DEBIASING COMPETITIVE IRRATIONALITY: HOW MANAGERS CAN BE PREVENTED FROM TRADING OFF ABSOLUTE FOR RELATIVE PROFIT

Lorenz Graf (corresponding author)

Friedrich-Alexander University Erlangen-Nuremberg
Lange Gasse 20
90403 Nuremberg, Germany
lgraf@lgraf.com

Andreas König

Friedrich-Alexander University Erlangen-Nuremberg
Lange Gasse 20
90403 Nuremberg, Germany
+49 911 5302 288
andreas.koenig@wiso.uni-erlangen.de

Albrecht Enders

IMD International
23, Ch. de Bellerive
CH – 1001 Lausanne, Switzerland
+41 21 6180568
albrecht.enders@imd.ch

Harald Hungenberg

Friedrich-Alexander University Erlangen-Nuremberg
Lange Gasse 20
90403 Nuremberg, Germany
+49 911 5302 314
harald.hungenberg@wiso.uni-erlangen.de

Published in

European Management Journal

Volume 30, Issue 4, August 2012, Pages 386–403

http://dx.doi.org/10.1016/j.emj.2011.12.001

DEBIASING COMPETITIVE IRRATIONALITY: HOW MANAGERS CAN BE PREVENTED FROM TRADING OFF ABSOLUTE FOR RELATIVE PROFIT

ABSTRACT

Managers sometimes sacrifice profits only to improve their relative competitive standing, a behaviour that is known as "competitive irrationality." Previous research has generated a wealth of insight into the general foundations of this often dysfunctional type of managerial decision making. However, almost no attention has been devoted to the question of how managers can reduce competitive irrationality. We address this issue by adopting the logic of debiasing research to hypothesize about five potential countermeasures: creating accountability, "considering the opposite," making the bias of competitive irrationality salient to the decision maker, reducing time pressure and relying on external advice. We test our hypotheses on a sample of 934 managers using web-based experiments. Our empirical evidence supports our call for reducing time pressure in managerial decision making and for providing managers with training in biases to attenuate competitive irrationality. However, our data also indicate that efforts to make managers feel accountable for their actions can have a detrimental effect on decision quality, which is contrary to our theorizing.

Keywords: competitive irrationality, positional concerns, debiasing, managerial decision making

"I would rather be the first man here than the second in Rome." – Julius Caesar

1. INTRODUCTION

Managers regularly make decisions that do not maximize absolute profits, but instead secure or improve their company's profitability relative to competitors (Griffith and Rust, 1997). In the extant literature, this phenomenon of positional behaviour in a managerial context has been dubbed "competitive irrationality" (Arnett and Hunt, 2002).

While early studies often legitimized competitive irrationality (Milgrom and Roberts, 1982), more recent research shows that managers engage in positional behaviour even when rational reasons for doing so are absent. For example, in a survey conducted by Armstrong and Collopy, two-thirds of the participating managers stated that their company's prime objective was to "do better than its competitors" rather than to "do the best that it can" (1996, p. 189), even though the former goal may clearly contradict the rationale of profit maximization.

Competitive irrationality has been shown to be particularly dysfunctional in the context of major managerial decisions at both the business unit and corporate levels. For example, at the business unit level, positional behaviour could result in economically unjustified price wars (Cassady, 1963) or in decisions to refrain from profitable cooperation with competitors (Kilduff et al., 2010). At the corporate level, competitive irrationality might result in overbidding during acquisition processes (Ku et al., 2005). In this vein, Malhotra et al. (2008) describe how competitive irrationality led to Boston Scientifics' acquisition of the medical device maker Guidant for 27.2 billion USD, an acquisition that *Fortune* later referred to as one of the worst deals in history. The same authors state that "[Boston Scientific's management] shifted their goals from maximizing value to beating [their] opponent [Johnson and Johnson] at almost any cost" (2008, p. 78).

As there is substantial evidence that managers are inclined to behave in a positional manner when making important decisions (Arnett and Hunt, 2002; Brouthers et al., 2008; Griffith and Rust, 1997), and that such behaviour can negatively affect a company's long-term performance, it seems pivotal to ask: W*hat can managers do to reduce competitive irrationality?*

Several studies from various disciplines that investigated antecedents of positional behaviour could help management researchers to answer this question (Zanna et al., 1975; Tesser, 1986). For instance, it is known that positional behaviour is reinforced by the similarity between an actor and her or his comparison standard (Tesser, 1988) as well as by trait competitiveness (Kelley and Stahelski, 1970; Spence and Helmreich, 1983).

However, despite this wealth of insight, the extant literature seems only loosely applicable to the real-life context of managers. In fact, even studies from management-related settings provide little information from which to derive normative conclusions about reducing competitive irrationality. This is attributable, at least in part, to the fact that few of the factors studied thus far have been "objective" (Garcia and Tor, 2009) – they do not vary by the individual actor but pertain instead to the context of the decision-making situation (Mischel, 1977). As such, these factors cannot feasibly be influenced by managers. For example, managers are generally unable to ad-hoc change their own formal management education, their business experience or their deontological orientation, all of which have been highlighted as precursors of competitive irrationality (Armstrong and Collopy, 1996; Arnett and Hunt, 2002).

In this paper, therefore, we take the more practice-oriented approach evident in debiasing research (Larrick, 2004; Milkman et al., 2009) to uncover measures to prevent competitive irrationality. Accordingly, we conceptualize competitive irrationality as a bias, and we systematically identify five deliberate "interventions intended to reduce the magnitude

of [this] bias" (Babcock et al., 1997, p. 916): creating accountability, "considering the opposite," making the bias of competitive irrationality salient to the decision maker, reducing time pressure and relying on external advice. We test our hypotheses on a sample of 934 managers using web-based experiments.

Our research contributes to the extant literature by describing and testing specific potential remedies for competitive irrationality. Our study also enhances the research on positional concerns by providing a structured overview of the literature dealing with positional behaviour in various decision domains. Finally, we add to studies on debiasing. The latter research stream offers suggestions on how to reduce a number of important biases (Milkman et al., 2009). However, there is generally very little research on debiasing in a management context, and there is no research (of which the authors are aware) that explicitly addresses methods of reducing competitive irrationality.

The paper is structured as follows. The second chapter defines the concept of competitive irrationality and provides a structured overview of the literature on drivers of positional concerns. In chapter three, we summarize the general assumptions underlying debiasing research and derive our hypotheses. Chapters four and five, respectively, describe the methodology used to test the hypotheses and present the results. Finally, in chapter six, we discuss the theoretical and practical implications, as well as the limitations of our research.

2. COMPETITIVE IRRATIONALITY AND RELATED RESEARCH

2.1 Competitive irrationality as a manifestation of positional concerns

In this paper, we conceptualize "competitive irrationality" as decisions that are made when managers "focus on damaging the profits of competitors, rather than improving their own profit performance" (Arnett and Hunt, 2002, p. 280). Thus, competitive irrationality refers to decisions that trade off absolute profits for relative standing compared to competitors and that are made without any evidence that such a trade-off would be truly advantageous

(ruling out, for example, trading off today's profits for future profits or exploiting imperfect incentive systems). A number of empirical studies demonstrate the existence of competitive irrationality. For example, Brouthers et al. (2008) find that managers set prices too aggressively and thereby forego profits not only for their own company but also for themselves personally. Similar results have been obtained by several other scholars, including Arnett and Hunt (2002), and Griffith and Rust (1997).

Competitive irrationality is a manifestation of what behavioural economists have termed "positional concerns" in a managerial context (Solnick and Hemenway, 1998). The essence of positional concerns is summarized in a well-known statement by John Stuart Mill, who claimed that "Men do not desire merely to be *rich*, but to be *richer* than other men" (1907, p. 69). In other words, the term "positional concerns" describes the inherent tendency of people to evaluate their well-being on the basis of their standing relative to others rather than on the basis of their own absolute resource endowments (Frank, 1999).

As a consequence of positional concerns, people may be willing to forego significant amounts of goods, e.g., personal income, in order to ensure that they compare favourably to their peers. For instance, Solnick and Hemenway (1998, p. 377) asked survey participants to indicate which of two different states of the world (A or B) they would prefer:

A: Your current yearly income is $50,000; others earn $25,000.

B: Your current yearly income is $100,000; others earn $200,000.

Subjects were informed that prices in this scenario were unchanged from current prices and that, therefore, the purchasing power of a dollar was the same in situations A and B. The two states were identical with the exception of the personal income dimension. Over 50% of the respondents chose option A. This implies that over half of the respondents were willing to forego a significant absolute amount of personal income to attain a better position relative to others.

The effects of positional concerns have primarily been studied by psychologists, who observe that these kinds of comparisons have affective consequences (Elster, 1991; Brickman and Bulman, 1977). Ultimately, such affect can culminate in "impulses or inclinations to respond with a particular action" (Zeelenberg et al., 2008, p. 20). For example, Alicke and Zell note that people develop feelings of envy when they compare unfavourably to another person "with respect to an attribute, possession, or position" (2008, p. 74; see also Smith and Kim, 2007). As a consequence of envy, one person might work to destroy their comparison counterpart's superiority (Parrott, 1991).

Behavioural outcomes of positional concerns have also gained prominence in the economic sciences and have been repeatedly investigated in experiments (Zeckhauser, 1991; Tversky and Griffin, 1991; Solnick and Hemenway, 1998; Hsee et al., 2004). In particular, economists find that positional concerns are helpful in explaining a variety of previously puzzling empirical findings. For example, the so-called "Easterlin paradox" – the finding that increasing any person's income increases that person's happiness, but that increasing everyone's income does not increase everyone's happiness (Easterlin, 1974) – is resolved by the introduction of positional concerns. Furthermore, certain patterns in consumer behaviour, such as "conspicuous consumption" (lavish spending on goods mainly for the purpose of displaying wealth; Veblen, 1924) and savings ratios (Duesenberry, 1949), can be explained by positional concerns. Finally, positional concerns help to explain empirical phenomena as diverse as flatter-than-expected wage distributions within companies (Frank, 1984), the "equity premium" in capital markets (Abel, 1990), and the boundaries of the firm (Nickerson and Zenger, 2008).

Two wider streams of research have investigated the root causes of positional concerns. The first stream stems from evolutionary psychology (Frank, 1999) and suggests that positional concerns increase an individual's chance of reproductive success by ensuring

preferential access to the scarce resources required for survival and to mating partners. These scarce resources are not allocated according to absolute standards but according to individuals' relative positions within the group. Consequently, positional concerns are evolutionarily advantageous (Hill and Buss, 2006).

