourselves to the west and very much "on an island," as Charlie likes to say. At some point during the night while drifting around all the rain and clouds it was agreed that getting north was best."
13	24.05.2015	7	Onboard reporter	Sam Davies	TSCA	6	The boats are crossing the Atlantic to Lisbon and approaching the Azores High. The skippers have to select a lane around the high pressure system. Sam Davies decided to head the furthest north.	Strategic	Opportunity-oriented	"It's no guarantees for gains," says Sam. "The forecast is "rich getting richer", at the same time we take this option because we think it's our quickest route to Lisbon. Unfortunately, because we are behind the fleet and the high is growing with time, we might be forced to go a bit wider."
14	24.05.2015	7	Onboard reporter	Ian Walker	ADOR	5	The boats are crossing the Atlantic to Lisbon. When approaching the Azores High, Ian Walker decides to gybe north.	Competitive	Opportunity-oriented	"Ian got fed up with the one-design procession. We all got fed up with it. There was a freedom in having nothing to loose – being at the back of the pack with the only options just floating ideas of chance. About mid-day Ian abandoned the game the rest of the fleet were playing and decided to gybe north. An immediate loss of additional mileage, the idea was to get into better breeze further away from the center of the Azores High."
15	17.06.2015	9	Onboard reporter	Sam Davies	TSCA	6	Sam Davies decides to take the inshore option at Point du Raz when all other skippers go offshore.	N/A	Opportunity-oriented	"We were the only team to choose to go this close to Point du Raz. The rest of the fleet took a route further offshore. For us it meant extremely strong tide around the corner but shorter distance and with a little bit of luck better wind conditions. Sam Davies explains: "For me, and all the sailing I have done, no matter how much tide there is and how many attempts you have to make you still get around quicker compared to sailing all the way around on the outside, because there you have lots of rocks and islands and quite a strong tide as well. We'll see whether our decision comes out right or not."
16	18.06.2015	9	Onboard reporter	Charles Caudrelier	DFRT	1	The boats approach the English Channel and can have two options: Either take the northern or southern route along the exclusion zone*. Charles Caudrelier opts for the northern option.	Strategic	Legitimization-oriented (external)	"There's an exclusion zone in the middle of the English Channel that we musn't go in. So we have two options... north or south ? While we thought about it, we waited. Thinking that, like usual, the boats would choose their side and stick to it with everyone going for the same option. But actually, what happened was totally the opposite."

Table 7: Strategic decisions to split taken during VOR 2014-15 (continued)

Strategic decision #	Date	Leg	Informant	Skipper	Boat	Rank	Decision description	Source of uncertainty	Reasoning	Quote
17	18.06.2015	9	Onboard reporter	Iker Martinez	MAPF	2	The boats approach the English Channel and can have two options: Either take the northern or southern route along the exclusion zone. Iker Martinez opts for the northern option.	Competitive	Competitor-oriented	"That's the case of MAPFRE with Dongfeng. Even when they lead, they're stuck to us. Like Messi always dribbling the defenders during a match, Dongfeng and Brunel are on us. The three of us are fighting for a podium place and anything can happen."
18	21.06.2015	9	Onboard reporter	Charlie Enright	AVIM	1	Sailing along the coast of Denmark, the skippers could either stay inshore of head offshore. Charlie Enright opted for an offshore route sailing more miles than the other boats.	Environmental	Long-term oriented	"Navigating TSS hell was a practice in patience and adaptability, the exit from The Hague complicated enough that we significantly changed our strategy several times during the early hours as the weather continued to evolve."

* Exclusion zones are areas of the ocean where the boats are not allowed to go (e.g., as these areas are busy trade areas or military zones)

Triangulating our propositions in the Volvo Ocean Race 2017-18

Our data analysis from the Volvo Ocean Race 2014-15 suggests that skippers not only differed in the source of uncertainty they perceived when they decided to deviate from the main field of competitors, but also in the way in which they reasoned. When skippers perceived more controllable sources of uncertainty and/or reasoned in a protective way, they were more likely to remain with the main field of competitors. By contrast, when skippers perceived less controllable sources of uncertainty and/or reasoned in a sensible way, they were more likely to deviate from competitors.

Based on these findings, we triangulated our propositions with data from the Volvo Ocean Race 2017-18. The data from the race confirmed our initial propositions. Independent from their prior competitive position and the incentive structure of the leg, skippers decided to deviate from their main field of competitors when perceiving certainty with regards to the decision or less controllable sources of uncertainty, and when reasoning in a sensible way. By contrast, skippers who were confronted with more controllable sources of uncertainty and who reasoned in a protective way were less likely to branch out from their rivals.

Similar to indications from the previous race edition, our analysis suggests a relation between the managerial cognitive capabilities of perception and reasoning. In this respect, perceptions of more controllable sources of uncertainty reduce strategic decision-makers' likelihood to deviate from the main field of competitors because they focus on controlling uncertainty. This becomes evident through protective reasoning.

For example, when the skippers crossed the Doldrums⁶ on their way from Melbourne to Hong Kong during leg 4 of the Volvo Ocean Race 2017-18, most skippers were more preoccupied with resolving internal and competitive uncertainty as illustrated by the following log book entry written by onboard reporter of team Vestas Wind (VS11) reporting how the team felt unable to predict when they will be able to gain speed again. Thus, reasoning is oriented towards what competitors were doing. Thereby, they found comfort in having them around at the moment:

⁶ The "doldrums" is a colloquial expression adopted for those parts of the Atlantic and Pacific Oceans affected by low-pressure. They are located around the equator and characterized by slow winds.

“(...) but today it looked like it could be and we all wondered just how long we might float here sweating through our days. The good news is that we’re not alone in our lack of progress and we don’t need to wait six hours for a sked to find out. We can clearly see AkzoNobel, MAPFRE, Dongfeng and TTOP (Turn the Tide on Plastic), and it appears like everyone’s in the same zone of weather.” (VS11, 9 January 2018)

This is also reflected in a log book entry by the navigator, Simon Fisher, of team Vestas Wind (VS11) later on the same day:

“We have seen gains and losses, sometimes slowly and sometimes frustratingly fast however it seems like currently we are being rewarded for our patience and steady focus as we can see ourselves gaining bearing on the lights of the other boats dotted around the horizon.” (VS11, 9 January 2018)

Similarly, Dee Caffari, the skipper of team Turn the Tide on Plastic (TTOP), discusses how she almost lost sight of her competitors and consequently worried about regaining control of them as the following quote from her illustrates:

“Sadly as a result of this crazy cloud action, we went from heroes to zeroes in the rankings. So we have some work to do. They are still in sight but sadly we are not controlling them anymore. We need to fight our way back and there is opportunity to do that as we will have more of this activity (...).” (TTOP, 10 January 2018)

These exemplary quotes provide evidence for our hypotheses 1a and 2a. Strategic decisions to follow the main field of competitors were more likely when strategic decision-makers perceived more controllable sources of uncertainty and reasoned in a protective way. By contrast, perceptions of less controllable sources of uncertainty enable strategic decision-makers to identify strategic decision option spaces that

increase the likelihood of sensible reasoning and strategic decisions to deviate from the main field of competitors.

For example, in the same decision situation, the skipper of team Brunel (TBRU), Bouwe Bekking, experienced environmental uncertainty as to how the weather will develop. This made him sensible to alternative strategic decision option spaces. Therefore, he reasoned in a long-term-oriented way as the following log book entry written by himself illustrates:

“But we are enjoying it some way, somehow. Trimming all the time, shifting gears to try to get the maximum out of each puff of breeze. Sometimes tacking, sometimes gybing as the wind is all over the show. So the weather forecast / models again show they suck in this area, so we are aiming to what we think is the best course in the long term.”

(TBRU, 9 January 2018)

The quote depicts how Bouwe Bekking developed a long-term oriented reasoning from perceiving environmental uncertainty unable to get a hold of the wind patterns or the weather forecast. This is in line with our propositions 1b and 2b.

Our propositions become particularly salient in the strategic decision that the skippers were facing during the last leg of the 2017-18 edition. Three skippers, those of teams Brunel (TBRU), Dongfeng Race Team (DFRT), and Mapfre (MAPF), were tied in overall points. Thus, winning this leg would ensure the overall win of the Volvo Ocean Race 2017-18.

