The Ironic Effects of Motivational Tools on Attention and Decision Making

The Ironic Effects of Motivational Tools on Attention and Decision Making

A dissertation presented

by

Pinar Fethiye Fletcher

to

the Business Studies Department

in partial fulfillment of the requirements

for the degree of

Doctor of Philosophy

in the subject of

Organizational Behavior

Harvard University

Cambridge, Massachusetts

April 2016

Dissertation Advisor: Max H. Bazerman Pinar Fethiye Fletcher

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Abstract

Decision makers often display *bounded awareness* – a tendency to miss or overlook easily accessible, critical information and contextual cues – and make suboptimal decisions. In popular parlance, these defective attentional strategies that seem astonishing with the benefit of hindsight have been described with terms such as "tunnel vision" or "wearing blinders". In my dissertation, I examine whether certain types of motivational tools commonly used by organizations increase the tendency for bounded awareness. Specifically, using laboratory experiments, I demonstrate that winner-takes-all type of incentive schemes, social comparison, and specific and challenging goals result in excessive and rigid focusing (e.g., on performance benchmarks stated in goals and/or performing better than rivals), decrease scanning of the social context for relevant information, impair ability to deal with uncertainty and ambiguity, and negatively affect decision making performance. These findings indicate that these types of motivational tools should be used with care in managerial and higher-level work where detection of new opportunities, threats and shifts in the organizational environment are of utmost importance. Furthermore, results show that variable reward schemes, broadly-defined goals, and an emphasis on individual performance and accomplishments (compared to an emphasis on performance relative to others) are more effective in inducing flexible, sophisticated attentional strategies. In addition to contributing to the literature on motivation, goal-setting, competition and decision making, results add to a growing body of research on inattentional blindness by exploring the properties of social context (instead of the properties of the stimuli/information) that affect individuals' ability to notice important information or contextual cues.

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Acknowledgements:

I would like to thank each of my committee members – Max Bazerman, Kathleen McGinn, and Francesca Gino – for their valuable feedback and support. They went above and beyond, mentoring me, guiding me and supporting me throughout my doctoral studies. I also would like to thank Mike Norton, and laboratory members of the Behavioral Insights Group and GiNorton for their helpful comments and suggestions.

I am grateful for the help and guidance of John Korn, Jennifer Mucciarone, Marais Young, Karla Cohen and Dianne Le at the Doctoral Programs Office at Harvard Business School throughout my doctoral studies. Harvard Business School and the staff and facilities of the Computer Laboratory for Experimental Research (CLER) at Harvard Business School University provided invaluable help and financial support for my research during my tenure at Harvard University. I also would like to thank my research assistants Martina Salander and Aya Tange for their help in data collection.

1. INTRODUCTION

Globalization and technological innovations gave rise to a complex and fast-paced work environment. In this kind of rapidly-shifting business landscape, individuals need to be flexible with their attentional resources and reevaluate priorities as unexpected changes occur. Put differently, organizations and their employees need to be able to capitalize on opportunities as they arise, and defend themselves from emerging threats. Unsurprisingly, individuals and organizations often fail at this challenging task, fail to use important information that is available to them, overlook opportunities they should have capitalized on, and run into avoidable predicaments (Bazerman, 2014; Neisser, 1979; Most, Scholl, Clifford, & Simons, 2005). For example, most notably (and disastrously) 9/11 was probably a "predictable surprise" that the US government and leaders should have foreseen and avoided based on the intelligence they had access to (Bazerman, 2014; Bazerman & Watkins, 2004).