The second stream draws from social comparison theory (Festinger, 1954), and suggests that humans frequently engage in comparisons with other people in order to satisfy their needs for self-evaluation (the desire to evaluate one's opinions and abilities; Smith, 1981), self-enhancement (the desire to obtain information that makes one appear favourable; Gibbons and Gerrard, 1991) and self-improvement (the desire to develop and improve one's own situation; Taylor and Lobel, 1989). A more recent sub-stream of the social comparison literature adopts a social cognition perspective and adds efficiency considerations as a driver of social comparisons. In this regard, scholars denote comparisons with other individuals as a highly efficient type of information processing. In particular, comparisons can be efficient in terms of reducing the amount of information that has to be taken into account to judge or evaluate a given individual (Mussweiler et al., 2006).

Regardless of their theoretical anchor, researchers studying positional concerns agree that people evaluate their well-being on the basis of their standing relative to others (Festinger, 1954). In fact, such comparisons are performed constantly, and most of the time involuntarily (Mussweiler and Epstude, 2009) and even unconsciously (Mussweiler et al., 2004). Thus, individuals are likely to engage in comparisons with others even in situations where this type of information processing may result in suboptimal decisions (Gilbert et al., 1995).

2.2 Extant research on factors influencing the manifestation of positional concerns

Given the significance of positional concerns in human behaviour, it is not surprising that scholars have adopted numerous theoretical perspectives to detect factors that influence

the extent to which positional concerns become manifest in various decision domains. A systematic literature review (the methodology of which is explained in Appendix A1) across multiple fields of research indicates that the relevant literature can be separated into two broad streams. The larger of these streams focuses on manifestation contexts that are not directly linked to management, while the smaller explicitly deals with positional concerns in management-related contexts. As summarized in section 2.2.3, although the latter stream contributes to the overall understanding of competitive irrationality, it provides little information relevant to our core question of how managers can be prevented from engaging in dysfunctional, positional decision making.

2.2.1 Studies on antecedents of positional behaviour in non-management-related contexts

Research aiming to explain the manifestation of positional concerns in contexts unrelated to management is primarily rooted in social psychology, and comprises, above all, contributions to the social comparison literature (e.g., Zanna et al., 1975; Tesser, 1986; Garcia et al., 2006). One subgroup of these studies investigates the role of "subjective" factors, which are construals that "[vary] among similarly situated actors" (Garcia and Tor, 2009, p. 871), such as personality, attitudes or values (Bazerman et al., 2000). For instance, Tesser (1988) shows that positional concerns are likely to be stronger the more relevant a given comparison dimension is to the comparing individual. In this regard, a person might care about being a good manager but may not find being a good football player to be important. In such a case, a colleague's superior result in an annual performance review would be relevant and drive the positional behaviour of the comparing individual, while another colleague's superior performance in a football match would have no influence on positional behaviour. Tesser (1988) also identifies the psychological closeness of the comparison counterpart as a driver of positional concerns. Psychological closeness is defined as "the degree of association between an actor and another," (Tesser 1986, p. 437) and it is increased by "anything that tends to put

two persons into a unit relationship" (Tesser 1986, p. 438). The closer a comparing individual is to his or her comparison standard, the more pronounced positional concerns will be.

Other subjective factors reinforcing positional behaviour in non-management contexts include the similarity between an actor and her or his comparison standard (Goethals and Darley, 1977), and trait competitiveness (Kelley and Stahelski, 1970; McClintock, 1972; Spence and Helmreich, 1983). The latter reflects an individual's tendency to think in terms of competition rather than cooperation (Griesinger and Livingston, 1973). Finally, when an individual must make a decision that will only affect others, that decision will reflect positional concerns to the extent that the deciding individual self-categorizes with the other individual(s) (Garcia et al., 2005). Imagine, for instance, a Harvard graduate who has to make a decision that is going to affect the position of others. If the "others" are also Harvard graduates, the decision maker will be more likely to make a positional decision than if the others were graduates of IESE Business School in Spain.

Another subgroup of non-management-related studies highlights the role of "objective" factors that influence the manifestation of positional concerns – factors that do not vary by individual actors but pertain to the context of the decision-making situation (Garcia and Tor, 2009). These factors are, in turn, inherently more under the agency of decision makers than subjective factors. In particular, a number of empirical studies in the field of social psychology have focused on the degree of positionality that people exhibit for various types of goods (e.g., Hill and Buss, 2006; Carlsson et al., 2007). These studies find, for instance, that people generally make positional choices for goods that are means to an end, such as income or physical attractiveness. In contrast, people make less-positional choices for goods that are ends in themselves, such as vacation time or a happy marriage (Solnick and Hemenway, 1998, 2005).

Social psychologists also find that individuals show more positional behaviour if they are within close proximity of a meaningful standard. Garcia et al. (2006), for instance, observed that undergraduate students acted more positionally vis-à-vis a fictitious counterpart when they were ranked number 499 on a performance list and the counterpart was ranked number 500 (the lowest rank on the list) than when they were ranked number 101 and the counterpart was ranked number 102 on the same list. To these students, the perceived cut-off point at position number 500 represented a meaningful standard and drove positional concerns, while position number 101 did not. Similarly, Garcia and Tor (2007) studied a sample of undergraduate students in a series of experiments as well as data on players traded among Major League Baseball teams in the US. They found that positional concerns became manifest when a comparison occurred in relation to a scale (e.g., being surpassed in rank) rather than in relation to a specific task (e.g., merely being outperformed). In addition, Garcia and Tor (2009) showed that the number of competitors was an objective antecedent of behaviour based on positional concerns: as the number of competitors increased, positional outcomes became less pronounced.

2.2.2 Studies on competitive irrationality in management-related contexts

In contrast to the research described above, studies investigating the effect of positional concerns in management-related contexts are primarily found in the fields of marketing (Armstrong and Collopy, 1996) and business ethics (Arnett and Hunt, 2002; Brouthers et al., 2008). Such investigations deviate from social psychology research in that they observe the idiosyncratic behaviour of managers or MBA students who are facing business-specific decisions.

Similar to the factors influencing positional behaviour in other contexts, the factors studied in the investigations belonging to this group can further be classified as subjective or objective. Three kinds of subjective factors discovered thus far seem to be particularly

important in this context. First, as shown by Armstrong and Collopy (1996), competitive irrationality increases – quite counter-intuitively – as a manager's level of formal management education rises. In these authors' classroom experiments involving pricing decisions, business students (undergraduates, MBAs and executive MBAs) from the US were split into three groups according to their level of formal management education; those with more advanced degrees made more competitively irrational decisions. Second, as Arnett and Hunt (2002) observed in their study of US business students (undergraduates and MBAs with at least three years of business experience), an individual's business experience is linked to competitive irrationality. Students with more business experience displayed lower levels of competitive irrationality. Third, several attributes derived from moral philosophy, including deontological orientation, idealism, relativism, cognitive moral development (Arnett and Hunt, 2002) and political moral indoctrination (Brouthers et al., 2008), affect competitive irrationality. Arnett and Hunt (2002), for instance, found that individuals who showed greater deontological orientation, i.e., believed to a greater degree that some actions were inherently right or wrong, were less likely to behave in a competitively irrational manner because such individuals tended to disapprove of harming others.

In our literature review, we detected only one objective factor found to significantly affect competitive irrationality: the degree of immediate exposure to competitor-oriented techniques in the decision situation. In a pricing experiment, Armstrong and Collopy (1996) compared the behaviour of subjects who received a favourable description of the experience curve concept to the behaviour of those that did not receive a description at all. Subjects exposed to the concept of the experience curve were significantly more prone to competitive irrationality than the control group. A supporting before-and-after test indicated that even a neutral description of the experience curve concept increased competitive irrationality.

2.2.3 Relevant gaps in the literature on positional concerns

Although prior research is highly informative to our general understanding of competitive irrationality, our overview highlights the lack of knowledge about the factors that managers can actively use to reduce this mode of decision-making. In particular, the applicability of research from non-management-related contexts suffers from the fact that decision-making processes related to personal life are likely to differ from decision-making processes in the business world (Ross and Ward, 1995). In addition, even the objective factors studied in non-management-related research are not easily transferrable to managerial settings. For example, the number of competitors is an objective factor, but it can hardly be changed by the focal decision maker in a company. Hence, testing the objective factors currently described in non-management-related contexts in a managerial context appears unlikely to be a fruitful approach to derive countermeasures against competitive irrationality.

Prior research specifically focusing on antecedents of competitive irrationality is also inadequate to inform our research question. The subjective factors examined in this context are highly intriguing. However, it is – almost by definition – extremely difficult for managers to deliberately influence such factors. For instance, while business experience or deontological orientation may help to explain managerial decision-making behaviour, managers cannot directly manipulate either of these factors. As Ruback and Innes postulate, "…if a variable cannot be changed, knowledge about its effects cannot lead to policy changes, no matter how intellectually interesting it may be" (1988, p. 683). Finally, the objective factors studied in this domain seem to be very limited as a means for reducing competitive irrationality. Thus, we conclude that objective factors that influence the effects of positional concerns in managerial decision making and that are subject to managerial discretion have yet to be explored. To fill this gap, we adopt a debiasing approach.

3 DEBIASING COMPETITIVE IRRATIONALITY

3.1 Competitive irrationality as biased decision making

Extant research on human sense- and decision making has developed a variety of dual-process theories (Evans, 1984; Sloman, 2002), all of which posit the existence of two entirely different systems of reasoning. Stanovich and West (2000) labelled these "System 1" and "System 2." System 1 refers to the intuitive mode of information processing, which is based on heuristics and emotions, and is characterized as context-dependent, automatic, effortless, implicit and, ultimately, quick. System 2, in contrast, encompasses more detached, deliberate and analytical methods of sense and decision making, and is, therefore, more explicit, cognitively more demanding and slower.

Evolutionary psychology (Cosmides and Tooby, 1994) suggests that human beings frequently resort to the System 1 mode, particularly when circumstances are complex and time is limited (Milkman et al., 2009). This mode functions well in such situations not only because System 1 enables quick decisions, but also because it utilizes comparably little cognitive resources. This is beneficial because human information processing capacity is limited (Simon, 1955) and, as a result, humans need to reduce cognitive effort wherever possible (Taylor, 1981). Given that complexity and urgency are quasi a priori conditions of managerial decision making (Isenberg, 1984), and given the advantages of System 1, managers are especially prone to move into System 1 thinking (Chugh, 2004), often with productive outcomes. In particular, System 1 allows them to remain able to act instead of being overwhelmed by the amount and complexity of stimuli, while at the same time it economizes on cognitive capacity.

However, decisions stemming from System 1 thinking are not always effective. In fact, as highlighted in the decision-making literature following Tversky and Kahneman's (1974) seminal studies, System 1 thinking can be highly detrimental because it can result in

biased decision making, characterized by "a pattern of judgment that systematically departs from the prescription of a normative rule" (Babcock et al., 1997, p. 916). A large number of biases are recognized (see, e.g., Hogarth, 1980; Carter et al., 2007, for taxonomies of biases). For example, framing bias can be observed in situations where people's decisions are influenced only by the way two fundamentally identical choice sets are presented to them. In particular, preference reversals between situations in which identical outcomes of a decision are framed as either gains or losses can often be observed (Tversky and Kahneman, 1981).