When the skippers were facing a final exclusion zone prior to arriving in The Hague, they had the strategic option to either pass it inshore along the coasts of Denmark, Germany, and the Netherlands or offshore. The skipper of Brunel (TBRU), Bouwe Bekking, being fourth decided to pass offshore early on because it was their initial plan not perceiving any uncertainty regarding the strategic decision at that point in time:

“We thought we had made the right choice (to go further offshore) and we expected a windshift. It came 90-minutes too late and that was the race. But that’s yacht racing.” (TBRU, 28 June 2018)

By contrast, the skipper of Dongfeng Race Team (DFRT), Charles Caudrelier, experienced strategic uncertainty when he decided. He pursued the option to go inshore and reasoned in a long-term oriented way as illustrated by his log book entry:

“The decision hurt the team in the short term as they tumbled down the leaderboard. But by Sunday morning, with less than 100 miles left to race, weather routing projections had the top boats finishing within minutes of each other. None had been able to break away overnight, despite the significant splits on the race course. “We knew that we would fall behind initially and that if it came good it would only be at the end. The last position report (1300 UTC on Sunday) we were 27-miles from the finish and they were 20-miles and we thought it was over. But then I did a small weather routing and it showed we could end up one-mile ahead so I woke everyone up and said, ‘let’s push!’” (DFRT, 28 June 2018).

Xabi Fernández, skipper of team Mapfre (MAPF), however, was less decisive. While at first, it seemed as if he sought to pursue Dongfeng Race Teams (DFRT) course, as it was initially his plan, he decided to follow team Brunel (TBRU) last minute being confronted with competitive uncertainty. Therefore, he reasoned that it was more important to cover Brunel (TBRU) than Dongfeng Race Team (DFRT) as illustrated by the following interview when he arrived second place in The Hague:

“This is very hard decisions to make (...) and once you made them, you have to commit. First we did one decision and then we changed them (...) we really thought we were ok with Dongfeng, but when the last sched came, we saw that they were across (...). But we were busy enough because we had to catch the other two.” (MAPF, 28 June 2018)

The skipper of Dongfeng Race Team (DFRT) eventually won the leg and the race, while the skippers of Mapfre (MAPF) and Brunel (TBRU) finished second and third. This example demonstrates how perceptions of controllable sources of uncertainty, such as competitive uncertainty, and protective reasoning can lead strategic decision-makers to forgo opportunities and take the strategic decision to follow the main field of competitors. By contrast, perceptions of less controllable sources of uncertainty and sensible reasoning enable strategic decision-makers to take strategic decisions idiosyncratically. Table 8 provides further evidence on perception and reasoning capabilities associated with the strategic decision to part from the main field of competitors from the Volvo Ocean Race 2017-18.

Table 8: Strategic decisions to split taken during VOR 2017-18

Strategic decision #	Date	Leg	Informant	Skipper	Boat	Rank	Decision description	Source of uncertainty	Reasoning	Quote
1	16.11.2017	2	Skipper	Simeon Tienpont	AKZO	1	The boats head down the eastern coast of Brazil and have to position for turning east towards Cape Town. The skipper of Akzo Nobel chose a more easterly route with less wind, but fewer distance than the other skippers.	Strategic	Opportunity-driven	"Ofcourse there is the excitement of the inside route we are trying to take to Cape Town. We all know we are in a little less pressure then the rest of the fleet but hopefully have to sail less miles because of it. Upcoming 24 hours will see how we are going to line up with the fleet as everyone will see a big lift and will make a dive down south again into the southern ocean. Apart from the excitement of the position report every 6 hours if we are still hanging in there with the fleet little news reaches our boat. Looking forward what the changes in weather is going to bring for us and how we line up with the fleet."
2	19.11.2017	2	Skipper	Xabi Fernandéz	MAPF	5	The skipper of Mapfre maintains significant leverage and gybes last of all boats and further south when they turn east towards Cape Town. He locates 80 miles south of the fleet, unable to see other boats anymore.	Strategic	Opportunity-driven	"We are pretty excited after that gibe close to the HP and our positioning with the rest of the fleet and now we are sailing with good wind (14-17knots) towards the first front which is going to give as a good push. On board the most common questions are, ETA, how much wind will come with the front and how far south we are going! The leader board seems not to be so important anymore!"
3	12.12.2017	3*	Skipper	Dee Caffari	TTOP	7	A low pressure system is approaching. The skippers have to decide how far to the center they would like to position. If they position too close to the center, the may incur damage to gear and boat as the winds are stronger and if they position too far away from the center, the boat may slow too much. The skipper of TTOP positions the furthest north of all boats. Thereby, she leaves the fleet that is positioned closer to the center out of AIS** range.	Environment	Responsibility-driven	"It was warm, sunny and lovely cruising, but frustrating to be racing in such conditions as the wind was shifty and gusty. (...) It is 24 hours of these conditions, flat water and easy breeze, then we will be negotiating a secondary low. Waves of 10 metres are being predicted and winds over 50 knots. These are boat-breaking conditions and decisions are being made by myself and Nico over what level we want to sail in. You get to a certain stage and then you stop sailing and just start surviving. We will sail faster if we can manage the conditions. So looking to keep racing but give ourselves a chance and not risk injury to people or boat."
4	04.01.2018	4	Navigator	Charlie Enright	VS11	4	The boats sail along the eastern coast of Australia towards Sydney. They have the option of leveraging the East Australia Current and strong winds from a tropical storm offshore to propel them north or turn closer to the coast with less wind, but fewer distance. The skipper of VES11 selected the inshore option heading away from the fleet that sails offshore.	Strategic	Opportunity-driven	"After lots of work to weigh up the options of our inshore option vs the more easterly option; both on shore and aboard; the die was cast by just a short gybe back into the coast shortly after Green Cape. A big header with pressure and we were pretty much locked onto our inshore track. With MAPFRE alongside us we in are in good company though, it is good to have someone alongside us to push us hard. The conditions too looked favourable for this option despite being more complex outside than it looked on the screen. With the routing now favouring setting up further to the west we remain cautiously optimistic we are in the right place."

Table 8: Strategic decisions to split taken during VOR 2017-18 (continued)

Strategic decision #	Date	Leg	Informant	Skipper	Boat	Rank	Decision description	Source of uncertainty	Reasoning	Quote
5	09.01.2018	4	Skipper	Bouwe Bekking	TBRU	4	The fleet is passing the Doldrums on their way from Melbourne towards Hong Kong. The skipper of Brunel positions the furthest west of all skippers. Thus, he is not able to see the other boats on AIS* anymore.	Environment	Long-term oriented	"(...) But we are enjoying it some way, somehow. Trimming all the time, shifting gears to try to get the maximum out of each puff of breeze. Sometimes tacking, sometimes gybing as the wind is all over the show. So the weather forecast / models again show they suck in this area, so we are aiming to what we think is the best course in the long term."
6	24.02.2018	6	Skipper	Bouwe Bekking	TBRU	4	When heading towards Auckland, Bouwe Bekking decided to go into stealth mode and hide their strategy change and choosing a more direct route towards Auckland.	Environment	Opportunity-driven	"We thought we were in "fat" city, but the weather has changed and moved the centre of the high pressure into our path, so we changed also to a more southerly route. It is pretty hard to explain this to the crew, first your sail two days hard on the wind and then of all sudden a course change of 40 degrees, but the above says it all."
7	18.03.2018	7*	Navigator	Libby Greenhalgh	SHKS	7	On their way from Auckland to Itajai in Brazil, the fleet clears Square Top Island and the northern limit of Coromandel close to New Zealand. Heading south-east down the eastern side of the Peninsula, the skipper of Sun Hung Kai / Scallywag decide to tack offshore away from the fleet while the fleet continues along the coast.	Environment	Long-term oriented	"As we split from the fleet we were also suffering an instrument failure which meant in some ways we were sailing blind so less than ideal. We probably should have tacked back and kept a visual on the fleet but we chose to stick with our plan and hold slightly further offshore to not fall into the lighter winds of the Bay of Plenty."
8	21.03.2018	7*	Navigator	Libby Greenhalgh	SHKS	6	During the passage of the fleet of the Southern Ocean, the skipper of Sun Hung Kai / Scallywag decides to take a route all on their own of about 10 nautical miles north of Turn the Tide on Plastic and the rest of the fleet further south.	Strategic	Legitimized action	"(...) but that has been the yo yo decision we have been trying to make (...). I am sure the viewers are watching us yet again break away from the pack and taking a higher risk decision with mile losing consequences. Bold it may look like but not entirely in our control no. The unintentional switcharoo we did on the fleet when we peeled to our FR0 initial wasn't as bad as we thought we had gained on the fleet as in fact a few hours later we could see our favourite friends TTOP, however the 8 nm further north put us closer to the high and we been lifted and lighter and are in a mile losing position. Should we gybe south and take a loss and hook into the same pressure as our fleet in an attempt to minimize the loss, probably. Will we probably not. Difficult decisions with a front chasing us down (...)"
9	24.03.2018	7*	Skipper	Dee Caffari	TTOP	6	Sailing in brutal physical conditions, a low pressure system continued its path in front of the fleet, while the wind shifted to west. The fleet is sailing close to the ice limits*** when the skipper of Turn the Tide on Plastic decides to continue to sail in the south while the rest of the fleet (except Mapfre) heads further north.	Strategic	Opportunity-driven	"We are playing the area just above the ice exclusion zone. If we go too far north we get into lighter winds and sail the wrong direction, if we go too far south we risk running into the ice exclusion zone. As a result we have been doing multiple gybes. We seem to be the only two playing down here as the rest have seemed to remain to the north. Let's hope our hard work pays off."