Despite the obvious need for sophisticated and flexible attentional strategies in today's organizational environment, motivation research often advocates the utilization of tools that narrow attention rigidly on a single set of performance dimension (Charness, Masclet, & Villeval, 2014; Gilliland & Landis, 1992; Staw & Boettger, 1990). For example, goals focus attention on narrow performance benchmarks stated in goals, while competition and social comparison focus attention on performing better than rivals (Charness, et al., 2014; Kilduff, Elfenbein, & Staw, 2010; Locke & Latham, 2002; Ordóñez, Schweitzer, Galinsky & Bazerman, 2009). Undoubtedly, at times, individuals benefit from this single-minded, narrow focus; they allocate all or most of their cognitive resources to the target at hand, boosting their performance (Locke & Latham, 2002). However, single-minded focusing of effort and attention on one target (e.g., accomplishing a specific goal or beating a competitor) comes at a cost. When attention narrows, individuals withdraw attention and cognitive effort from other areas; in particular, they

do not scan the social context, or they scan it superficially (Kahneman, 1973; Easterbrook, 1959; Wachtel, 1967). Consequently, narrowed attention increases the likelihood that important structural features of the context will be ignored and that some important information or data will be missed or overlooked. When individuals fail to process important information or contextual cues, they are more likely to behave inappropriately or make suboptimal decisions.

In my dissertation, I focused on incentive schemes, performance feedback and goal-setting systems typically utilized by organizations, and examined whether these tools negatively affect attention deployment and reduce ability to notice important, salient information. Put differently, I analyzed whether these motivational tools increase decision makers' tendency to display *bounded awareness* – a tendency to miss or overlook highly accessible, critical information (Bazerman & Chugh, 2005) – and make suboptimal decisions. Departing from earlier studies on attentional failures that focused exclusively on the unintentional tendency to miss visual stimuli (Most, et al., 2005; Simons & Chabris, 1999; Simons, 2000a), I broadly studied individuals' propensity to overlook available information.

I tested my hypotheses by conducting a number of laboratory experiments, using different decision making contexts and participant populations (Amazon Mechanical Turk participants, and the participants in the standing participant pool of Computer Lab for Experimental Research (CLER)).

In Chapter 1, I focused on analyzing the effect of goal specificity on the ability to gather and process information during unstructured decision making tasks that contained uncertainty and ambiguity. In Chapter 2, I examined whether motivational tools commonly used by organizations such as specific and challenging goals or winner-takes all incentive schemes coupled with comparative performance feedback systems increased the probability that

unexpected but highly relevant and accessible information will be missed. In Chapter 3, I analyzed the effect of social comparison (i.e., comparative performance feedback) and competitive incentive schemes on individuals' ability to pay attention to the contextual cues embedded in competitive environments and their subsequent propensity to engage in destructive competition.

2. CHAPTER 1: DECIDING UNDER THE INFLUENCE OF SPECIFIC GOALS

2. 1. Overview

Stories about individuals who ignore or miss critical, easily accessible information and make bad decisions are common. For example, Bruno Iksil, the JP Morgan bond trader now better known as the "London Whale", was heavily criticized for overlooking the size of the derivatives market – a basic trading fundamental – when he built his outsized position (Financial Times, 2013). In another instance, a Pennsylvania road crew surprised everyone by accidentally paving over a dead deer while focused on doing roadwork (Associated Press, 1996; Most, et al., 2005). Even more tragically, mountaineers lose their lives because they overlook or fail to notice critical information such as impending storms and dwindling oxygen reserves in pursuit of reaching the summit (Forbes, 2012; Krakauer, 1997). As these reports demonstrate, suboptimal allocation of attention and excessive focusing on a subset of relevant information or stimuli often have costly consequences (Bazerman & Chugh, 2005; Chugh & Bazerman, 2007; Most et al., 2005; Simons, 2000a).

Can specific performance or work goals be partially responsible for such defective attentional strategies that seem astonishing with the benefit of hindsight? For example, could commonly-used specific performance goals such as achieving a threshold rate of return (Aragon & Nanda, 2013) have prompted Bruno Iksil to attend excessively and rigidly to a subset of available information such as expected returns, impairing his ability to take into consideration the shallowness of the market in which he was trading? Or, might specific work goals such as resurfacing a predetermined amount of road surface per day have led the road crew to focus excessively on paving, interfering with their ability to notice the dead deer lying in the middle of the road? In 1996 on Mount Everest, could the goal of getting a specific number of clients to the

summit have led experienced guides to miss or overlook the approaching storm (Krakauer, 1997)?