As noted in the previous section, competitive irrationality is a manifestation of positional concerns in a managerial context. Positional concerns are deeply embedded schemata that are driven by affective (and hence cognitively cheap) processes (Hill and Buss, 2006). They therefore fall into the category of System 1 cognitive processing. Accordingly, such positional concerns can lead to quick, but flawed, managerial decisions. In fact, a host of research indicates that managers make competitively irrational decisions which sacrifice absolute profit for relative position vis-à-vis competitors, even when they are explicitly instructed to maximize profit (Armstrong and Collopy, 1996; Griffith and Rust, 1997; Arnett and Hunt, 2002; Brouthers et al., 2008). As this behaviour clearly violates the normative objective of profit maximization, we consider competitive irrationality as a bias in this study.

3.2 Debiasing in managerial decision making

Given the ubiquity and consequences of biased decision making, the call for strategies to counter biases has led to an extensive stream of literature concerned with the overarching issue of how biases can be reduced in managerial decision making (Arkes, 1991; Babcock et al., 1997; Wilson et al., 2002; Larrick, 2004; Kahn et al., 2006; Milkman et al., 2009). This body of research suggests that, while individuals sometimes unconsciously correct for biases in their decision making (called "implicit adjustment" by Wilson et al., 2002, p. 188), they often do not. Therefore, active measures to "debias" managerial decision making are needed.

Correspondingly, the term “debiasing” refers to the “deliberative and theory-driven correction [of biases]” (Wilson et al., 2002, p. 189), and debiasing strategies can be defined as intentional “interventions intended to reduce the magnitude of [a] bias” (Babcock et al., 1997, p. 916).

Different debiasing strategies have been found to successfully address a variety of biases, particularly in psychological research (overviews can be found, e.g., in Fischhoff, 1982; Arkes, 1991; Larrick, 2004). For example, several authors study the effects of increased incentives on biased decision making (Camerer and Hogarth, 1999), while others explore measures to fight people’s “overconfidence” in their judgments (Fischhoff, 1982). Along a similar vein, Lord et al. (1984) researched the possible beneficial effects of “considering the opposite” in social judgment and Mussweiler et al. (2000) successfully applied Lord et al.’s technique to combat the “anchoring” effect.

A comparatively small body of literature oriented towards managerial practitioners also offers suggestions for reducing a number of biases (Hammond et al., 1998). For example, some scholars discuss the applicability of “devil’s advocacy” to managerial decision making (Schwenk, 1984), explore measures to reduce bias in the use of balanced scorecards (Roberts et al., 2004), or suggest the introduction of bias-reducing measures to the field of supply management (Kaufman et al., 2009).

Larrick (2004) was the first to develop a taxonomy of strategies to debias decision making which found wide reception. He proposed three generic types of debiasing strategies: motivational, cognitive and technological. Motivational strategies, including the provision of incentives and the creation of accountability, attempt to increase the effort a decision maker puts into performing a task. Cognitive strategies aim to change the decision maker’s perception of a problem, and encompass such strategies as “consider the opposite,” training in rules, training in representations and training in biases. Finally, technological strategies

attempt to debias decision making by changing the decision-making process through organizational or technological means. This group of debiasing strategies encompasses group decision making, the use of linear models, multiattribute utility analysis or decision analysis, and the use of decision-support systems.

All in all, research on debiasing has provided significant insight into how to improve decision making. However, little emphasis has been placed on debiasing managerial decisions, and there is no research (of which the authors are aware) that explicitly addresses the reduction of competitive irrationality. As the ability to successfully prevent competitive irrationality could improve managerial decision making, this constitutes an important gap in the literature.

3.3 Debiasing strategies to prevent competitive irrationality

We adopted two approaches to the development of testable hypotheses on strategies to debias competitive irrationality. First, we selected suitable strategies used for debiasing other biases, particularly those mentioned in Larrick's (2004) taxonomy. Larrick's (2004) taxonomy seems to be the most suitable schema as it lists "general-purpose strategies" that can work against a variety of biases (e.g., Lerner and Tetlock, 1999; Lord et al., 1984). Furthermore, Larrick's conceptualization of "bias" is sufficiently broad to explain a bias as complex as competitive irrationality, which can be caused by multiple judgment errors (Arkes, 1991), including overly competitor-oriented decision strategies and the use of competitor's payoffs as a reference point. Finally, Larrick's synthesis provides a level of granularity fine enough to allow for the derivation of direct actions.

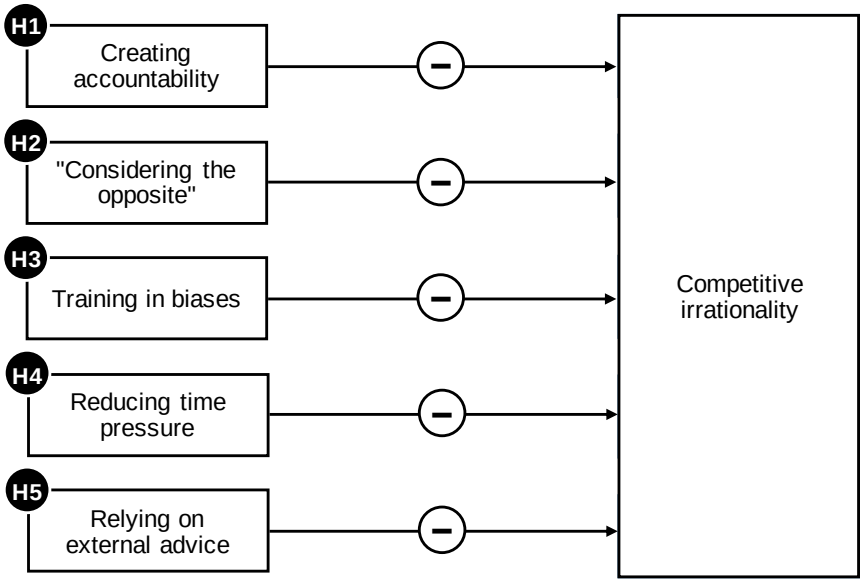
Specifically, we selected a subset of debiasing strategies from Larrick's taxonomy by applying two criteria. First, the chosen strategies could not appear *prima facie* to be inapplicable to the phenomenon of competitive irrationality. For example, the strategy Larrick (2004) refers to as "training in representations" attempts to remedy faulty statistical reasoning

by "[training] people to translate probabilistic reasoning tasks into frequency formats" (p. 322). As competitive irrationality is not caused by errors in statistical reasoning, this strategy immediately appeared to be inapplicable. Second, the effects of potential strategies needed to be empirically testable on a large sample of managers. This excluded, for instance, strategies associated with high financial incentives, which would have led to prohibitively high costs of the experiment. In accordance with these criteria, three strategies were selected: (1) *creating accountability,* (2) *considering the opposite* and (3) *training in biases.*

Second, in addition to selecting strategies mentioned explicitly in the debiasing literature, we took an explorative approach to detect other strategies for debiasing competitive irrationality. In so doing, we were guided by the premise described in section 3.2 that debiasing entails a deliberate attempt to motivate individuals to use System 1 rather than System 2 thinking (Milkman et al., 2009). Accordingly, we searched the broader decision-making literature, including standard textbooks in the field (e.g., Hogarth, 1980; Bazerman and Moore, 2009), to build a list of other applicable strategies that have been shown to support System 2 thinking. Subsequently, we narrowed this longlist to the set of debiasing strategies to be tested in this project by selecting only strategies that: (a) were frequently present or relevant in managerial decision-making situations, and (b) could be manipulated by the decision maker, so that managers could actively use those factors to reduce bias in decision making (the "moderator as repair" principle; Larrick, 2004, p. 325). By applying these selection criteria, we removed some potential strategies that might influence competitive irrationality but are unlikely to be relevant in managerial decision-making situations. We also removed strategies that are usually beyond the control of an acting manager (such as the modification of the absolute level of payoffs associated with different decision alternatives). After applying these filter criteria, two debiasing strategies remained: (4) *reducing time pressure* and (5) *relying on external advice*.

In order to further increase the validity of our selection, we solicited expert opinions from academia and practice. In this respect, we discussed our longlist, our reduction process and its results with six management scholars and five practitioners (three strategy consultants and two managers of larger companies). We explicitly opted to include practitioners in our expert panel to ensure the practical relevance of the selected factors. Furthermore, at various steps of the selection process, we validated our list through both formal and informal discussions with other scholars at multiple scientific conferences. In the course of these discussions, we received substantial communicative support for both our longlist and our final selection of factors. In the following, we build our hypotheses regarding the effects of the five debiasing strategies, which are illustrated in Figure 1.

Figure 1: Strategies of debiasing competitive irrationality



3.3.1 Creating accountability

Accountability "refers to the implicit or explicit expectation that one may be called on to justify one's beliefs, feelings, and actions to others" (Lerner and Tetlock, 1999, p. 255). This debiasing strategy attempts to force decision makers to anticipate potential criticism and,

thereby, seriously consider their decisions. This strategy therefore encourages decision makers to adopt System 2 thinking. Accountability has been found to reduce the occurrence of a large variety of biases as long as four conditions are fulfilled (Lerner and Tetlock, 1999): accountability must be created before the decision is made; accountability must relate to the decision-making process rather than the outcome; the audience to whom the decision maker has to justify his or her decision must be legitimate, reasonably well-informed and interested in accuracy; and the views of that audience must be unknown to the decision maker (Simonson and Nye, 1992). We hypothesize that, if these conditions are satisfied, the creation of accountability can also have a debiasing effect in cases of competitive irrationality. Formally, we propose:

H1: The creation of pre-decision process accountability to a reasonably well-informed, legitimate audience with unknown views and an interest in accuracy decreases competitive irrationality.

3.3.2 Considering the opposite

This debiasing strategy consists of asking decision makers to find explicit arguments against their initial judgment before finalizing a decision (Soll and Klayman, 2004). "Considering the opposite" has been successfully used to reduce the occurrence of a large number of different biases (Lord et al., 1984). As first impulses are typically more emotional than logical (Moore and Loewenstein, 2004) and as competitive irrationality is driven by emotions, "considering the opposite" may help to reduce this type of emotional System 1 thinking and instead increase the likelihood of System 2 thinking, which, in turn, will help to reduce biased behaviour. For example, managers who set out to merely beat their competitors may reconsider their decisions after explicitly contemplating the potential advantages of *not* beating their competitors in terms of absolute profits. We therefore hypothesize:

H2: An explicit appeal to "consider the opposite" decreases competitive irrationality.

3.3.3 Training in biases

Training in biases is a rather loosely defined debiasing strategy that refers to efforts to make managers *aware* of a possible bias (Larrick, 2004). It does *not* encompass the provision of instructions to decision makers on how to counter such a bias or specific decision tools to remedy the bias. Hence, this strategy is conceptually different from those previously described in that it focuses purely on creating awareness of the focal bias.