Table 8: Strategic decisions to split taken during VOR 2017-18 (continued)

Strategic decision #	Date	Leg	Informant	Skipper	Boat	Rank	Decision description	Source of uncertainty	Reasoning	Quote
10	25.04.2018	8	Navigator	Libby Greenhalgh	SHKS	3	The fleet has to manage a geographical wind shift along the Brazilian coast that created competing benefits: Sailing on port tack would guarantee more easterly breeze when it was reached, but it also meant sailing more miles. By contrast, sailing further offshore meant more winds and less miles, but even more extra miles. The skipper of SHSK decided to head north prior to everyone else separating from the fleet.	Environment	Opportunity-driven	"A transition of global weather systems another equator crossing and probably people talking a lot about weed, not the kind you smoke but big long tentacles of Sargasso weed. But the depth of this team shows well and we have hung on in there making initially some significant gains today to be throwing stones at most. Since then we made a now punchy decision to split from the fleet as we were getting headed behind them. We then wiggled our way up but while latest ached has us leading the reality is we perhaps were a little impatient and should have taken a smaller loss with the fleet."
11	25.04.2018	8	Skipper	Dee Caffari	TTOP	3	The fleet has to manage a geographical wind shift along the Brazilian coast that created competing benefits: Sailing on port tack would guarantee more easterly breeze when it was reached, but it also meant sailing more miles. By contrast, sailing further offshore meant more winds and less miles, but even more extra miles. The skipper of TTOP decided to head the furthest east away from the fleet.	Environment	Long-term oriented	"We have sailed within sight of Vestas for the last 24 hours having lost sight of the others as we all tacked on the shifts around a huge cloud yesterday afternoon [from 25 Apr 2018]. Yesterday was all about making short term losses to make long term gains. That is what I was telling the team as we pushed out to the East while it was easy to gain miles in that direction. We lost AIS and visual on the other boats and it was not until we saw the position report that we realised we made the split as big as we had [from 26 Apr 2018]."
12	29.04.2018	8	OBR	Richard Edwards	SHKS	7	The fleet is approaching the doldrums on their passage from Brazil to North America. They have to pick a lane whether to remain more west and sailing a shorter distance or sailing further east in stronger winds, but incurring extra miles. The skipper of SHKS was the first to choose from the fleet to head further east offshore.	N/A	Opportunity-driven	"Separated from the rest of the fleet after making the surprise decision to tack early resulted in lost mileage and relative isolation, living out the repetitive tasks of cloud dodging, navigating average winds, and preparing for day to night pressure changes. Navigator Libby Greenhalgh pulled no punches. "We're 75 miles behind and been losing 6-12 miles per sched. It resulted from us choosing to head north earlier than the rest of the fleet who pushed east, and we probably got punished for that. It definitely wasn't the right decision, and we should have stuck with our original plan."
13	29.04.2018	8	Skipper	Charles Caudrelier	DFRT	3	The fleet is approaching the doldrums on their passage from Brazil to North America. They have to pick a lane whether to remain more west and sailing a shorter distance or sailing further east in stronger winds, but incurring extra miles. The skipper of DFRT was the last to remain in coastal waters and heading further west than the rest of the skippers prior to gybing north.	Environment	Opportunity-driven	"If only we knew how to manage small clouds - right now we are under a huge one. Sometimes they bring rain, sometimes not; sometimes strong wind, sometimes nothing. Again they are a source of big stress on board each time. Playing with this cloud, we are moving west of the fleet, hoping for a bit more wind."
14	21.05.2018	9*	Skipper	Xabi Fernández	MADF	2	When crossing the Atlantic on their way from Newport (US) to Cardiff (UK), the skipper of Mapfre decides to gybe away from the fleet crossing further to the north than the rest of the fleet.	N/A	Long-term oriented	"We were happy when we gibed as it was the plan we had even before the start, hoping to get the northerly winds earlier after a transition, but what happened was we had a very slow transition to get to the north winds and by then the 4 boats in the south had travelled a lot to the ESE."

Table 8: Strategic decisions to split taken during VOR 2017-18 (continued)

Strategic decision #	Date	Leg	Informant	Skipper	Boat	Rank	Decision description	Source of uncertainty	Reasoning	Quote
15	22.05.2018	9*	Navigator	Libby Greenhalgh	SHKS	6	After seeing Mapfre and Dongfeng Race Team split from the fleet when crossing the Atlantic from Newport (US) to Cardiff (UK), the skipper of Scallywag decides to gybe away from the main fleet after some hesitation earlier on.	Environment	Opportunity-driven	"The cowboy in me would have gybed us at about 0800-0900 on the 21st but we didn't as we are playing less of the early split and hanging with our friends to try pounce at the end. Though never say never. Right now the weather situation is complex and difficult to really have faith in the short term and the big picture shows that we ultimately all converge so you could say do whatever? But there are larger risks with different routes and while we are choosing the biggest distance I think we also have the best winds."
16	11.06.2018	10	Sailor	Emily Nagel	AKZO	2	When reaching the Fastnet rock on their way from Cardiff, UK to Gothenburg, Sweden, the skippers of team AkzoNobel and team Mapfre decide to head further north while the rest of the fleet continues sailing west.	Environment	Long-term oriented	"We're now constantly leap frogging other teams having rounded the Fastnet rock literally right next to TTOP. Now past Mizzen Head we're trying to get north, although the breeze has different plans."
17	12.06.2018	10	Skipper	Xabi Fernández	MAPF	1	When reaching the Fastnet rock on their way from Cardiff, UK to Gothenburg, Sweden, the skippers of team AkzoNobel and team Mapfre decide to head further north while the rest of the fleet continues sailing west.	Environment	Opportunity-driven	"Last night after a bit of tacking and sailing with quite a shifty conditions, we managed to position ourselves north of the fleet. Right now, it looks we are leaving the ridge behind and we are sailing with the new S-SW winds, doing about 11 knots of BS so looks promising. Hopefully we can stretch with Akzonobel and put some ground between us and the rest of the boats but as I said, for the moment it just looks promising."
18	23.06.2018	11	Skipper	Charles Caudrelier	DFRT	2	In their final push from Norway towards The Hague in the Netherlands, a split develops in the fleet. The fleet either had the option to go inshore sailing along the coasts of Denmark, Germany, and the Netherlands, or to stay offshore and sail straight most of the time prior to turning east to The Hague (finish line). While the majority of skippers opts for the latter route, the skipper of Dongfeng chooses the inshore route.	Strategic	Long-term oriented	"The decision hurt the team in the short term as they tumbled down the leaderboard. But by Sunday morning, with less than 100 miles left to race, weather routing projections had the top boats finishing within minutes of each other. None had been able to break away overnight, despite the significant splits on the race course. "We knew that we would fall behind initially and that if it came good it would only be at the end. The last position report (1300 UTC on Sunday) we were 27-miles from the finish and they were 20-miles and we thought it was over. But then I did a small weather routing and it showed we could end up one-mile ahead so I woke everyone up and said, 'let's push!'""
19	23.06.2018	11	Skipper	Dee Caffari	TTOP	6	In their final push from Norway to The Hague in the Netherlands, a split develops in the fleet. The fleet either had the option to go inshore sailing along the coasts of Denmark, Germany, and the Netherlands, or to stay offshore and sail straight most of the time prior to turning east to The Hague (finish line). While the majority of skippers opts for the latter route, the skipper Turn the Tide on Plastic chooses the inshore route.	Environment	Long-term oriented	"So the fleet have split and we are in the company of Dongfeng and Scallywag. This is not looking too glamorous right now but we are playing the long term picture which could be good if the weather does what it says its going to do and that is a big ask."