In contrast with the above assertion that specific goals can lead to a tendency to miss or ignore the obvious, prior research on goal-setting showed that goal specificity has a beneficial effect on attention deployment (Locke, Chah, Harrison & Lustgarten, 1989; Shah, Friedman & Kruglanski, 2002). Past research also asserted that goal specificity does not have a systematic effect on average performance levels (Locke et al., 1989). However, prior goal-setting research typically utilized highly structured tasks such as response time and anagram tasks that contain little ambiguity and uncertainty (Wood, Mento & Locke, 1987). Past research designs that did involve complex tasks minimized structural ambiguity and uncertainty by giving explicit instructions on how to perform tasks, providing or teaching rule-based solutions, or by overtly identifying the set of information individuals should pay attention to (for examples please see Cervone, Jiwani & Wood, 1991; Earley, Connolly, & Ekegren, 1989a; Kanfer & Ackerman, 1989; Winters & Latham, 1996). At times, ambiguity and uncertainty were further minimized by providing immediate or simultaneous feedback on the optimality of participants' task strategies and decisions (Kanfer & Ackerman, 1989; Cervone et al., 1991).

As a result, the effects of goal specificity on attention and performance have not been examined in the most common decision making environments – those that are unstructured, contain high levels of ambiguity and uncertainty, and require unique solutions (Simon, 1990; Simon, 1979). This chapter addresses this gap and shows that past research findings on goal specificity do not generalize to unstructured decision making tasks. In contrast with its beneficial effect in structured tasks, goal specificity hurts attention allocation and impairs performance in unstructured decision making tasks by weakening individuals' ability to contend with uncertainty

and ambiguity. More precisely, in these more ambiguous environments, specific goals increase the likelihood that individuals narrow their attention excessively and rigidly, and miss or disregard important information. Put differently, in unstructured decision making tasks, specific goals increase bounded awareness (Bazerman & Chugh, 2006; Chugh & Bazerman, 2007; Milkman, Chugh & Bazerman, 2009), the tendency to overlook useful and easily accessible information that would be instrumental for goal attainment.

Additionally, this chapter contributes to the existing goal-setting literature by showing that increased goal specificity increases decision makers' propensity to satisfice. Current results suggest that goal specificity can have a de-motivating effect on decision makers in addition to its previously demonstrated (Locke et al., 1989; Shah et al., 2002) attentional or focusing effect. Furthermore, the findings indicate that, contrary to the common wisdom that "the more specific goals you have, the better you will do", setting broadly-defined goals during information capture and processing is important for improving unstructured decision making processes and outcomes.

2.2. Hypotheses

2.2.1. Properties of Unstructured Decision Making Tasks

The effect of goal-setting in structured task environments have been studied thoroughly (see Locke & Latham, 2002). Therefore, the primary purpose of this chapter is to examine the effect of specific performance goals in *unstructured decision making tasks*. Unstructured decision making tasks (1) have multiple potential solutions, (2) require processing of information that is inherently uncertain or ambiguous (consequently, they contain a degree of uncertainty and ambiguity regarding which of the potential task strategies or solutions is optimal), and (3) require

ad hoc, customized and dynamic solutions rather than rule-based solutions that can be applied repeatedly (Simon, 1990; Simon, 1979).