Training in biases may be effective in attenuating competitive irrationality, as some authors suggest that even the act of cueing debiasing behaviour may reduce the effect of biases in decision making (Arkes, 1991). Nisbett et al. (1983), for example, demonstrate that experiment subjects' excessive reliance on information stemming from small samples is reduced when those subjects are made "explicitly aware of the role of chance in determining the impression one may get from a small sample" (p. 353). We therefore hypothesize that explicitly warning decision makers about the bias of competitive irrationality – without providing any means to actively counteract it – may be sufficient to reduce its occurrence. Formally:

H3: If the bias of competitive irrationality is made salient to the decision maker through specific training, competitive irrationality decreases.

3.3.4 Reducing time pressure

Time pressure arises "when a discrepancy appears between what a person would like to do or feels he/she should do, and what he/she actually believes can be done before the deadline runs out" (Svenson and Benson, 1993, p. 157). Time pressure is a ubiquitous phenomenon (Svenson and Maule, 1993) and is, therefore, a part of managerial reality (Isenberg, 1984). Managers can, however, influence time pressure in a variety of ways. For

instance, they can move or renegotiate deadlines, reprioritize the time allocated to different tasks, or exploit the fact that time pressure is largely perceptual (Edland and Svenson, 1993). In other words, managers can ease time pressure by changing the decision context.

The extant literature, which commonly assumes that time pressure lowers decision quality, implies that time pressure might drive competitive irrationality (Maule and Edland, 1997). Several arguments can be put forward in this regard. First, time pressure creates stress (Svenson and Maule, 1993), which in turn makes people more susceptible to System 1 thinking and, ultimately, biases (Hogarth, 1980). Second, time pressure heightens the role of emotions in decision-making processes (Finucane et al., 2000), thereby potentially promoting positional concerns. Third, time pressure might reduce cooperation in negotiations (Alcock, 1974; Carnevale and Lawler, 1986) and increase the likelihood of positional decisions in games of ultimatum bargaining (Sutter et al., 2003). If increasing time pressure now increases competitive irrationality, it seems sensible to assume that attenuating time pressure might reduce competitive irrationality. We therefore hypothesize:

H4: Reducing time pressure reduces competitive irrationality.

3.3.5 Relying on external advice

Managers frequently turn to outside advisors, such as management consultants, investment bankers or friends, when important decisions are to be made. They then align their decision with the recommendations of those external advisors (Canback, 1998). This can have a significant impact on competitive irrationality. As discussed above, positional concerns depend on social comparisons. If an external advisor is not personally involved in the situation and has no stake in the actual outcome, it seems reasonable to assume that a comparison, if one occurs at all, would have significantly fewer affective (i.e., System-1-controlled) consequences (all else equal). This is because people are not as concerned with comparisons between two people who are distant from themselves as they are with a

comparison in which they are directly involved (Garcia et al., 2005). Therefore, the degree of social comparison and, thus, the degree of competitive irrationality, can be expected to be significantly lower when a manager seeks and relies on the advice of an external person when making a decision than when the manager makes a decision without such advice. This gives rise to the following hypothesis:

H5: Reliance on external advice reduces competitive irrationality.

4. METHODOLOGY

4.1 Experiments

We use an experimental methodology to test our hypotheses. Largely following Croson et al., we define experiments as "a research methodology which involves collecting primary data from individual decision-makers [and which] involve[s] multiple treatments, that is, some participants see one set of materials, and other participants see another set" (2007, p.173). In order to derive implications from experiments, scholars usually compare participant behaviour between the treatments.

For our research project, experiments offer certain advantages that seem to match the requirements of our research questions better than other means of inquiry (Croson et al., 2007). First, contrary to field studies and case studies, experiments enable us to control all aspects of the stimulus material, so that any change in behaviour can be interpreted causally (Gould, 2000; Martin, 2007). This aspect is particularly important in research on competitive irrationality, which involves measurements of affective reactions that may be embarrassing or even unconscious to the people who experience them (Smith, 1991; Sabini and Silver, 2005). Second, because experiments allow for the control of nuisance variables, the aforementioned cause-effect relationships can be unambiguously identified (Field and Hole, 2003). As this is a concern of this research project, experiments appear to be particularly suitable. Third, experiments are replicable, which enables other researchers to reproduce the results and

increase the external validity of findings (Hubbard et al., 1998). In fact, extant research on positional concerns in the field of social psychology overwhelmingly relies on experiments for these same three reasons.

Specifically, we test our hypotheses using web-based survey experiments, i.e., experiments in which the stimulus material is provided to the experiment subjects in the form of a survey that is administered over the Internet. Compared to laboratory experiments, web-based experiments are somewhat limited in their possibilities to control for the environment in which research participants must make their decisions. Nevertheless, web-based experiments generally yield results similar to those that would be obtained in laboratory experiments (Birnbaum, 1999; Reips, 2002; Gosling et al., 2004). Furthermore, they offer cost-efficient access to a large number of participants, they reduce experimenter and demand effects (Orne, 2006; Reips, 2002), and they improve external validity, as they can provide the "realism of field data" (Falk and Fehr, 2003, p. 403).

4.2 Subjects

The subject population consists of actual managers. The managers surveyed had an average of 7.2 years of work experience and included alumni of a large public German business school, consulting staff of a large international consulting firm, alumni of a marketing student club and MBA students from various graduate schools (predominantly in the US). The sample also included additional other business professionals.

A total of 3,722 managers were invited to participate in the experiments, all of whom were addressed by email. Of the invited managers, 934 completed the surveys assigned to them, leading to an effective response rate of 25%. Although response rates are not necessarily related to non-response bias (Krosnick, 1999), we analyzed the subsample of German business school alumni to determine whether there was a significant difference in the rationality of the decisions made by early and late responders, with the latter serving as a

proxy for non-responders (Armstrong and Overton, 1977). No such difference was found (N = 270, U = 8505.5, $p(two\text{-}tailed)$ = .274).

4.3 Procedure

The experiment setup used to test the five hypotheses consisted of one control group and seven treatment groups. The subjects were automatically and randomly assigned to the experiment groups and each experiment group received slightly different stimulus material, i.e., a different version of the survey.

The stimulus material for the control group was developed on the basis of the material used by Armstrong and Collopy (1996) and Arnett and Hunt (2002). It presented a scenario in which the subjects were asked to assume that they were owners of a company (YouCo) who needed to make a pricing decision for a product that would only be marketed for one more period. In particular, the subjects were given a choice between four pricing options ranging from a "low price" to a "high price." In addition, control group subjects were provided with information on the potential profits for their company and their main competitor (CompetitorCo) during that period for every one of the four options. The profits associated with the four pricing options were structured such that, as the price increased, YouCo's absolute profits increased as well, but CompetitorCo's profits increased by even more. The subjects were informed that the profits were dependent only on their pricing choice and that they did not depend on any action of CompetitorCo. We deliberately avoided stating that the profits represent net present values in order to make the scenario conceptually as simple as possible. To prevent potential distortions by subjects attempting to trade off current profits for future profits, the scenario explicitly stated that the companies' products could only be sold for one more year.

Given the described payoff structure, a perfectly rational subject would opt to maximize YouCo's absolute profit by selecting the "high price" option regardless of the profits such a

choice implies for the competitor. However, as shown by authors such as Armstrong and Collopy (1996), Arnett and Hunt (2002), and Brouthers et al. (2008), competitively irrational subjects select different prices. A choice of the lowest price indicates the highest level of competitive irrationality. The subjects' choices were recorded and scored from 1 (low price) to 4 (high price) to yield the reverse-coded, ordinal-scaled independent variable of competitive irrationality.

The subjects in the treatment groups received slightly modified stimulus material, as outlined in the following sections. The exact wording of the scenarios used for the control and treatment groups can be found in the Appendix.

Accountability. The "accountability" scenario was modified to include the information that subjects would be giving a guest lecture in front of a multidisciplinary honours class of university students, during which they would need to explain the process they used to arrive at their decision. They were explicitly encouraged to think about what they would say to the students and to mentally "simulate" justifying their decision in front of the imagined audience (Lerner and Tetlock, 1999).

"Consider the opposite." After subjects in the "consider the opposite" group had indicated an initial decision choice, they were asked to explicitly consider at least one argument against their initial choice. They then had the opportunity to revise their answer before it was submitted.

Training in biases. Subjects in the "training in biases" group read two short quotes from the *Harvard Business Review*, which explained the possibility that emotions and social comparisons might interfere with rational decision making (Malhotra et al., 2008, pp. 78 and 80). They then read the same scenario as the control group and were asked to make a decision. In assuming that showing these quotes to the respondent serves as a proxy for training in biases, we follow Larrick (2004), who considers any measure that increases the awareness of

a bias to be a training measure. As the quotes we displayed in the stimulus material specifically address the possibility of biased decisions arising from competitive irrationality, we are confident in viewing them as a very simple form of training.

Reducing time pressure. To gain a deeper understanding of the effect of time pressure on competitive irrationality, we tested this antecedent in two different treatment groups. Subjects in both treatment groups had a limited time in which to make their decisions. However, one group had a time limit of only one minute before having to make a decision, while the second group was allotted two minutes. Although not strictly required from a methodological point of view, we opted to employ two groups with different time constraints in order to increase the likelihood of obtaining sufficient variance in the independent variable of perceived time pressure. As is common in studies of time pressure, a countdown clock on the screen showed subjects the remaining time (Maule et al., 2000). To further test for the robustness of the time pressure manipulation, the surveys for the control group and the two "time pressure" treatment groups included a manipulation check to assess the subjects' perception of time pressure. This additional check used an extended version of an established measure (Kohli, 1989) and yielded an interval-scaled index of perceived time pressure.[1]

Relying on external advice. A sufficient condition for external advice to mitigate competitive irrationality of a decision maker who relies on such guidance is a significantly lower level of competitive irrationality in the external advice itself. In other words, if external advice is less biased, a manager who follows this advice will be less biased in his or her decision making. Based on this assumption, we tested how external advisors would decide in the described decision situation. To improve our analysis, we tested two separate situations of external advice. Subjects in the first group were told that they were paid, external consultants (as

[1] The instrument employed consists of four items, each scored on a five-point Likert scale. The items used were "I felt pressured to reach a decision quickly," "I felt I had enough time to make the decision" (reverse coded), "I felt the decision making process was rushed" and "I felt under time pressure."

opposed to company owners). They were not asked to make a decision but to make a recommendation for a client. Subjects in the second treatment group were told that they needed to advise a close friend.

5. RESULTS

Figure 2 provides an overview of the number of completed responses per experiment group and the choices made by subjects in the individual groups. As is apparent from the distribution of answers, subjects in all experiment groups displayed considerable levels of competitive irrationality. For instance, in the control group, which contained 129 subjects, only 69% chose the profit-maximizing "high price," while the remaining 31% chose competitively irrational lower prices.