* Marks legs with double point score (different incentive structure)

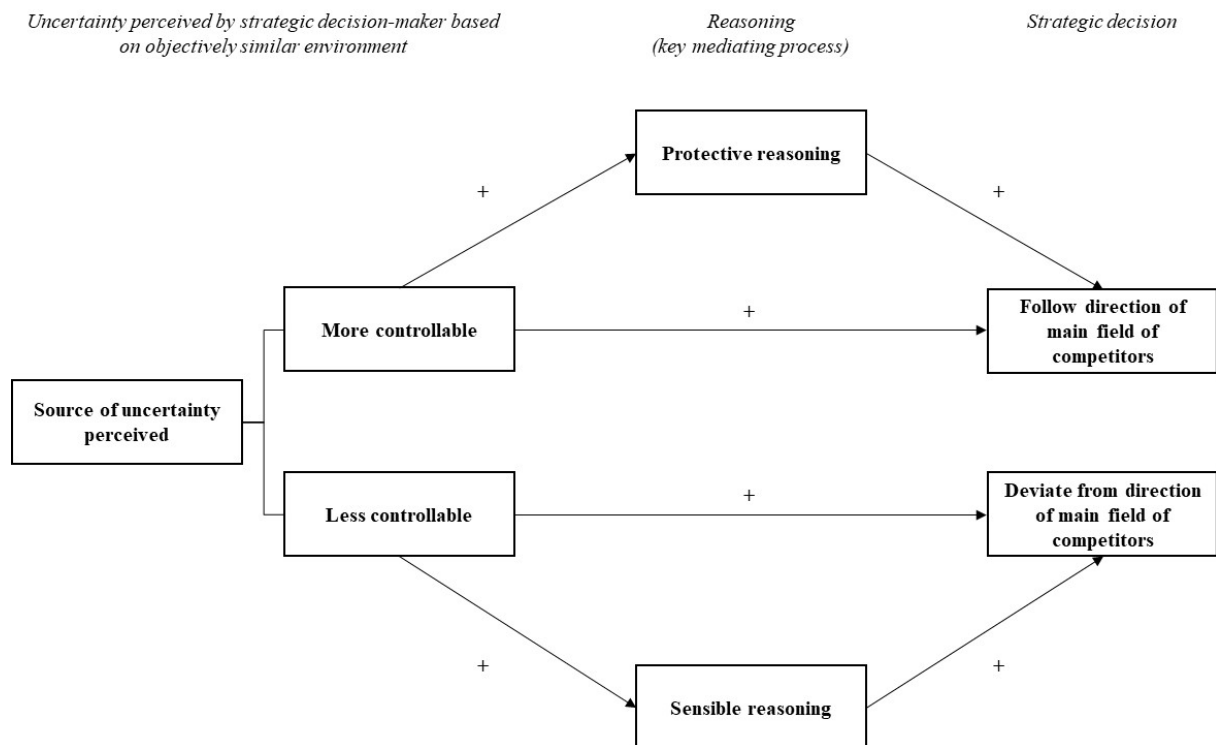
** AIS refers to Automatic Identification System, an onboard software that is installed for safety reasons, but that is frequently used by sailors to detect and follow surrounding competitors within 20 nautical miles range.

*** The ice limits refer to a technically imposed barrier by Race Control in which boats are not allowed to sail. They are imposed as precautions for icebergs and other physical objects that might impede the safety of the boats and crew.

Discussion

This research explored how differences in strategic decision-makers cognitive capabilities influence strategic decisions. From our analysis of the Volvo Ocean Race 2014-15, we derived several propositions that we substantiated in the following race edition depicted. Figure 3 summarizes our findings:

Figure 3: Relation between perception, reasoning, and strategic decision content



Our propositions focus on the managerial cognitive capabilities of perception (of uncertainty) and reasoning that are crucial mental activities in determining whether strategic decision-makers will deviate or follow the general direction of competitors. Thereby, we find that depending on which sources of uncertainty strategic decision-makers perceive, they will decide one way or the other (Propositions 1a & 1b). Individuals follow a natural tendency to obtain control over their perceived state of the world through a human control system of constant comparison between perceived and desired state of the world (Powers, 1973). As a result, when strategic decision-makers perceived sources of uncertainty that were easier to control (e.g., internal, supply, competitive), they followed their main field of competitors. However, when they perceived sources of uncertainty that were more difficult to control (e.g., strategic,

environment), strategic decision-makers decided to deviate from their main field of competitors. We found this to be influencing the way that strategic decision-makers reasoned. Protective reasoning was associated with following the main field of competitors whereas sensible reasoning induced strategic decision-makers to take the strategic decision to part from their main field of competitors (Propositions 2a & 2b). These propositions hold independent from the size of rewards are granted suggesting that the way in which strategic decision-makers perceive and reason influences their strategic decision to follow or deviate from the general direction of their competitors.

Based on these findings, our research provides several implications for literature: First, this study contributes to the literature on cognition in strategic decision-making (e.g., Eisenhardt, 1989a; Dean & Sharfman, 1996) by identifying and specifying cognitive capabilities that lead to differences in strategic decisions. While prior research highlighted the role of environment its relation to cognition in strategic decisions (e.g., Hough & White, 2003; Mitchell et al., 2011; Nadkarni & Barr, 2008), our research uncovered specific mental activities that strategic decision-makers share when they take a strategic decision to follow or deviate from the general direction of their competitors. By developing capabilities that enable strategic decision-makers to perceive the environment as one that is less controllable as well as sensible reasoning capabilities, strategic decision-makers may become more effective at seizing appealing opportunities (cf. Teece, 2007).

Second, our research speaks to the managerial cognitive capabilities literature (e.g., Adner & Helfat, 2003; Eggers & Kaplan, 2013; Gavetti, 2005; Helfat & Peteraf, 2015). In this sense, our study does not only specify the nature of the managerial cognitive capabilities of perception and reasoning (Helfat & Peteraf, 2015) in the strategic decision to follow or deviate from the general direction of competitors, but also finds that these managerial cognitive capabilities are related. Thus, if strategic decision-makers possess cognitive capabilities that allow them to perceive the world in a certain way (Adner & Helfat, 2003), they may not only be better equipped to sense more opportunities than others (e.g., Barr, 1998; Jackson & Dutton, 1988), but they may also be more capable in seizing them when others cannot as their perceptions inform reasoning. This underlines the crucial role of individual perceptions in shaping strategic decisions (e.g., Fiol & Huff, 1992; Gavetti, 2012, 2005; Helfat & Peteraf, 2015; Huff, 1990; Walsh, 1995). Because cognitive capabilities develop through repeated practice

(Helfat & Peteraf, 2015), strategic decision-makers may become more sensible to sensing and seizing of opportunities, the more they are exposed to context where these capabilities are required and trained. In this sense, our research also addresses calls for more scholarly work on how strategic decision-makers can better identify and pursue opportunities absent radical environmental change (Eggers & Kaplan, 2013, 2009).