These properties of unstructured decision making tasks differentiate them from some complex tasks (Earley et al., 1989a, Wood et al., 1987; Campbell, 1988) that do not contain any uncertainty and ambiguity. For example, a linear optimization task can be complex but does not contain any ambiguity or uncertainty (e.g., output can be maximized deterministically given constraints on a number of factors such as x and y). Unstructured decision making tasks differ from learning tasks (Kanfer & Ackerman, 1989; Cervone et al., 1991) as well. In learning tasks, individuals learn "rules" or "strategies" that can be applied repeatedly, and eventually become much more efficient at performing the task, so much so that they perform the majority of the task on "auto pilot" after a while (Kanfer & Ackerman, 1989). Although it is possible to accumulate some expertise on how to make unstructured decisions*,* decision making cannot be automated the way learning tasks can be. In fact, making decisions on auto pilot is often the cause of suboptimal decision making (Bazerman & Moore, 2013; Stanovich & West, 2000). Every instance of an unstructured decision requires taking a step back and evaluating the particular situation, and may require a customized, ad hoc strategy.

For example, an investment decision is an unstructured decision making task. Multiple potential solutions exist in such a task (e.g. various investment alternatives), and investors can use different information sources (e.g., financial statements, research analyst reports) and analyze different parameters (e.g., past profitability of the firm, growth forecasts) to make a decision. The information investors process is inherently uncertain and ambiguous (e.g., there is some uncertainty associated with growth forecasts; conclusions from research analyst reports might be vague or even conflicting). The task contains ambiguity and uncertainty about whether

particular strategies or solutions will lead to attainment of goals, such that investors are likely to be uncertain about whether they have acquired all the information they need (e.g., "Is analyzing the financial statements of the company sufficient?"; "How should the departure of the founding CEO be factored in?") and whether they have made the optimal decision ("Will this investment perform as I expect it to?"). Furthermore, investors are required to develop dynamic, customized solutions for each investment decision, such as using different parameters and information sources depending on the particulars of the situation they face (e.g., "I need to look at growth projections and ignore past profitability because the start-up company has a very short track record"; "I should take into account the fact that we just entered a recessionary period"). In other words, the particular informational demands of the investment decision will dictate how the investor should approach and complete the decision task.

2.2.2. Implications of Unstructured Decision Making Task Properties on Attention and Effort

Decision makers typically have substantial autonomy over their task strategy (i.e., information search and processing strategy) (Simon, 1990; Simon, 1979). The attentional efforts of decision makers have been described as a *"beam of light"* where *"the central brilliant part represents the focus, surrounded by a less intense fringe"* (Kahneman, 1973, p.40; Wachtel, 1967). Decision makers determine (1) *the width of the beam*, or the number and range of cues or data points they will focus their attention on at any given time, and (2) *the range the beam will scan*, or the extent of information search they will engage in.

In unstructured decision making tasks, individuals try to optimize the width and scanning of this beam of light – the width of their attention span and information search/scanning activity – under uncertainty and structural ambiguity. This has four important consequences. First,

uncertainty and ambiguity make task performance more cognitively taxing; evaluation of available information for relevance, importance and adequacy becomes more challenging. Second, uncertainty and ambiguity prompt decision makers to make judgment calls; the more uncertainty and ambiguity in the task environment, the more judgment calls individuals need to make as to the adequacy and importance of available information. Relatedly, uncertainty and ambiguity increase the likelihood that attentional width and scanning activity will be calibrated suboptimally. Finally, uncertainty and ambiguity shield the decision maker from the knowledge that they may not have done enough or that they may have miscalibrated their attentional span and information search.

In highly structured decision making tasks with little or no uncertainty and ambiguity, the likelihood of this kind of miscalibration or inappropriate satisficing is minimal because the relevance, importance and adequacy of available information is fairly obvious.

2.2.3. Goal Specificity, Attention and Effort

As compared to broadly defined, do-your-best goals, specific goals contain more information about the value of specific behaviors and outcomes. Put differently, specific goals provide more guidance on where to focus attention and what an optimal level of effort should look like (Locke et al., 1989; Staw & Boettger, 1990). In highly structured tasks with no uncertainty and ambiguity, specific goals efficiently optimize attention and effort on the processing of relevant information, and guide task performers towards optimal outcomes (Locke et al., 1989; Locke & Latham, 2002). However, the very characteristic that makes specific goals effective in structured task environments – their high information content – can render them problematic in unstructured decision making tasks which contain uncertainty and ambiguity.