Figure 2: Results from manager sample, by group

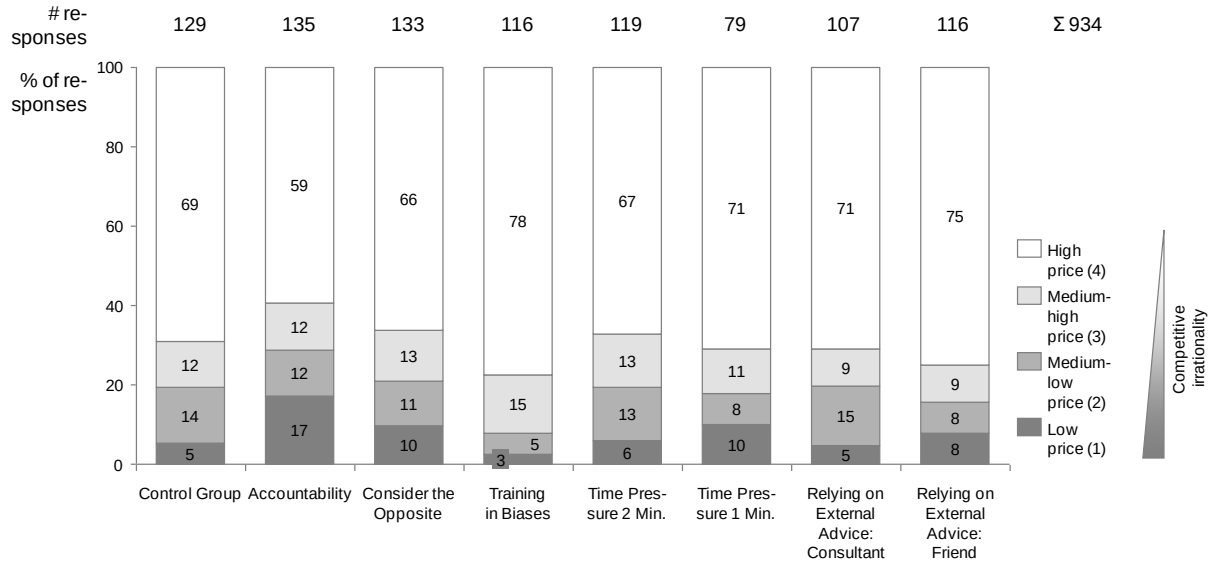


Table 1 provides an overview of the results of our hypothesis tests. These results are discussed in greater detail below.

Table 1: Results of hypotheses tests

Hypo-thesis	**Test type**	**Test statistic**		**p-value (two-tailed)**	**Comment**
H1	Mann-Whitney U-test	U	7616.5	.040 **	Effect contrary to hypothesized direction
H2			8274.0	.549	
H3			6700.0	.070 *	
H4	Nonparametric correlation	Kendall's tau-b	-.105	.019 **	
H5	Mann-Whitney U-test	U	6782.5	.778	Consultant vs. control group
			7079.5	.359	Friend vs. control group

**: Significant at .05 level; *: Significant at .1 level

Accountability. We applied a Mann-Whitney U test, which is appropriate as the dependent variable (competitive irrationality) is not interval-scaled and the data is not normally distributed (Sheskin, 2004). A comparison of central tendencies between the accountability treatment group and the control group highlights a significant difference in competitive irrationality (U = 7616.5, *p(two-tailed)* = .040), albeit not in the direction proposed by the initial hypothesis. In fact, accountability appears to increase competitive irrationality. Therefore, these results do not support hypothesis H1.

"Consider the opposite." No significant effect was found for the "consider the opposite" treatment (U = 8274.0, *p(two-tailed)* = .549) when compared to the control condition. Consequently, hypothesis 2 is not confirmed by the findings.

Training in biases. A comparison of the central tendencies of the training in biases treatment group and the control group shows significantly lower competitive irrationality in the

treatment group (U = 6700.0, *p(two-tailed)* = .070).[2] This finding lends support to hypothesis H3 and demonstrates that training can, in fact, help to reduce competitive irrationality.

Reducing time pressure. As noted above, the experiments for the control group and the two time pressure treatment groups included a manipulation check to assess perceived time pressure. The corresponding scale, which is computed from the four individual items of the manipulation check, has a coefficient alpha of .893, which indicates good reliability. Removing items from the scale does not increase coefficient alpha. The manipulation check shows that the perceived time pressure is significantly different between the three experiment groups and hence that the manipulation is indeed successful (see Appendix for details).

A non-parametric correlation analysis involving all subjects assigned to the control group and to the two time pressure treatment groups was performed to test the time pressure hypothesis. It measures the correlation between perceived time pressure (as indicated by the manipulation check) and competitive irrationality. The variables are significantly correlated (*tau-b* = -.105, *p(two-tailed)* = .019), which supports hypothesis H4: reducing time pressure alleviates competitive irrationality. Those subjects who perceived less time pressure showed significantly less competitive irrationality in their decision making.

Relying on external advice. The central tendencies of competitive irrationality were compared between the control group and each of the two "relying on external advice" treatment groups. As with testing "accountability," we applied a Mann-Whitney U (Sheskin, 2004). The choices made by subjects in the "consultant" treatment group did not differ significantly from those made by the control group (U = 6782.5, *p(two-tailed)* = .778). Similarly, no differences were found between the "friend" treatment group and the control group (U = 7079.5, *p(two-tailed)* = .359). Consequently, hypothesis H5 could not be confirmed.

[2] We follow Kerlinger (1970) in assuming .1 as a sensible alpha criterion (Orne, 2006; Stigler, 2008).

6. DISCUSSION

6.1 Theoretical implications

Overall, our study contributes to the literature on managerial decision making. While prior research dealing with the manifestation of positional concerns in various contexts has yielded important insight, this study is the first to conceptualize competitive irrationality as a bias, review the related literature, and explicitly test five countermeasures. Furthermore, we contribute to debiasing research, which has recently gained momentum, particularly because of its importance for practitioners. Although scholars have succeeded in detecting debiasing strategies for a number of influential biases, no study thus far has aimed to identify means of debiasing competitive irrationality.

The empirical results of our study hold several specific implications, which we discuss in relation to each experiment.

Accountability. Contrary to expectations, the experiment results indicate that creating accountability reinforces competitive irrationality rather than reduce it. Previous research has established a number of boundary conditions under which accountability can exert debiasing effects. However, said research has also identified cases in which those conditions were violated and the bias under investigation was amplified (Lerner and Tetlock, 1999). Despite the careful construction of the stimulus material, possible violations of those conditions cannot be completely ruled out in our study and might explain our findings. For example, managers tend to favourably evaluate positional decisions by subordinates (Armstrong and Collopy, 1996), and it is conceivable that the experiment subjects assumed that the university class they were to address behaved similar to managers. In this case, the views of the audience are “known” to the experiment subjects (or at least preconceived), which constitutes a violation of the condition assumed in our hypothesis that the views of the audience are strictly anonymous to the experiment subjects.

"Consider the opposite." Contrary to predictions derived from debiasing research, our experiments do not support the notion that instructing decision makers to "consider the opposite" attenuates competitive irrationality. This finding has two possible explanations. First, the subjects might not have modified their initial choice because they saw no reason to actually follow the experiment instructions (Koriat et al., 1980), or because they did not want to appear inconsistent to themselves or the experimenter (Cialdini and Trost, 1998). Second, subjects in the control group may have adopted this debiasing strategy without having been explicitly instructed to do so. Such behaviour among the control group subjects would have been indistinguishable from the behaviour exhibited by the treatment group subjects.

Training in biases. The hypothesis that training in biases could help reduce competitive irrationality was confirmed by our results. This finding is important, as it indicates that training in biases, even in a simple form, might reduce the occurrence of biases, just as training in statistics can increase the use of statistical reasoning (Larrick, 2004). Furthermore, this observation is by no means trivial – it contradicts the widely held claim that "simply being aware that one is prone to a bias does not ameliorate the bias" (Joyce and Biddle, 1981, p. 348). Future research could aim to improve our understanding of training in biases and its effect on competitive irrationality, perhaps by comparing the influence of different kinds of training (e.g., complex versus simple, or in person versus online).

Time pressure. As extant theory suggests that time pressure might be a driver of competitive irrationality, we hypothesized that attenuating time pressure would reduce competitive irrationality. The experiment results not only confirm the hypothesized relationship, but thereby also strengthen the notion that competitive irrationality can be sensibly conceptualized as a bias. Given the importance of time pressure and urgency in relation to managerial decision making, which is shown in this study and in other experiments, it is interesting that knowledge about how time pressure actually influences decision making is

still fairly limited (Svenson and Maule, 1993). This knowledge gap promises to be a fruitful avenue for further research.

Relying on external advice. The experiment results do not support the notion that external advisors, such as consultants or friends, show significantly less competitive irrationality. Thus, our findings contradict the idea that a reliance on external advisors can help deflect competitive irrationality in managerial decision making.

There are several potential explanations for this result. First, the stimulus material might have been too weak in the sense that the attempt to move the focus to an external perspective might not have been successful (Epley et al., 2002). Second, there may actually be no effect at all: Some scholars have found that people will respond according to their own preferences when making a decision for someone else when they do not have specific information about the preferences of the other person (Johansson-Stenman et al., 2002). Third, the subjects might have self-categorized with the company owner in the decision scenario (Garcia et al., 2005). The experiment data do not allow us to determine which explanation holds. Despite our findings, the notion that seeking external advice allows managers to overcome cognitive biases in sense and decision making has intuitive appeal and is supported by a growing body of empirical evidence (e.g., Gilbert, 2005). Thus, future research should continue to investigate the effect of external influence, perhaps by analyzing whether some, less affect-based biases are easier to overcome than other, more affect-based biases.

6.2 Practical implications

Although our research was conducted in an experimental setting, the results provide several hints as to how practitioners might be able to improve their decision making in real-world contexts. First, the finding that accountability can increase competitive irrationality implies that managers might wish to be aware of their own tendencies to make competitively

irrational decisions when they feel accountable and perceive a need to justify their decisions. Furthermore, they might be well advised to be careful when imposing accountability on their subordinates in situations that might be prone to competitive irrationality.

Second, decision makers might benefit from focused training on biases, as training appears to be an effective strategy for avoiding competitive irrationality. The inclusion of the phenomenon of competitive irrationality in university management education, company training programs and guidelines for decision making might therefore be beneficial. In this respect, we also agree with scholars who advocate the use of checklists for decision making (Kahneman et al., 2010). Such checklists could include items specifically designed to raise awareness of the potential for competitive irrationality.

Third, when a decision has to be made that might be prone to competitive irrationality, managers should try to reduce time pressure. This could be achieved, for example, by moving deadlines, re-prioritizing tasks or removing the decision maker from the time-pressure-inducing environment. In fact, as other stressors are likely to exacerbate managerial biases, managers could think about proactively creating decision-making environments that allow decision makers ample time to reflect before they finalize important decisions.