Third, previous empirical work suggested that gains and losses vis-à-vis a reference point play an important role in determining whether strategic decision-makers may deviate from their competitors (e.g., Kahneman & Tversky, 1979; Tversky & Kahneman, 1992, 1986). While this work has contributed invaluablely to our understanding when strategic decision-makers should be more likely to deviate the strategic decisions of competitors, it neglected the cognitive underpinnings, such as managerial cognitive capabilities (cf. Helfat & Peteraf, 2015), underlying such decisions, particularly in the presence of cognitive pressures (e.g., Dobrev, 2007; Greve, 1998). Therefore, our work speaks to this perspective by going beyond understanding strategic decision-makers' behavior. Instead, we explore strategic decision-makers' mental activities that account for differences in their strategic decisions. We found that skippers that were positioned lower in rank (and thus in a gain frame) were not always more likely to branch out from the main field of competitors than those in higher ranks (and thus in a loss frame). This could be due to the fact that less controllable sources of uncertainty can lead strategic decision-makers to miss out on sensing opportunities (Teece, 2007), and thus to forego a chance to frame a decision-situation as a gain or loss (e.g., Dutton & Jackson, 1987; Kahneman & Tversky, 1979). Similarly, even when strategic decision-makers may sense an opportunity, they may fail to sense a reward because of their protective reasoning. This suggests that apart from a reference point (Kahneman & Tversky, 1979; Tversky & Kahneman, 1992, 1986) strategic decision-makers' cognitive underpinnings, such as cognitive capabilities play an essential role in determining their choices.

Fourth, our work also contributes to the literature on risk-taking (e.g., Bromiley, 1991; Palmer & Wiseman, 1999; Wiseman & Bromiley, 1996). This stream of literature suggests that managers of firms with poor performance were more likely to take risk than managers of well-performing organizations (e.g., Bowman, 1982; Fiegenbaum & Thomas, 1988; Singh, 1986). This is similar to the strategic decision to deviate from the general direction of competitors that strategic decision-makers took in our study. Hence,

specific perception and reasoning capabilities may also foster risk-taking behavior in strategic decision-makers. Kahneman and Lovallo (1993: 17) stated that “it is the optimistic denial of uncontrollable uncertainty that account for managers’ views of themselves as prudent risk-takers, and for rejection of gambling as a model of what they do”. Thus, building up perception capabilities that allow strategic decision-makers to experience the world as less controllable may lead them to take more risk. As managerial cognitive capabilities may be build-up through repeated practice (Helfat & Peteraf, 2015), risk-averse individuals could train these specific capabilities in order to become more proactive risk-takers as a proactive risk-taking attitude may be essential to engage in certain fields, such as entrepreneurship (e.g., McMullen & Shepherd, 2006), entry into new markets (e.g., Lumpkin & Dess, 1996), and creation of new ventures (e.g., Gartner, 1985).

And fifth, this study also contributes to previous research on inertia (e.g., Barr et al., 1992; Kaplan, Murray, & Henderson, 2003; Milliken & Lant, 1991) by studying how strategic decision-makers may overcome tendencies to procrastinate or forgo attractive strategic options because of the presence of uncertainty. In identifying cognitive capabilities that lead strategic decision-makers to deviate from the general direction of competitors, we specify how strategic decision-makers can overcome these tendencies. For example, because managerial cognitive capabilities are built through repeated practice (Helfat & Peteraf, 2015), strategic decision-makers could expose themselves to experiences that allow them to overcome pressures to reduce uncertainty. This could help them in better seizing appealing opportunities (e.g., Teece, 2007). In addition, because managers are often not aware of what their organizations are capable of doing (e.g., Eggers & Kaplan, 2013), fostering sensible reasoning may help managers in matching resources to the opportunities they identified in the environment.

More broadly, our results may also inform the literatures on market positioning (Dobrev, 2007; Greve, 1998), strategic positioning (Porter, 1996; Ghemawat & Rivkin, 1999), observational learning (Banerjee, 1992; Bikhchandani, Hirshleifer, & Welch, 1998; Gaba & Terlaak, 2013; Hirshleifer & Teoh, 2003), and imitation (DiMaggio & Powell, 1983; Haunschild & Miner, 1997; Ross & Sharapov, 2015). On a firm-level, organizations are positively influenced by what others do (Strang & Still, 2006). Thus, prior research in these fields demonstrated that although organizations may adopt idiosyncratic strategies, the existence of other organizations as a reference group makes

it more likely that it adopts the strategy selected by this reference group (DiMaggio & Powell, 1983; Dobrev, 2007; Greve, 1998; Huff, 1982; Mascarenhas, 1989; Porac, Thomas, & Baden-Fuller, 1989; Reger & Huff, 1993). Our research adds to this view that strategic decision-makers that command perception capabilities that lead them to experience less or less controllable sources of uncertainty as well as sensible reasoning may be more likely in overcoming these behavioral bounds. Furthermore, our research makes the cognitive underpinnings of strategic decision-makers' deliberate decisions (e.g. Klingbiel & Joseph, 2015) explicit.

Managerial implications, limitations & future research

Our findings also suggest some practical implications. Individuals have a natural tendency to reduce uncertainty (Hogg & Terry, 2000). Taking the strategic decision to deviate from competitors entails uncertainty regarding the potential rewards this move might be offering (e.g., Klingbiel & Joseph, 2015). Therefore, strategic decision-makers often orient themselves on what competitors are doing (e.g., Dobrev, 2007).

Yet, our research demonstrates that some cognitive capabilities that strategic decision-makers possess can help them overcome these tendencies and take action when others cannot (yet) do so. For example, the CEO of the Swedish premium car manufacturer, Hakan Samuelsson, presented its electrification strategy in 2017 and announced that it would no longer manufacture traditional gasoline or diesel engines by 2019 (Ritchie, 2017). Volvo's CEO was the first premium car manufacturer to proclaim this strategic decision stating that "we have an ambition to be fastest in this transition (to electrification). We want to be the first company to clear this, and we want to do this change. It's a very decisive decision" (Taylor, 2017). Hence, Samuelsson may possess cognitive capabilities that helped him overcome social and cognitive pressures exerted from competitors in his market segment and deviate from the general direction that competitors were taking. Hence, building up cognitive capabilities through repeated practice (cf. Helfat & Peteraf, 2015) can help managers to look beyond what their reference group is doing and sense and seize opportunities when others cannot.

Of course, our study also has limitations that provide several avenues for future research: First, we selected two professional sailing races as our contexts of study. The selection of this sport context allowed us to study the nature of managerial cognitive capabilities in strategic decisions, while holding the objective environment, information

and resources constant. In this respect, our study was conducted in a single industry setting that offered a similar objective environment to all skippers because they were sailing close together. Thus, our research setting enabled us to study the mental activities of perception and reasoning absent noise created through environmental context, information and resource asymmetry.

Future research may want to relax these assumptions and study the interrelation of them with managerial cognitive capabilities. For example, by studying different industry contexts, scholars could explore whether some cognitive capabilities are particularly present in some industry contexts than others. Less dynamic industry contexts, such as the furniture industry, could lead strategic decision-makers to develop perceptions of controllable sources of uncertainty and more protective reasoning making reducing their capability to react to radical changes in the environment should the industry be disrupted (e.g., Barr, 1998; Barr et al., 1992). By contrast, highly dynamic environments, such as the biotechnology sector, could facilitate strategic decision-makers development of perception capabilities for less controllable sources of uncertainty and sensible reasoning because of repeated exogenous jolts (Meyer, 1982) that they have to deal with in this industry context. Hence, future research could compare managerial cognitive capabilities across industries in order to better understand what drives capability build-up (e.g., Eggers & Kaplan, 2009).

In addition, studies could assess whether possessing superior information and resources to others supports strategic decision-makers in identifying and seizing opportunities, e.g., by leveraging first-mover advantages (e.g., Lieberman & Montgomery, 1988). Because uncertainty entails the inability to predict a change in the environment, superior information could help alleviate uncertainty. Hence, strategic decision-makers should be able to reason in a more sensible way and seize opportunities (e.g., Gavetti, 2012; Teece, 2007) because they are more certain that seizing an opportunity will add value to the organization. Yet, Greve (1998) argued that information is often difficult to attain. Thus, strategic decision-makers with a superior resource base should be better able to search for information that may help alleviate or preempt uncertainty. For example, early entrants into a market may build a superior position in a geographic or technology space as well as defend and expand their position vis-à-vis competitors (Carpenter & Nakamoto, 1989; Lieberman & Montgomery, 1998 or Zachary, Gianiodis, Payne, & Markman, 2017 for a summary). By reducing

uncertainty, strategic decision-makers may thus be able to train their sensible reasoning capabilities because they become accustomed to environments that support them in overcoming uncertainty (e.g., Michel, 2007).