Specific goals can negatively affect unstructured decision making performance through two mechanisms that can occur concurrently. First, specific goals have a higher potential to induce inappropriate satisficing behavior than broadly-defined goals. Second, compared to broadly-defined goals, specific goals are more likely to focus attention excessively and rigidly on an inappropriately small set of available information and cause cursory scanning activity. Both of these mechanisms are likely to affect both the attentional span (i.e., the width of the light beam) and the information search activity (i.e., the range of scanning), and cause bounded awareness.

2.2.4. Specific Goals and Satisficing in Unstructured Decision Making

Decision makers often satisfice inappropriately (e.g., stop seeking or evaluating information prematurely) (Simon, 1990). As mentioned above, in unstructured decision making tasks with uncertainty and ambiguity, the likelihood of inappropriate satisficing is higher (Simon, 1990), because the task environment requires a higher number of judgment calls from decision makers while simultaneously shielding them from the knowledge that they might have not done enough.

Specific goals make this kind of satisficing behavior even more likely in unstructured decision making tasks, because the informational content of specific goals allows them to be used as *convenient yardsticks around which to satisfice*. For example, imagine that investment advisers are given the specific goal of finding an investment that is likely to generate a *profit margin of 12% next year*. Compared to broadly-defined goals, this kind of specific goal might prompt investment advisers to satisfice and make them more likely to stop looking for relevant information prematurely – for example, the goal might encourage advisers to stop searching for investment alternatives as soon as they find one company that generated a 12% profit margin last year (Company A) and make them miss the investment alternative/company that generated a

36% profit margin last year (Company B), which would have not only a higher potential for profitability next year but also a higher likelihood of reaching the threshold level of 12%. Or, finding a company that met the 12% threshold in the past might deter investors from seeking crucial forward-looking information (e.g., earnings guidance from management) that would be important for making an optimal investment decision that will perform well in the future.

Broadly-defined goals that require optimization or maximization do not provide such convenient yardsticks around which to satisfice. For example, imagine that a client asked his or her investment advisers to identify the investment alternative that they think will perform the best next year. In this case, decision makers cannot satisfice around a specific performance level (e.g., 12% profit margin) or a particular performance metric (e.g., profit margin or historical performance); they are forced to take a step back, widen their attentional span, and conduct a broader and more protracted information search. Consequently, compared to individuals who are assigned specific goals, decision makers who work towards broadly-defined goals are more likely to capture all the relevant and accessible information, less likely to display bounded awareness and more likely to make optimal decisions.

2.2.5. Specific Goals and Attentional Strategies

Goals focus attention on information and behavior deemed instrumental to their attainment (Allport, 1989; Staw & Boettger, 1990). Specific goals narrow attention sooner and to a greater degree than more broadly-defined goals (Locke et al., 1989). In unstructured decision making tasks, there is always a risk that important information will be excluded from decision makers' attentional set because there is a high level of uncertainty and ambiguity regarding the optimal set of information (Simon, 1990). Specific goals exacerbate this risk, because they

prompt individuals to use more stringent information filters earlier in the decision making process.

Returning to the beam of light analogy, specific goals increase the likelihood that decision makers excessively narrow the beam of light, discount the information at the periphery of the beam, unduly curb scanning activity, and ignore the "big picture" (Easterbrook, 1959). Put differently, specific goals might prompt an excessive focus on the information or metrics that are stated in the goals and cause bounded awareness; they might interfere with decision makers' ability to take a step back, and to uncover, weigh and process all of the relevant and accessible data points.

For example, in the investment decision example, investment advisers who are given the specific goal of meeting the 12% profit margin threshold might inappropriately restrict their attention to easily quantifiable data such as historical financial data (which provides information on historical profit margins and is easy to evaluate vis-à-vis the threshold level mentioned in the specific goal but only has limited value in predicting *future profitability*). Consequently, they might either ignore or miss other accessible information that provides valuable clues as to the future profitability of the company. As a result, they may miss or ignore the information that the charismatic and highly-effective CEO has just left the company or they might discount or overlook the fact that last year was a high-growth year and next year is expected to be a recessionary year.