6.3 Limitations and concluding remarks

One limitation of this paper relates to the potential restrictions arising from the research method. By definition, experiments are more limited with respect to external validity than other research designs, as factors that are excluded in an experiment setup might, in real-life situations, interfere with or even offset effects observed in the laboratory (Martin, 2007). Some authors argue that subjects might understand experiment tasks in a way not intended by the experimenter (Lord et al., 1984), which would render the results less meaningful.

In addition, as the manipulations possible in web experiments are comparably weaker than they are in other experimental research settings, one must be careful when deriving any

conclusions about the three unsupported hypotheses. As the weakness of the manipulations might have prevented us from finding any effects in those experiments, future research appears warranted. With respect to external validity, it should be noted that any real-world implementation of the debiasing techniques discussed in this study is likely to differ from the implementations used in the experiments. Hence, while the experiments demonstrate that debiasing effects *can* exist, they give us only an *indication* of how such debiasing measures can be implemented in actual organizational contexts.

Furthermore, one might contest the findings of the "training in biases" experiment by claiming that the experiment setup was fraught with demand characteristics (Podsakoff et al., 2003). The text displayed before the scenario description could be argued to exert demand effects in that it might give subjects the impression that the experimenter expects them to make the profit-maximizing choice. Even though the stimulus material was designed to avoid suggesting that the subjects were part of an experiment, this argument is somewhat difficult to refute. However, it might be of limited relevance, as any real-life training in biases sponsored by top management would naturally feature similar demand characteristics. In that respect, the experiment adequately represents its real-life counterpart. In addition, the point of this debiasing strategy is to make the subject aware of a potential bias and remind the subject that such a bias may lead to a deviation from the rational solution. However, further research could help to clarify the potential role of demand effects.

In addition, research on competitive irrationality to date has been solely conducted on the individual level. It remains to be investigated whether and how the tendencies found among individuals translate into the behaviour of organizations. Some researchers, particularly those active in upper echelons research, find that organizations tend to mirror their top managers' behaviour (Hambrick and Mason, 1984; Kets de Vries, 2004). Other scholars argue against such generalizations, maintaining that "theories based solely upon

individual-level explanations offer unrealistic representations of how strategic decisions are made within organizations" (Audia and Greve, 2006, p. 93). We therefore acknowledge that further research on competitive irrationality across various levels of analysis is warranted.

Finally, as this research undertaking only concerns itself with a select subsample of potential debiasing strategies, other debiasing strategies should be the subject of further studies. These could include increasing incentives for decision makers or introducing elements of group decision making (Larrick, 2004). Additional avenues for research could encompass testing the link between competitive irrationality (and its drivers) and debiasing strategies under conditions of uncertainty. Such tests would increase the generalizability of this research, as most managerial decisions are made under conditions of uncertainty (Wilson, 2003).

All in all, in this paper, we develop a detailed understanding of the psychological processes underlying competitive irrationality. Furthermore, we review the literature dealing with the manifestation of positional concerns and provide an overview of their underlying mechanisms. Finally, we draw on debiasing research to present hypotheses about the influence of five possible antidotes to this deeply engrained, yet potentially maladaptive, behavioural pattern. Our web-based survey experiments indicate that reducing time pressure and training in biases can, in fact, help to debias competitive irrationality. Contrary to expectations, the strategy of creating accountability appears to have adverse consequences for decision making.

Previous research has shown that a lack of awareness of competitive irrationality can have significant counterproductive consequences. We therefore hope that our findings will help to make scholars and managers more conscious of this decision making bias and serve as a starting point for a fruitful, in-depth conversation on positional concerns in the context of managerial decision making.

ACKNOWLEDGEMENTS

We gratefully acknowledge helpful comments from Stephen Garcia and editorial support from Tina Pedersen and Angela Fehn. We also thank faculty members and participants at the AOM Business Policy and Strategy Doctoral Consortium 2009 (especially Phil Bromiley, Anne Marie Knott and Tom Moliterno) as well as various participants at the Strategic Management Society Conference 2010 in Rome. Finally, many thanks go to Associate Editor Thomas Wrona, and two anonymous reviewers for their highly valuable comments.

REFERENCES

Abel, A. B. (1990) Asset prices under habit formation and catching up with the Joneses. *The American Economic Review* **80**(2), 38–42.

Alcock, J. E. (1974) Cooperation, competition, and the effects of time pressure in Canada and India. *Journal of Conflict Resolution* **18**(2), 171–197.

Alicke, M. D. and Zell, E. (2008) Social comparison and envy. In R. H. Smith (Ed.) *Envy. Theory and Research* (pp. 73–93). Oxford University Press, Oxford.

Arkes, H. R. (1991) Costs and benefits of judgment errors: Implications for debiasing. *Psychological Bulletin* **110**(3), 486–498.

Armstrong, J. S. and Collopy, F. (1996) Competitor orientation: Effects of objectives and information on managerial decisions and profitability. *Journal of Marketing Research* **33**(2), 188–199.

Armstrong, J. S. and Overton, T. S. (1977) Estimating nonresponse bias in mail surveys. *Journal of Marketing Research* **14**(3), 396–402.

Arnett, D. B. and Hunt, S. D. (2002) Competitive irrationality: The influence of moral philosophy. *Business Ethics Quarterly* **12**(3), 279–303.

Audia, P. G. and Greve, H. R. (2006) Less likely to fail: Low performance, firm size, and factory expansion in the shipbuilding industry. *Management Science* **52**(1), 83–94.

Babcock, L., Loewenstein, G. and Issacharoff, S. (1997) Creating convergence: Debiasing biased litigants. *Law and Social Inquiry* **22**(4), 913–925.

Bazerman, M. H., Curhan, J. R., Moore, D. A., and Valley, K. L. (2000) Negotiation. *Annual Review of Psychology* **51**(1), 279–314.

Bazerman, M. H. and Moore, D. A. (2009) *Judgment in managerial decision making* (7th ed). John Wiley & Sons, Hoboken, NJ.

Birnbaum, M. H. (1999) Testing critical properties of decision making on the internet. *Psychological Science* **10**(5), 399–407.

Brickman, P. and Bulman, R. J. (1977) Pleasure and pain in social comparison. In J. M. Suls and R. L. Miller (Eds.) *Social Comparison Processes. Theoretical and Empirical Perspectives* (pp. 149–186). Hemisphere Publishing Corporation, Washington, D.C.

Brouthers, L., Lascu, D.-N. and Werner, S. (2008) Competitive irrationality in transitional economies: Are communist managers less irrational? *Journal of Business Ethics* **83**(3), 397–408.

Camerer, C. F. and Hogarth, R. M. (1999) The effects of financial incentives in experiments. A review and capital-labor-production framework. *Journal of Risk and Uncertainty* **19** (3), 7–42.

Canback, S. (1998) The logic of management consulting: Part 1. *Journal of Management Consulting* **10**(2), 3–11.

Carlsson, F., Johansson-Stenman, O. and Martinsson, P. (2007) Do you enjoy having more than others? Survey evidence of positional goods. *Economica* **74**(296), 586–598.

Carter, C., Kaufmann, L. and Michel, A. (2007) Behavioral supply management: A taxonomy of judgment and decision-making biases. *International Journal of Physical Distribution & Logistics Management*, **37**(8), 631–669.

Carnevale, P. J. D. and Lawler, E. J. (1986) Time pressure and the development of integrative agreements in bilateral negotiations. *Journal of Conflict Resolution* **30**(4), 636–659.

Cassady, R., Jr. (1963) *Price warfare in business competition: A study of abnormal competitive behavior*. Michigan State University Press, East Lansing, MI (Occasional Paper, 11).

Chugh, D. (2004) Societal and managerial implications of implicit social cognition: Why milliseconds matter. *Social Justice Research* **17**(2), 203–222.

Cialdini, R. B. and Trost, M. R. (1998) Social influence: Social norms, conformity, and compliance. In D. T. Gilbert, S. T. Fiske and G. Lindzey (Eds.) *The Handbook of Social Psychology*. Vol. 2 (4th ed., pp. 151–192). Oxford University Press, New York, NY.

Cosmides, L. and Tooby, J. (1994) Beyond intuition and instinct blindness: Toward an evolutionarily rigorous cognitive science. *Cognition* **50**(1-3), 41–77.

Croson, R., Anand, J. and Agarwal, R. (2007) Using experiments in corporate strategy research. *European Management Review* **4**(3), 173–181.

David, R. J. and Han, S.-K. (2004) A systematic assessment of empirical support for transaction cost economics. *Strategic Management Journal* **25**(1), 39–58.

Duesenberry, J. S. (1949) *Income, saving, and the theory of consumer behavior*. Harvard University Press, Cambridge, MA.

Easterlin, R. A. (1974) Does economic growth improve the human lot? Some Empirical Evidence. In P. A. David and M. W. Reder (Eds.) *Nations and Households in Economic Growth* (pp. 89–125). Academic Press, New York, NY.

Edland, A. C. and Svenson, O. (1993) Judgment and decision making under time pressure: Studies and findings. In O. Svenson and A. J. Maule (Eds.) *Time Pressure and Stress in Human Judgment and Decision Making* (pp. 27–40). Plenum Press, New York, NY.

Elster, J. (1991) Envy in social life. In R. J. Zeckhauser (Ed.) *Strategy and Choice* (pp. 49–82). MIT Press, Cambridge, MA.

Epley, N., Savitsky, K. and Gilovich, T. (2002) Empathy neglect: Reconciling the spotlight effect and the correspondence bias. *Journal of Personality and Social Psychology* **83**(2), 300–312.

Evans, J. S. B. T. (1984) Heuristic and analytic processes in reasoning. *British Journal of Psychology* **75**(4), 451–468.

Falk, A. and Fehr, E. (2003) Why labour market experiments? *Labour Economics* **10**(4), 399–406.

Festinger, L. (1954) A Theory of social comparison processes. *Human Relations* **7**(2), 117–140.

Field, A. B. and Hole, G. (2003) *How to design and report experiments*. Sage, London.

Finucane, M. L., Alhakami, A., Slovic, P. and Johnson, S. M. (2000) The affect heuristic in judgments of risks and benefits. *Journal of Behavioral Decision Making* **13**(1), 1–17.

Fischhoff, B. (1982) Debiasing. In D. Kahneman, P. Slovic and A. Tversky (Eds.) *Judgment under uncertainty. Heuristics and biases* (pp. 422–444). Cambridge University Press, Cambridge, UK.

Frank, R. H. (1984) Are workers paid their marginal products? *The American Economic Review* **74**(4), 549–571.

Frank, R. H. (1999) *Luxury fever: Why money fails to satisfy in an era of success*. Free Press, New York, NY.

Garcia, S. M. and Tor, A. (2007) Rankings, standards, and competition: Task vs. scale comparisons. *Organizational Behavior and Human Decision Processes* **102**(1), 95–108.

Garcia, S. M. and Tor, A. (2009) The N-Effect: More competitors, less competition. *Psychological Science* **20**(7), 871–877.