Second, our research focused on two strategic decisions: The decisions to follow or deviate from the general direction of competitors. Yet, strategic decision-makers are continuously confronted with other strategic decisions, such as governance (e.g., Carson et al., 2006), partner choice (e.g., Beckman et al., 2004), and imitation (e.g., Gaba & Terlaak, 2013). Thus, these different research streams could also benefit from including a managerial cognitive capabilities perspective. Moreover, we studied the managerial cognitive capabilities of perception and reasoning. Yet, Helfat and Peteraf (2015) also conceptualized the capabilities of language, communication, and social cognition that are crucial in the reconfiguration of resources and thus in overcoming resistance to change. Hence, future research could look at situations of change in organizations to better understand how these managerial cognitive capabilities contribute to strategic decision-makers adapting or remaining inert in the face of change (e.g., Tripsas & Gavetti, 2000).

And third, because our research exclusively focused on two strategic decisions and the underlying managerial cognitive capabilities, this study does not encompass any predictions about antecedents and outcomes of the relation between managerial cognitive capabilities and strategic decisions. For example, while we did not explicitly assess the performance effect of these strategic decisions in our study, our research demonstrated that some of the strategic decisions that skippers took led other skippers to regret that they did not seize this opportunity as well, although having sensed it. In our example from the Volvo Ocean Race 2014-15 during leg 4, when the skippers approached the Philippines and the skipper of teams Brunel (TBRU) and SCA (TSCA) decided to part from the main field of competitors and head via Vietnam to Auckland, the skipper of Dongfeng Race Team (DFRT), Charles Caudrelier, stated that he regretted that he did not have the courage to break from the fleet, particularly as it became evident that teams Brunel (TBRU) and SCA (TSCA) were going faster due to better winds. This example demonstrates that following the direction of competitors to be able to play tactics is not always the “better” option in terms of performance, but that taking strategic decisions and overcoming cognitive and behavioral bounds may also pay off, at least in the short-term. In this respect, future research may want to study the performance

implications of strategic decision-makers' cognitive capabilities underlying their strategic decisions.

Similarly, future research may want to link strategic decision-makers traits and such as personality (e.g., Alston, 1975; Hambrick, 2007; Hambrick & Mason, 1984; Ruble & Dweck, 1995), environments, such as culture (e.g., Hofstede, 1980; Schneider & De Meyer, 1991), or the way in which strategic decision-makers have been trained to cope with uncertainty (Michel, 2007) to managerial cognitive capabilities. This could help us in better understanding why some individuals possess or develop cognitive capabilities that others do not command, and consequentially why their strategic decisions differ despite being exposed to an objectively similar environment (cf. Nadkarni & Barr, 2008).

Conclusion

By exploring the nature of managerial cognitive capabilities that leads to differences in strategic decisions, we shed new light on managers' mental activities that drive strategic decisions. Thereby, we extend the relatively new stream of research on managerial cognitive capabilities. Exploring strategic decision-makers cognitive capabilities may help us in better understanding why strategic decision-makers decide differently and ultimately also how their differences in cognition drives performance. Our hope is that our study provides a first step into this direction and that it may spark future research in this stream.

References

- Adner, R., & Helfat, C. E. 2003. Corporate effects and dynamic managerial capabilities. *Strategic Management Journal*, 24(10): 1011–1025.
- Alston, W. P. 1975. Traits, consistency, and conceptual alternatives for personality theory. *Journal for the Theory of Social Behavior*, 5: 17–47.
- Banerjee, A. 1992. A simple model of herd behaviour. *Quarterly Journal of Economics*, 107(3): 797–818.
- Baron, R. A., & Ensley, M. D. 2006. Opportunity recognition as the detection of meaningful patterns: Evidence from comparisons of novice and experienced entrepreneurs. *Management Science*, 52(9): 1331–1344.
- Barr, P. S. 1998. Adapting to unfamiliar environmental events: A look at the evolution of interpretation and its role in strategic change. *Organization Science*, 9(6): 644–669.
- Barr, P. S., Stimpert, J. L., & Huff, A. S. 1992. Cognitive change, strategic action, and organizational renewal. *Strategic Management Journal*, Summer Special Issue 13: 15–36.
- Bateman, T. S., & Zeithaml, C. T. 1989. The psychological context of strategic decisions: A model and convergent experimental findings. *Strategic Management Journal*, 10: 59–74.
- Beckman, C. L., Haunschild, P. R., & Phillips, D. J. 2004. Friends or strangers? Firm-specific uncertainty, market uncertainty, and network partner selection. *Organization Science*, 15(3): 259–275.
- Bikhchandani, S., Hirshleifer, D., & Welch, I. 1998. Learning from the behavior of others: Conformity, fads, and informational cascades. *Journal of Economic Perspectives*, 12(3): 151–170.

Boumgarden, P., Nickerson, J., & Zenger, T. R. 2012. Sailing into the wind: Exploring the relationships among ambidexterity, vacillation, and organizational performance. *Strategic Management Journal*, 33(6): 587–610.

Bourgeois, L. J., & Eisenhardt, K. M. 1988. Strategic decision processes in high velocity environments: Four cases in the microcomputer industry. *Management Science*, 34: 816–835.

Bouty, I., & Drucker-Godard, C. 2018. Managerial work and coordination: A practice-based approach onboard a racing sailboat. *Human Relations*: 1–23.

Bowman, E. H. 1982. Risk seeking by troubled firms. *Sloan Management Review*, Summer: 33–42.

Bromiley, P. 1991. Testing a causal model of corporate risk taking and performance. *Academy of Management Journal*, 34: 37–59.

Carpenter, G. S., & Nakamoto, K. 1989. Consumer preference formation and pioneering advantage. *Journal of Marketing Research*, 26: 285–298.

Carson, S. J., Madhok, A., & Wu, T. 2006. Uncertainty, opportunism, and governance: The effect of volatility and ambiguity on formal and relational contracting. *Academy of Management Journal*, 49(5): 1058–1077.

Case, T. I., Fitness, J., Cairns, D. R., & Stevenson, R. J. 2004. Coping with uncertainty: Superstitious strategies and secondary control. *Journal of Applied Psychology*, 34(4): 848–871.

Child, J. 1972. Organizational structure, environment, and performance: The role of strategic choice. *Sociology*, 6(1): 1–22.

Colman, A. M. 2006. *A dictionary of psychology* (2nd edn). Oxford, UK: Oxford University Press.

Corbin, J., & Strauss, A. 1990. Grounded theory research – procedures, canons, and evaluative criteria. *Zeitschrift fuer Soziologie*, 19(6): 418–427.

Cyert, R. M., & March, J. G. 1963. *A behavioral theory of the firm*. Englewood Cliffs, NJ: Prentice-Hall.

Dean, J.W. Jr, & Sharfman, M.P. 1996. Does decision process matter? A study of strategic decision-making effectiveness. *Academy of Management Journal*, 39(2): 368–96.

deCharms, R. 1968. *Personal causation: The internal affective determinants of behavior*. New York: Academic Press.

DiMaggio, P. J., & Powell, W. W. 1983. The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review*, 48: 147– 160.

Dobrev, S. D. 2007. Competing in the looking-glass market: Imitation, resources, and crowding. *Strategic Management Journal*, 28(13): 1267–1289.

Duncan, R. B. 1972. Characteristics of organizational environments and perceived environmental uncertainty. *Administrative Science Quarterly*, 17: 313–327.

Eggers, J. P., & Kaplan, S. 2009. Cognition and renewal: Comparing CEO and organizational effects on incumbent adaptation to technical change. *Organization Science*, 20: 461–477.

Eggers, J. P., & Kaplan, S. 2013. Cognition and capabilities: What are they? *Strategic Management Journal*, 21(10–11): 1105–1121.

Eisenhardt, K. M. 1989a. Making fast strategic decisions in high-velocity environments. *Academy of Management Journal*, 32(3): 543–576.

Eisenhardt, K. M. 1989b. Building theories from case study research. *Academy of Management Journal*, 14(4): 532–550.

Eisenhardt, K. M., & Graebner, M. E. 2007. Building from cases: Opportunities and challenges. *Academy of Management Journal*, 50(1): 25–32.

Eisenhardt, K. M., & Martin, J. A. 2000. Dynamic capabilities: What are they? *Strategic Management Journal*, 21: 1105–1121.

Daft, R. L., & Weick, K. E. 1984. Toward a model of organizations as interpretative systems. *Academy of Management Review*, 9(2): 284–295.