2.2.6. A comprehensive model of goal specificity, attention and decision making

Compared to broadly-defined goals, specific goals are more likely to prompt decision makers to employ a satisficing strategy in unstructured decision making contexts. This kind of satisficing behavior curbs the amount and range of information taken into account, increases

bounded awareness and leads to suboptimal decision making. Furthermore, specific goals increase the likelihood that inappropriately stringent information filters will be used in unstructured decision making tasks, excessively and rigidly narrowing attention span and unduly curbing information search. Such excessive filtering of useful and accessible information will result in bounded awareness and suboptimal decision making performance. Because information gathering and processing is a key component of task strategy and performance in unstructured decision making tasks (Simon, 1990; Wood, George-Falvy, & Debowski, 2001), information gathering and processing activity will mediate the relationship between goal specificity and decision making performance. Specifically:

Hypothesis 1. *In unstructured decision making tasks, broad goals lead individuals to gather and process more information than specific goals.*

Hypothesis 2. *In unstructured decision making tasks, individuals who work towards broad goals will be more likely to make optimal decisions (i.e., perform better) than individuals who work towards specific goals.*

Hypothesis 3. *The relationship between goal specificity and decision optimality stated in Hypothesis 2 will be mediated by information gathering and processing activity.*

2.2.7. Present research

Hypotheses 1-3 were tested in four laboratory experiments, using different decision making contexts to increase the validity and generalizability of the research.

In Studies 1 and 2, the participants assumed the role of business consultants and made a series of recommendations under time pressure. Decision makers worked towards either specific or broadly-defined performance goals. The participants automatically received all the available

and relevant information on the decision making alternatives. As a result, information gathering was not costly in Studies 1 and 2.

In Studies 3 and 4, the participants assumed the role of investment advisers and made investment decisions. In both studies, participants worked towards investment goals that varied in their specificity. In contrast with Studies 1 and 2, information gathering was costly in Studies 3 and 4; participants had to make an effort to gather information and make explicit requests for information. This design allowed us to collect an overt behavioral measure of participants' attentional span; it also increased external validity and generalizability of findings by making information gathering costly as it often is in most real-world decision making contexts. Furthermore, unlike in Studies 1 and 2, there was no time pressure in Studies 3 and 4. Participants in these two studies could take as much time as they wanted to gather and process information, and make decisions.

Moreover, in Studies 1 and 3, the participants worked towards "*mere goals*" (Schweitzer, Ordóñez, & Douma, 2004) and did not reap any rewards other than the psychological benefit of accomplishing their goals when they made optimal decisions. In contrast, Study 2 and 4 participants were given "*reward goals*" and received economic incentives for accomplishing their goals (i.e., a bonus payment for reaching the optimal decision in line with their goals) (Schweitzer et al., 2004).

Finally, in Studies 1 and 2, participants evaluated the information on the alternatives side-by-side (i.e., joint evaluation), while in Studies 3 and 4 participants evaluated the information on the alternatives sequentially (i.e., separate evaluation) (Bazerman, Moore, Tenbrunsel, Wade-Benzoni, & Blount, 1999).

2.3. Study 1

A laboratory experiment examined differences in information gathering and processing strategies, and performance of specific and broad goal recipients both in structured and unstructured decision making environments.

2.3.1. Study 1 Methods

Participants and design. One hundred participants (51% male; M_{age} = 31.66, SD =7.87, range 19-55) were recruited from Amazon's Mechanical Turk website to complete a consulting task. The participants completed the study for $3. Additionally, thirty participants (43% male; M_{age} = 37.60, SD =12.98, range 20-64) were recruited for a pilot study (to be discussed in detail) and were paid the same amount ($3).