Garcia, S. M., Tor, A., Bazerman, M. H. and Miller, D. T. (2005) Profit maximization versus disadvantageous inequality: The impact of self-categorization. *Journal of Behavioral Decision Making* **18**(3), 187–198.

Garcia, S. M., Tor, A. and Gonzalez, R. (2006) Ranks and rivals: A theory of competition. *Personality and Social Psychology Bulletin* **32**(7), 970–982.

Gibbons, F. X. and Gerrard, M. (1991) Downward comparison and coping with threat. In J. Suls and T. A. Wills (Eds.) *Social Comparison. Contemporary Theory and Research* (pp. 317–345). Lawrence Erlbaum Associates, Hillsdale, NJ.

Gilbert, C. (2005) Unbundling the structure of inertia: Resource versus routine rigidity. *Academy of Management Journal* **48**(5), 741–763.

Gilbert, D. T., Giesler, R. B. and Morris, K. A. (1995) When comparisons arise. *Journal of Personality and Social Psychology* **69**(2), 227–236.

Goethals, G. R. and Darley, J. M. (1977) Social Comparison Theory: An Attributional Approach. In J. M. Suls and R. L. Miller (Eds.) *Social Comparison Processes. Theoretical and Empirical Perspectives* (pp. 259–278). Hemisphere Publishing Corporation, Washington, D.C.

Gosling, S. D., Vazire, S., Srivastava, S. and John, O. P. (2004) Should we trust web-based studies?: A comparative analysis of six preconceptions about internet questionnaires. *American Psychologist* **59**(2), 93–104.

Gould, J. E. (2000) *Concise handbook of experimental methods for the behavioral and biological sciences*. CRC Press, Boca Raton, FL.

Griesinger, D. W. and Livingston, J. W. (1973) Toward a model of interpersonal motivation in experimental games. *Behavioral Science* **18**(3), 173–188.

Griffith, D. and Rust, R. (1997) The price of competitiveness in competitive pricing. *Journal of the Academy of Marketing Science* **25**(2), 109–116.

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

Hammond, J. S., Keeney, R. L. and Raiffa, H. (1998) The Hidden Traps in Decision Making. *Harvard Business Review* **76**(5), 47–58.

Hill, S. E. and Buss, D. M. (2006) Envy and positional bias in the evolutionary psychology of management. *Managerial and Decision Economics* **27**(2/3), 131–143.

Hogarth, R. M. (1980) *Judgement and choice: The psychology of decision*. John Wiley & Sons, Chichester.

Hsee, C. K., Zhang, J. and Chen, J. (2004) Internal and substantive inconsistencies in decision making. In D. J. Koehler and N. Harvey (Eds.) *Blackwell Handbook of Judgment and Decision Making* (pp. 360–378). Blackwell Publishing, Malden, MA.

Hubbard, R., Vetter, D. E. and Little, E. L. (1998) Replication in strategic management: Scientific testing for validity, generalizability, and usefulness. *Strategic Management Journal* **19**(3), 243.

Isenberg, D. J. (1984) How senior managers think. *Harvard Business Review* **62**(6), 81–90.

Johansson-Stenman, O., Carlsson, F. and Daruvala, D. (2002) Measuring future grandparents' preferences for equality and relative standing. *The Economic Journal* **112**(479), 362–383.

Joyce, E. J. and Biddle, G. C. (1981) Are auditors' judgments sufficiently regressive? *Journal of Accounting Research* **19**(2), 323–349.

Kahn, B. E., Luce, M. F. and Nowlis, S. M. (2006) Debiasing insights from process tests. *Journal of Consumer Research* **33**(1), 131–138.

Kahneman, D., Klein, G., Sibony, O. and Lovallo, D. (2010) Strategic decisions: When can you trust your gut? *The McKinsey Quarterly* **2**, 1–10.

Kaufmann, L., Michel, A. and Carter, C. R. (2009) Debiasing strategies in supply management decision-making. *Journal of Business Logistics* **30**(1), 85–106.

Kelley, H. H. and Stahelski, A. J. (1970) Social interaction basis of cooperators' and competitors' beliefs about others. *Journal of Personality and Social Psychology* **16**(1), 66–91.

Kerlinger, F. N. (1970) *Foundations of behavioral research: Educational and psychological inquiry*. Holt, Rinehart and Winston, London.

Kets de Vries, M. (2004) Organizations on the couch: A clinical perspective on organizational dynamics. *European Management Journal* **22**(2), 183–200.

Kilduff, G. J., Elfenbein, H. A., and Staw, B. M. (2010) The psychology of rivalry: A relationally-dependent analysis of competition. *Academy of Management Journal* **53**(5), 943-969.

Kohli, A. (1989) Determinants of influence in organizational buying: A contingency approach. *Journal of Marketing* **53**(3), 50–65.

Koriat, A., Lichtenstein, S. and Fischhoff, B. (1980) Reasons for confidence. *Journal of Experimental Psychology: Human Learning and Memory* **6**(2), 107–118.

Krosnick, J. A. (1999) Survey research. *Annual Review of Psychology* **50**(1), 537.

Ku, G., Malhotra, D. and Murnighan, J. K. (2005) Towards a competitive arousal model of decision-making: A study of auction fever in live and internet auctions. *Organizational Behavior and Human Decision Processes* **96**, 89-103.

Larrick, R. P. (2004) Debiasing. In D. J. Koehler and N. Harvey (Eds.) *Blackwell Handbook of Judgment and Decision Making* (pp. 316–337). Blackwell Publishing, Malden, MA.

Lerner, J. S. and Tetlock, P. E. (1999) Accounting for the effects of accountability. *Psychological Bulletin* **125**(2), 255–275.

Lord, C. G., Lepper, M. R. and Preston, E. (1984) Considering the opposite: A corrective strategy for social judgment. *Journal of Personality and Social Psychology* **47**(6), 1231–1243.

Malhotra, D., Ku, G. and Murnighan, J. K. (2008) When winning is everything. *Harvard Business Review* **86**(5), 78–86.

Martin, D. W. (2007) *Doing psychology experiments*. Cole Publishing, Pacific Grove, CA.

Maule, A. J. and Edland, A. C. (1997) The effects of time pressure on human judgement and decision making. In R. Ranyard, W. R. Crozier, and O. Svenson (Eds.) *Decision Making. Cognitive models and explanations* (pp. 189–204). Routledge, London.

Maule, A. J., Hockey, G. R. J. and Bdzola, L. (2000) Effects of time-pressure on decision-making under uncertainty: Changes in affective state and information processing strategy. *Acta Psychologica* **104**(3), 283–301.

McClintock, C. G. (1972) Social motivation–A set of propositions. *Behavioral Science* **17**(5), 438–454.

Milgrom, P. and Roberts, J. (1982) Predation, reputation, and entry deterrence. *Journal of Economic Theory* **27**(2), 280–312.

Milkman, K. L., Chugh, D. and Bazerman, M.H. (2009) How can decision making be improved? *Perspectives on Psychological Science* **4**(4), 378–383.

Mill, J. S. (1907) On social freedom: Or the necessary limits of individual freedom arising out of the conditions of our social life. *Oxford and Cambridge Review* 1, 57–83.

Mischel, W. (1977) The interaction of person and situation. In D. Magnusson and N.S. Endler (Eds.) *Personality at the Crossroads: Current Issues in Interactional Psychology* (pp. 333–352). Lawrence Erlbaum Associates, Hillsdale, NJ.

Moore, D. A. and Loewenstein, G. (2004) Self-interest, automaticity, and the psychology of conflict of interest. *Social Justice Research* **17**(2), 189–202.

Mussweiler, T. and Epstude, K. (2009) Relatively fast! Efficiency advantages of comparative thinking. *Journal of Experimental Psychology: General* **138**(1), 1–21.

Mussweiler, T., Rüter, K. and Epstude, K. (2004) The man who wasn't there: Subliminal social comparison standards influence self-evaluation. *Journal of Experimental Social Psychology* **40**(5), 689–696.

Mussweiler, T., Rüter, K. and Epstude, K. (2006) The why, who, and how of social comparison: A socio-cognitive perspective. In S. Guimond (Ed.) *Social Comparison and Social Psychology. Understanding Cognition, Intergroup Relations, and Culture* (pp. 33–54). Cambridge University Press, Cambridge, UK.

Mussweiler T., Strack F. and Pfeiffer T. (2000) Overcoming the inevitable anchoring effect: Considering the opposite compensate for selective accessibility. *Personality and Social Psychology Bulletin* **26**(9), 1142–1150.

Newbert, S. L. (2007) Empirical research on the resource-based view of the firm: An assessment and suggestions for future research. *Strategic Management Journal* **28**(2), 121-146.

Nickerson, J. A. and Zenger, T. R. (2008) Envy, comparison costs, and the economic theory of the firm. *Strategic Management Journal* **29**(13), 1429–1449.

Nisbett, R. E., Krantz, D. H., Jepson, C. and Kunda, Z. (1983) The use of statistical heuristics in everyday inductive reasoning. *Psychological Review* **90**(4), 339–363.

Orne, M. T. (2006) On the social psychology of the psychological experiment: With particular reference to demand characteristics and their implications. In N. K. Denzin (Ed.) *Sociological Methods. A Sourcebook* (pp. 285–299). AldineTransaction, New Brunswick, NJ.

Parrott, W. G. (1991) The emotional experiences of envy and jealousy. In P. Salovey (Ed.) *The Psychology of Jealousy and Envy* (pp. 3–30). The Guilford Press, New York, NY.

Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y. and Podsakoff, N. P. (2003) Common Method Biases in Behavioral Research: A Critical Review of the Literature and Recommended Reviews. *Journal of Applied Psychology* **88**(5), 879–903.

Reips, U.-D. (2002) Standards for internet-based experimenting. *Experimental Psychology* **49**(4), 243–256.

Roberts, M. L., Albright, T. L. and Hibbets, A. R. (2004) Debiasing Balanced Scorecard Evaluations. *Behavioral Research In Accounting* **16**(1), 75–88.

Ross, L. and Ward, A. (1995) Psychological barriers to dispute resolution. In M. P. Zanna (Ed.) *Advances in Experimental Social Psychology: Vol. 27. Advances in Experimental Social Psychology* (pp. 255–303). Academic Press, San Diego, CA.

Ruback, R. B. and Innes, C. A. (1988) The relevance and irrelevance of psychological research: The example of prison crowding. *American Psychologist* **43**(9), 683–693.

Sabini, J. and Silver, M. (2005) Why emotion names and experiences don't neatly pair. *Psychological Inquiry* **16**(1), 1–10.

Schwenk, C. R. (1984) Devil's advocacy in managerial decision-making. *Journal of Management Studies* **21**(2), 153–168.

Sheskin, D. J. (2004) *Handbook of parametric and nonparametric statistical procedures*. Chapman & Hall/CRC, Boca Raton, FL.

Simon, H. A. (1955) A behavioral model of rational choice. *Quarterly Journal of Economics* **69**(1), 99–118.