Dutton, J. E., & Jackson, S. E. 1987. Categorizing strategic issues: Links to organizational action. *Academy of Management Review*, 12(1): 76–90.

Festinger, L. 1954. A theory of social comparison processes. *Human relations*, 7(2): 117–140.

Fiegenbaum, A., & Thomas, H. 1988. Attitudes towards risk and the risk-return paradox: Prospect theory explanations. *Academy of Management Journal*, 31(1): 85–106.

Fiol, C. M., & Huff, A. S. 1992. Maps for managers: Where are we? Where do we go from here? *Journal of Management Studies*, 29: 267–285.

Fishburn, P. C., & Kochenberger, G. A. 1979. Two-piece von Neumann-Morgenstern utility functions. *Decision Science*, 10: 503–51

Fredrickson, J. W. 1984. The comprehensiveness of strategic decision processes: Extension, observation, future directions. *Academy of Management Journal*, 27(3): 445–466.

Gaba, V., & Terlaak, A. 2013. Decomposing uncertainty and its effects on imitation in firm exit decisions. *Organization Science*, 24(6): 1847–1869.

Gartner, W. B. 1985. A conceptual framework for describing the phenomenon of new venture creation. *Academy of Management Review*, 10: 696–706.

Gavetti, G. 2005. Cognition and hierarchy: Rethinking the microfoundations of capabilities' development. *Organization Science*, 16(6): 599–617.

Gavetti, G. 2012. Towards a behavioral theory of strategy. *Organization Science*, 23(1): 267–285.

Gazzaniga, M., Heatherton, T., & Halpern, D. 2010. *Psychological science*. New York: Norton.

Ghemawat, P., & Rivkin, J. W. 1999. Creating competitive advantage. In P. Ghemawat (Ed.), *Strategy and the business landscape: Text and cases*: 49–74. Englewood Cliffs, NJ: Prentice-Hall.

Gilbert, C. G. 2006. Change in the presence of residual fit: Can competing frames coexist? *Organization Science*, 17(1): 150–167.

Gioia, D. A., Corley, K. G., & Hamilton, A. L. 2012. Seeking qualitative rigor in inductive research: Notes to the Gioia methodology. *Organizational Research Methods*, 16(1): 15–31.

Glaser, B., & Strauss, A. 1967. *Discovering grounded theory*. Chicago: Aldine.

Greve, H. R. 1998. Managerial cognition and the mimetic adoption of market positions: What you see is what you do. *Strategic Management Journal*, 19(10): 967–988.

Hambrick, D. C. 2007. Upper echelons theory: An update. *Academy of Management Review*, 32(2): 334–343.

Hambrick D. C., & Mason, P. A. 1984. Upper echelons: The organization as a reflection of its top managers. *Academy of Management Review*, 9(2): 193–206.

Haunschild, P. R. 1994. How much is that company worth?: Interorganizational relationships, uncertainty, and acquisition premiums. *Administrative Science Quarterly*, 39(3): 391–411.

Haunschild, P. R., & Miner, A. S. 1997. Modes of interorganizational imitation: The effects of outcome salience and uncertainty. *Administrative Science Quarterly*, 42: 472–500.

Hawley, A. H. 1950. *Human ecology: A theory of community structure*. New York: Ronald Press.

Heerkens, C. N., & van der Heijden, B. 2011. Importance assessment of decision attributes: A qualitative study comparing experts and laypersons. *Management Decision*, 49(5): 748–761.

Helfat, C. E., & Peteraf, M. A. 2015. Managerial cognitive capabilities and the microfoundations of dynamic capabilities. *Strategic Management Journal*, 36: 831–850.

Hirshleifer D., & Teoh, S. H. 2003. Herd behaviour and cascading in capital markets: A review and synthesis. *European Financial Management*, 9(1): 25–66.

Hofstede, G. 1980. *Cultures consequences*. Beverly Hills, CA: Sage.

Hogg, M. A., & Mullin, B.-A. 1999. Joining groups to reduce uncertainty: Subjective uncertainty reduction and group identification. In D. Abrams & M. A. Hogg (Eds.), *Social identity and social cognition*: 249-279. Malden, MA: Blackwell Publishing.

Hogg, M. A., & Terry, D. J. 2000. Social identity and self-categorization processes in organizational contexts. *Academy of Management Review*, 25(1): 121–141.

Holcomb, T. R., Holmes, R. M., & Connelly, B. L. 2009. Making the most of what you have: Managerial ability as a source of resource value creation. *Strategic Management Journal*, 30(5): 457–485.

Hough, J. R., & White, M. A. 2003. Environmental dynamism and strategic decision-making rationality: An examination at the decision level. *Strategic Management Journal*, 24(5): 481–489.

Huff, A. S. 1982. Industry influences on strategy reformulation. *Strategic Management Journal*, 3(2): 119–131.

Huff, A. S. 1990. *Mapping strategic thought*. New York: Wiley.

Huy, Q. N. 2001. Time, temporal capability, and planned change. *Academy of Management Review*, 26(4): 601–623.

Jackson, S. E., & Dutton, J. E. 1988. Discerning threats and opportunities. *Administrative Science Quarterly*, 33(3): 370–387.

Judge, W. Q., & Miller, A. 1991. Antecedents and outcomes of decision speed in different environmental context. *Academy of Management Journal*, 34(2): 449–463.

Kachelmeier, S. J., Shehata, M. 1991. Examining risk preferences under high monetary incentives: Experimental evidence from The People's Republic of China. *American Economic Review*, 82(5): 1120–1141.

Kahneman, D., & Klein, G. 2009. Conditions for intuitive expertise. *American Psychologist*, 64(6): 515–526.

Kahneman, D., Knetsch, J. L., & Thaler, R. H. 1991. The endowment effect, loss aversion, and status quo bias. *Journal of Economic Perspectives*, 5: 193–206.

Kahneman, D., & Lovallo, D. 1993. Timid choices and bold forecasts: A cognitive perspective on risk taking. *Management Science*, 39(1): 17–31.

Kahneman, D., & Tversky, A. 1979. Prospect theory: An analysis of decision under risk. *Econometrica*, 47: 263–291.

Kaplan, S. 2008. Cognition, capabilities, and incentives: Assessing firm response to the fiber-optic revolution. *Academy of Management Journal*, 51: 672–695.

Kaplan, S., Murray, F., & Henderson, R. 2003. Discontinuities and senior management: Assessing the role of recognition in pharmaceutical firm response to bio-technology. *Industrial and Corporate Change*, 12(2): 203–233.

Kiefer, T. 2005. Feeling bad: Antecedents and consequences of negative emotions in ongoing change. *Journal of Organizational Behavior*, 26: 875–897.

Klingbiel, R., & Joseph, J. 2015. Entry timing and innovation strategy in feature phones. *Strategic Management Journal*, 37: 1002–1020.

Knight, F. H. 1921. *Risk, uncertainty, and profit* (1964 edition). New York: Augustus M. Kelley.

Knudsen, T. 2001. *Firm-specific cognitive frames as co- determinants of persistent performance differentials*. Working paper, University of Southern Denmark: Odense University.

Langley, A. 1999. Strategies for theorizing from process data. *Academy of Management Review*, 24(4): 691–710.

Lant, T. K., & Mezias, S. J. 1990. Managing discontinuous change: A simulation study of organizational learning and entrepreneurship. *Strategic Management Journal*, Summer Special Issue 11: 147–179.

Laughhunn, D., Payne, J., & Crum, R. 1980. Managerial risk preferences for below-target returns. *Management Science*, 26: 1238–1249.

Levy, J. S. 1992. An introduction to prospect theory. *Political Psychology*, 13(2): 171–186.

Lieberman, M. B., & Montgomery, D. B. 1988. First-mover advantages. *Strategic Management Journal*, 9(1): 41–58.

Lieberman, M. B., & Montgomery, D. B. 1998. First-mover (dis)advantages: Retrospective and link with the resource-based view. *Strategic Management Journal*, 19: 1111–1125.

Lipshitz, R., & Strauss, O. 1997. Coping with uncertainty: A naturalistic decision-making analysis. *Organizational Behavior & Human Decision Processes*, 69(2): 149–163.

Lumpkin, G. T., & Dess, G. G. 1996. Clarifying the entrepreneurial orientation construct and linking it to performance. *Academy of Management Review*, 21(1): 135–172.