Instructions on consulting task. Participants performed the consulting task on their computers. They were instructed that "*As a business consultant, you will help your clients make decisions. Specifically, you will be asked to review information and make recommendations for your clients.*" The participants performed the consulting task in fourteen different business situations (i.e., rounds). In each round, participants were given a decision making task (e.g., make a recommendation for your client who is looking for a new production location) and given information on five different alternatives (e.g., name of the town, each location's proximity to raw materials, etc.). Participants had thirty seconds to review the available information and choose one of the options.

Structured and unstructured decision making environments. In half of the rounds, participants were given structured decision tasks. In the remaining rounds, participants received unstructured decision tasks. Structured and unstructured decision tasks were presented in a random order.

In the structured decision rounds, participants received deterministic data only. In other words, there was no uncertainty or ambiguity associated with the information provided on the decision alternatives – there was no room for different interpretations of data; data did not include any forecasts or estimates; performance level on a certain dimension was certain and invariable (i.e., no range of possible outcomes); the data clearly demonstrated the superiority/inferiority of one alternative over the other. For example, when asked to recommend a production location, participants received precise information on proximity to necessary resources (in miles) and availability of labor (yes/no) in each location. Consequently, participants could use relatively straightforward, rule-based decision making strategies (e.g., choose the option that is closest to the necessary resources). Furthermore, once participants made a decision, they could easily ascertain that the decision they have made was optimal (e.g., "I am certain that no other option is closer to the necessary resources.") (see Table 1 for an example).

Table 1. Example – Structured decision for production location (Study 1 & 2)

	Harrisville†	**Bedford**	**Calyer**	**Edmont**	**Mesa**
Features:					
Available land (sq ft)	8600	8400	8300	8400	8200
Proximity to raw materials (miles)	4	6	6	4	8
Proximity to wholesalers (miles)	7	7	8	7	12
Proximity to distributor (miles)	10	12	10	12	10
Proximity to highway (miles)	2	3	3	4	4
Immediate availability	Yes	Yes	No	Yes	No
Additional Information:					
Availability labor	Yes	Yes	Yes	Yes	Yes
# highways nearby	2	1	2	1	1
Room for expansion	Yes	Yes	No	Yes	No
# competitors in area	1	2	4	2	1

†The choice most likely to satisfy the goals (optimal choice)

In contrast, in unstructured decision making rounds, participants received stochastic data that contained uncertainty or ambiguity (e.g., forecasts with varying levels of accuracy, range of possible outcomes for certain performance dimensions). For example, when asked to recommend

a production method to a client, participants were given expected production rate (min/max), expected rate of accidents (min/max), and reliability level of these forecasts. Consequently, participants had to use complex decision making strategies such as utilizing more than one piece of information at a time to draw conclusions (e.g., evaluate forecasted range of productivity along with reliability of those forecasts) and could not apply unsophisticated rule-based strategies. Furthermore, because of the uncertainty and ambiguity embedded in the data, ascertaining the optimality of decisions made was more difficult (see Table 2 for an example).

Table 2. Example – Unstructured decision for production method (Study 1 & 2)

	A	**B**	**C**	**D**	**E†**
Production Forecasts:					
Expected # products/hr – main unit (Max)	28	25	29	28	29
Expected # products/hr – main unit (Min)	22	20	25	22	24
Raw material cost ($ MM)	4.5	4.4	5.1	5.4	4.2
Labor cost/year ($ MM)	3.0	3.0	3.0	3.0	3.0
Expected accidents – Max (#/yr)	6	10	6	8	6
Expected accidents – Min (#/yr)	4	6	3	2	2
Additional Information:					
Efficiency rate (%)	91	86	88	90	94
Reliability of production forecasts (%)	80	77	70	85	99
Auxiliary production unit available? (Yes/No)	Yes	No	No	Yes	Yes
Production capacity – auxiliary unit (# products/hr)	2	0	0	1	3

†The choice most likely to satisfy the goals (optimal choice)

Goal conditions. Half of the participants were randomly assigned to the broadly-defined goal condition ("broad goals"). The remaining participants were assigned to the specific goal condition ("specific goals"). In each round, participants in the broad goals condition were given a broadly-stated performance goal suitable to the decision task in hand (e.g., find the most optimal production location; identify the production method that is most likely to perform the best). In contrast, participants in the specific goals condition received specifically-stated goals suitable to the decision task in hand (e.g., find the production location that is at most 2 miles away from the

highway; recommend a production method that is most likely to produce more than 25 products/hr).