Simonson, I. and Nye, P. (1992) The effect of accountability on susceptibility to decision errors. *Organizational Behavior and Human Decision Processes* **51**(3), 416–446.

Sloman, S. A. (2002) Two systems of reasoning. In T. Gilovich, D. Griffin and D. Kahneman (Eds.) *Heuristics and Biases. The Psychology of Intuitive Judgment* (Corr. 2006 printing, pp. 379–396). Cambridge University Press, Cambridge, UK.

Smith, R. H. (1991) Envy and the sense of injustice. In P. Salovey (Ed.) *The Psychology of Jealousy and Envy* (pp. 79–99). The Guilford Press, New York, NY.

Smith, R. H. and Kim, S. H. (2007) Comprehending envy. *Psychological Bulletin* **133**(1), 46–64.

Smith, W. P. (1981) On the nature of the question in social comparison. In J. H. Harvey (Ed.) *Cognition, social behaviour, and the environment* (pp. 325–339). Lawrence Erlbaum Associates, Hillsdale, NJ.

Soll, J. B. and Klayman, J. (2004) Overconfidence in interval estimates. *Journal of Experimental Psychology: Learning, Memory and Cognition* **30**(2): 299-314.

Solnick, S. J. and Hemenway, D. (1998) Is more always better?: A survey on positional concerns. *Journal of Economic Behavior and Organization* **37**(3), 373–383.

Solnick, S. J. and Hemenway, D. (2005) Are positional concerns stronger in some domains than in others? *American Economic Review* **95**(2), 147–151.

Spence, J. T. and Helmreich, R. L. (1983) Achievement-related motives and behavior. In J. T. Spence (Ed.) *Achievement and Achievement Motives. Psychological and Sociological Dimensions* (pp. 7–74). W. H. Freeman and Company, San Francisco, CA.

Stanovich, K. E. and West, R. F. (2000) Individual differences in reasoning: Implications for the rationality debate? *Behavioral and Brain Sciences* **23**(5), 645–665.

Stigler, S. (2008) Fisher and the 5% Level. *Chance* **21**(4), 12.

Sutter, M., Kocher, M. and Strauß, S. (2003) Bargaining under time pressure in an experimental ultimatum game. *Economics Letters* **81**(3), 341–347.

Svenson, O. and Benson, L. (1993) On experimental instructions and the inducement of time pressure behavior. In O. Svenson and A. J. Maule (Eds.) *Time Pressure and Stress in Human Judgment and Decision Making* (pp. 157–165). Plenum Press, New York, NY.

Svenson, O. and Maule, A. J. (Eds.) (1993) *Time pressure and stress in human judgment and decision making*. Plenum Press, New York, NY.

Taylor, S. E. (1981) The interface of cognitive and social psychology. In J. H. Harvey (Ed.) *Cognition, social behavior, and the environment* (pp. 189–211).Lawrence Erlbaum Associates, Hillsdale, NJ.

Taylor, S. E. and Lobel, M. (1989) Social comparison activity under threat: Downward evaluation and upward contacts. *Psychological Review* **96**(4), 569–575.

Tesser, A. (1986) Some effects of self-evaluation maintenance on cognition and action. In R. M. Sorrentino and E. T. Higgins (Eds.) *Handbook of Motivation and Cognition. Foundations of Social Behavior* (pp. 435–464). The Guilford Press, New York, NY.

Tesser, A. (1988) Toward a self-evaluation maintenance model of social behavior. In L. Berkowitz (Ed.) *Advances in Experimental Social Psychology: Vol. 21. Social Psychological Studies of the Self: Perspectives and Programs* (pp. 181–227). Academic Press, San Diego, CA.

Thomas, J. B., Clark, S. M. and Gioia, D. (1993) Strategic sensemaking and organizational performance: Linkages among scanning, interpretation, action, and outcomes. *Academy of Management Journal* **36**(2), 239–270.

Tranfield, D., Denyer, D. and Smart, P. (2003) Towards a methodology for developing evidence-informed management knowledge by means of systematic review. *British Journal of Management* **14**(3), 207-222.

Tversky, A. and Griffin, D. (1991) Endowment and contrast in judgments of well-being. In R. J. Zeckhauser (Ed.) *Strategy and Choice* (pp. 297–318). MIT Press, Cambridge, MA.

Tversky, A. and Kahneman, D. (1974) Judgment under Uncertainty: Heuristics and Biases. *Science* **185**(4157), 1124–1131.

Tversky, A. and Kahneman, D. (1981) The framing of decisions and the psychology of choice. *Science* **211**(4481), 453–458.

Veblen, T. (1924) *The theory of the leisure class: An economic study of institutions*. George Allen and Unwin, London. (Original work published 1899).

Wilson, D. (2003) Strategy as decision making. In S. Cummings and D. Wilson (Eds.) *Images of Strategy* (pp. 383–410). Blackwell Publishing, Malden, MA.

Wilson, T. D., Centerbar, D. B., Brekke, N. (2002) Mental contamination and the debiasing problem. In T. Gilovich, D. Griffin and D. Kahneman (Eds.) *Heuristics and biases. The psychology of intuitive judgment.* (pp. 185–200). Cambridge University Press, Cambridge, UK.

van de Ven, A. H. (1992) Suggestions for studying strategy process: A research note. *Strategic Management Journal* **13**(S1), 169–188.

Zanna, M. P., Goethals, G. R. and Hill, J. F. (1975) Evaluating a sex-related ability. Social comparison with similar others and standard setters. *Journal of Experimental Social Psychology* **11**(1), 86–93.

Zeckhauser, R. J. (1991) The strategy of choice. In R. J. Zeckhauser (Ed.) *Strategy and Choice* (pp. 1–21). MIT Press, Cambridge, MA.

Zeelenberg, M., Nelissen, R. M., Breugelmans, S. M. and Pieters, R. (2008) On emotion specificity in decision making: Why feeling is for doing. *Judgment and Decision Making* **3**(1), 18–27.

APPENDIX

A1. Methodology of systematic literature review

Our extensive literature review had the goal of obtaining a broad overview of research on positional behaviour in various decision domains and of detecting important gaps in the extant literature. We followed, to a very large extent, the systematic procedures presented by David and Han (2003) and Tranfield et al. (2003). Accordingly, we exclusively searched for published journal articles in five databases provided by EBSCO Host (Business Source Complete, EconLit, PsycArticles, Psychology and Behavioral Sciences Collection, and PsycINFO) (Newbert, 2007; van de Ven, 1992). On the basis of a first, "narrative" (David and Han, 2003, p. 40) literature review, we developed and applied a list of keywords, including "competitive irrational*," "positional concern*," "positional bias," "positionality," "positional goods" and "overcompetition." All articles identified in scholarly journals using these keywords were screened for relevance. To complement this systematic procedure, we checked all references cited in Armstrong and Collopy's (1996) seminal work on competitive irrationality for articles that may have escaped our query. Furthermore, we used Google Scholar to detect all articles that cite Armstrong and Collopy's (1996) article, and we screened those articles for factors that might influence positional behaviour. Finally, given that the items used to assess the competitiveness of an individual in the "social value orientation" literature (Griesinger and Livingston, 1973) bear a striking resemblance to the behavioural characteristics attributed to positional concerns, we also screened this research stream.

A2. Stimulus material for control group; adapted from Armstrong and Collopy (1996)

You are the owner and general manager of a manufacturing firm known as YouCo.

Recently, your company introduced a new product for industrial customers and you must decide the pricing strategy for this product.

You are aware that your main competitor, CompetitorCo, is producing a product that is very similar to the one that your firm has just introduced. It is as good as yours and the market is the same for both products.

Unfortunately, new legal regulations will ban both products in one year. Therefore, the products will only be sold for one year. The products' technology cannot be transferred to another product and any experience with the old product will not help in the development of a new product.

After calculating the total profits expected for your firm and the competitor until the end of the year, you know that four pricing strategies will yield the following results:

	Low price	***Medium-low price***	***Medium-high price***	***High price***
YouCo	*€ 25 million*	*€ 35 million*	*€ 45 million*	*€ 55 million*
CompetitorCo	*€ 10 million*	*€ 30 million*	*€ 50 million*	*€ 70 million*

A3. Stimulus material for treatment groups

Table 1: Stimulus material for treatment groups

Element	**Modification of text compared to control group stimulus material**
Time pressure treatment groups, welcome screen	[…] You will have 1 (2) minute (minutes) to make your choice. This is normally sufficient time to make an effective decision. A clock will indicate how much time you have left. […]
Relying on external advice, consultant treatment group scenario	Imagine that you have been hired as an external consultant by an industry manager. He is the owner and general manager of a manufacturing firm known as ClientCo. Recently, your client's company introduced a new product for industrial customers and your client must decide the pricing strategy for this product. You are aware that your client's main competitor, CompetitorCo, is producing a product that is very similar to the one that his firm has just introduced. You should assume that the competitor's product is as good as your client's and that the market is the same for both products. Unfortunately, new legal regulation will ban both products in one year. Therefore, the products will only be on sale for one year. The product's technology cannot be transferred to another product and any experience with the old product will not help in the development of a new product. After calculating the total profits expected for your client's firm and the competitor until the end of the year, you know that four pricing strategies will yield the following results: [...]
Relying on external advice, friend treatment group scenario	Think of a very close friend that you have known for a long time and are regularly in touch with. Imagine that one day he asks you for advice: […] [same text as for consultant treatment group scenario but all references to "client" and "ClientCo" are replaced with "friend" and "FriendCo"]
Accountability treatment group scenario	Recently, a professor from the local university invited you to give a short presentation about decision making in one of his courses. It is a multi-disciplinary course for the top 10% of the student body only and includes master's level students from all disciplines, including social and natural

Element	Modification of text compared to control group stimulus material
	sciences, business and engineering. You only have one important decision to make this week. Therefore, you decide that you will talk about how you make this one decision. The decision situation is as follows: [control group scenario] Remember that you have to give a presentation on the process you used to make this decision. So please take a minute to think about what exactly you will tell the students before actually making your decision!
"Consider the opposite" treatment group scenario	[control group scenario and input fields to collect response] Now please take a minute and explicitly think of at least one argument against your initial choice. Then please revise your choice if desired and proceed to the next page.
Training in biases treatment group, additional page	Read the following quotes from the *Harvard Business Review*: "The primal urge to win often overwhelms rational decision making." "...decision errors […] can result when managers and executives, overcome by competitive arousal, shift their goals from maximizing value to beating an opponent at almost any cost." [...]

A4. Results of time pressure manipulation check

Comparison between experiment groups	Test statistic (U)	p-value (two-tailed)
Control group vs. Two-minute time pressure treatment group	5170.5	< .001 ***
Control group vs. One-minute time pressure treatment group	1738.0	< .001 ***
One-minute time pressure treatment group vs. Two-minute time pressure treatment group	2830.5	< .001 ***

***: Significant at .001 level