March, J. G., & Simon, H. A. 1958. *Organizations*. New York: Wiley.

Mascarenhas, B. 1982. Coping with uncertainty in international business. *Journal of International Business Studies*, 13(2): 87–98.

McGrath, R. G. 1997. A real options logic for initiating technology positioning investments. *Academy of Management Review*, 22(4): 974–996.

McGrath, R. G., Ferrier, W. J., & Mendelow, A. L. 2004. Real options as engines of choice and heterogeneity. *Academy of Management Review*, 29(1): 86–101.

McKenzie, J., Woolf, N., van Winkelen, C., Morgan, C. 2009. Cognition in strategic decision making: A model of non-conventional thinking capacities for complex situations. *Management Decision*, 47(2): 209–232.

McMullen, J. S., & Shepherd, D. A. 2006. Entrepreneurial action and the role of uncertainty in the theory of the entrepreneur. *Academy of Management Review*, 31(1): 132–152.

Meyer, A. D. 1982. Adapting to environmental jolts. *Administrative Science Quarterly*, 27: 515–537.

Michel, A. A. 2007. A distributed cognition perspective on newcomers' change processes: The management of cognitive uncertainty in two investment banks. *Administrative Science Quarterly*, 52: 507–557.

Miller, K. D. 1992. A framework for integrated risk management in international business. *Journal of International Business Studies*, 23(2): 311–331.

Miles, M. B., & Huberman, A. B. 1984. *Qualitative data analysis: A source book of new methods*. Beverly Hills, CA: Sage.

Milliken, F. C. 1987. Three types of perceived uncertainty about the environment: State, effect, and response uncertainty. *Academy of Management Review*, 12(1): 133–143.

Milliken, F. J., & Lant, T. K. 1991. The effects of an organization's recent performance history on strategic persistence and change. *Advances in Strategic Management*, 7: 129 – 156.

Mintzberg, H., Raisinghani, D., & Théorêt, A. 1976. The structure of “unstructured” decision-processes. *Administrative Science Quarterly*, 21(2): 246–275.

Mitchell, J. R., Shepherd, D. A., Sharfman, M. P. 2011. Erratic strategic decisions: When and why managers are inconsistent in strategic decision making. *Strategic Management Journal*, 32(7): 683–704.

Nadkarni S., & Barr, P. S. 2008. Environmental context, managerial cognition, and strategic action: An integrated view. *Strategic Management Journal*, 29(13): 1395–1427. [SEP]

Olusoga, S. A., Mokwa, M. P., & Noble, C. H. 1995. Strategic groups, mobility barriers, and competitive advantage: An empirical investigation. *Journal of Business Research*, 33: 153–164.

Olzak, S., & Uhrig, S. C. N. 2001. The ecology of tactical overlap. *American Sociological Review*, 66(5): 694–717.

Palmer, T. B., & Wiseman, R. M. 1999. Decoupling risk taking from income stream uncertainty: A holistic model of risk. *Strategic Management Journal*, 20: 1037–1062.

Pfeffer, J., Salancik, G. R., Leblebici, H. 1976. The effect of uncertainty on the use of social influence in organizational decision-making. *Administrative Science Quarterly*, 21(2): 227–245.

Porac, J. F., Thomas, H., & Baden-Fuller, C. 1989. Competitive groups as cognitive communities: The case of Scottish knitwear manufacturers. *Journal of Management Studies*, 26(4): 397–416.

Porter, M. E. 1996. What is strategy? *Harvard Business Review*, 74 (November–December): 61–78.

Powers, W. T. 1973. *Behavior: The control of perception*. Chicago: Aldine.

Reger, R. K., & Huff, A. S. 1993. Strategic groups: A cognitive perspective. *Strategic Management Journal*, 14(2): 103–123.

Ritchie, E. J. 2017. *Volvo' electric car announcement: Turning point or nonevent?* <https://www.forbes.com/sites/uhenergy/2017/07/11/volvos-electric-car-announcement-turning-point-or-nonevent/#7a97ae6a6d3a>, last accessed 14 September 2018.

Ross, J. M., & Sharapov, D. 2015. When the leader follows: Avoiding dethronement through imitation. *Academy of Management Journal*, 58(3): 658–679.

Ruble, D. N., & Dweck, C. S. 1995. Self-conceptions, person conceptions, and their development. In N. Eisenberg (ed.), *Social development: Review of personality and social psychology*, 15: 109–139. Thousand Oaks, CA: Sage.

Samuelson, W., & Zeckhauser 1988. Status quo bias in decision making. *Journal of Risk and Uncertainty*, 1: 7–59.

Schneider, S. C., & De Meyer, A. 1991. Interpreting and responding to strategic issues: The impact of national cultures. *Strategic Management Journal*, 12(4): 307–320.

Schroeder, A. 2008. *The snowball: Warren Buffett and the business life*. New York: Bantam Books.

Schwenk, C. R. 1984. Cognitive simplification processes in strategic decision-making. *Strategic Management Journal*, 5(2): 111–128.

Simon, H. A. 1976. *Administrative behavior: A study of decision making processes in organizations*, 3rd ed. New York: The Free Press.

Singh, J. V. 1986. Performance, slack, and risk-taking in organizational decision-making. *Academy of Management Journal*, 29(3): 562–585.

Stanovich, K. E. 2009. *What intelligence tests miss: The psychology of rational thought*. New Haven, CT: Yale University Press.

Strang, D., & Still, M. C. 2006. Does ambiguity promote imitation, or hinder it? An empirical study of benchmarking teams. *European Management Review*, 3(2): 101–112.

Taylor, M. 2017. *Volvo's electric car strategy is being badly misinterpreted*. <https://www.forbes.com/sites/michaeltaylor/2017/07/05/most-of-what-youve-read-on-volvos-electric-car-strategy-is-badly-misleading/#a87f9482ed95>, last accessed 10 October 2018.

Teece, D. J. 2007. Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal*, 28: 1319–1350.

- Thompson, J. D. 1967. ***Organizations in action***. New York: McGraw-Hill.
- Trigeorgis, L., & Reuer, J. J. 2017. Real options theory in strategic management. ***Strategic Management Journal***, 38: 42–63.
- Tripsas, M., & Gavetti, G. 2000. Capabilities, cognition, and inertia: Evidence from digital imaging. ***Strategic Management Journal***, 21(10– 11): 1147–1161.
- Tversky, A., & Kahneman, D. 1986. Rational choice and the framing of decisions. ***Journal of Business***, 59: 251–278.
- Tversky, A., & Kahneman, D. 1991. Reference Theory of Choice and Exchange. ***Quarterly Journal of Economics***: 1039–1061.
- Tversky, A., & Kahneman, D. 1992. Advances in prospect theory: Cumulative representation of uncertainty. ***Journal of Risk and Uncertainty***, 5: 297–323.
- Volvo Ocean Race 2017. [***Chart showing the Volvo Ocean Race’s 2014-15 route and legs***]. <http://www.volvooceanrace.com/en/review/2014-15.html>, last accessed 18 June 2017.
- Walsh, J. 1995. Managerial and organizational cognition: Notes from a trip down memory lane. ***Organization Science***, 6: 280–321.
- Weick, K. E. 1995. ***Sensemaking in organizations***. London: Sage.
- White, R. W. 1959. Motivation reconsidered: The concept of competence. ***Psychological Review***, 66(5): 297–333.
- White, H. C. 1981. Where do markets come from? ***American Journal of Sociology***, 87: 517–547.

Wiseman, R. M., & Bromiley, P. 1996. Toward a model of risk in declining organizations: An empirical examination of risk, performance and decline. *Organization Science*, 7, 524–543.

Yates, J. F., & Stone, E. R. 1992. The risk construct. In J. F. Yates (Ed.), *Risk-taking behavior*: 1–26. New York: Wiley.

Zachary, M. A., Gianiodis, P. T., Payne, G. T., & Markman, G. D. 2017. Entry timing: Enduring lessons and future directions. *Journal of Management*, 41(5): 1388–1415.

Zajac, E. J., & Kraatz, M. S. 1993. A diametric forces model of strategic change: Assessing the antecedents and consequences of restructuring in the higher education industry. *Strategic Management Journal*, 14(Summer Special Issue): 83–103.