Pilot and optimal decision. While making each decision, the buyers could choose among five alternatives. The optimal decision in each round was the same for participants in both goal conditions (e.g., the production method that was most likely to perform the best was also the method that was most likely to fulfill the minimum hourly production rate of 25 products/hr, as specified in the specific goals condition).

We ran the pilot study to independently verify that the participants are able to correctly identify the optimal alternative when they reviewed and processed all the available information. The participants in the pilot study immediately proceeded to making decisions after reading the general instructions on the consulting task. They were not given any goals before making decisions and were only told about clients' needs (e.g. "recommend one of the production methods to your client"). They had unlimited time to review available information and make a decision. As expected, participants in the pilot were able to correctly identify the optimal alternative that performed the best on all dimensions including the dimensions stated in specific goals (For structured decisions, on average 93% of the time, range: 83-100% over 7 decisions; for unstructured decisions, on average 90% of the time, range: 87-97% over 7 decisions).

Presentation of information. In each round, all the available information was listed on a table; each of the five columns represented an alternative/option and each row represented a performance along a certain dimension (see Table 1 and 2). The optimal product was assigned to a column randomly. Four to six performance dimensions were listed under the top section of the table, and another three to five performance dimensions were listed under the bottom, "additional information" section of the table. Certain pieces of information were more helpful in assessing

the relative attractiveness of an alternative. For example, labor was available in all potential production locations but public transportation was not available in all locations. However, it should be noted that performance along the criteria utilized in specific goal condition was always sufficient for identifying the most optimal alternative.

Some of the crucial information (for both specific and broad goal recipients) was listed in the top section of the table, while the rest was given in the bottom, additional information section, because we wanted to examine whether specific goal recipients would focus excessively and satisfice with the first few pieces of relevant information listed in the top section, and overlook the crucial information listed under additional information section. For example, in the production method example, expected min and max # of products that could be produced in the main unit was located in the top, *forecasts* section of the table, while existence of an auxiliary production unit (yes/no), the amount of production at auxiliary unit and reliability of forecasts were listed in the bottom, *additional information* section. To judge the expected/most likely capacity of a production method, participants in both goal conditions needed to analyze all five pieces of the information.

To summarize, the presentation of information in all rounds allowed us to assess the breadth of information search the participants engaged in.

Goal-related questionnaire. Upon completion of the consulting task, the participants were asked to rate the specificity ("how specific or broad was your assigned goal?") (1= "extremely specific"; 7 = "extremely broad") and difficulty ("how easy or difficult was your assigned goal?") level of their goals on a 7-point bipolar Likert scale (1= "extremely easy"; 7 = "extremely difficult").

Information capture and processing. Next, the attention the participants allocated to the available information was measured using a 4-item "information capture and processing scale"; the items assessed the breadth of attentional span and the extent of information search/scanning. The participants indicated the degree to which they agreed/disagreed with four-statements using a seven-point, bipolar scale (1 = "Strongly disagree"; 7 = "Strongly agree"). The four items were: (1) I only had time to carefully examine two or three features/dimensions (2) The information listed under additional information section was irrelevant most of the time (3) Before I made a final decision, I took a step back and looked at all the features of an alternative as a whole (4) I reviewed and took into account all the available information when I was making a decision. The first two items were reverse coded. All items loaded onto the same factor (total variance explained 66.17%) and were aggregated into an information capture and processing scale (Cronbach's alpha = .82).

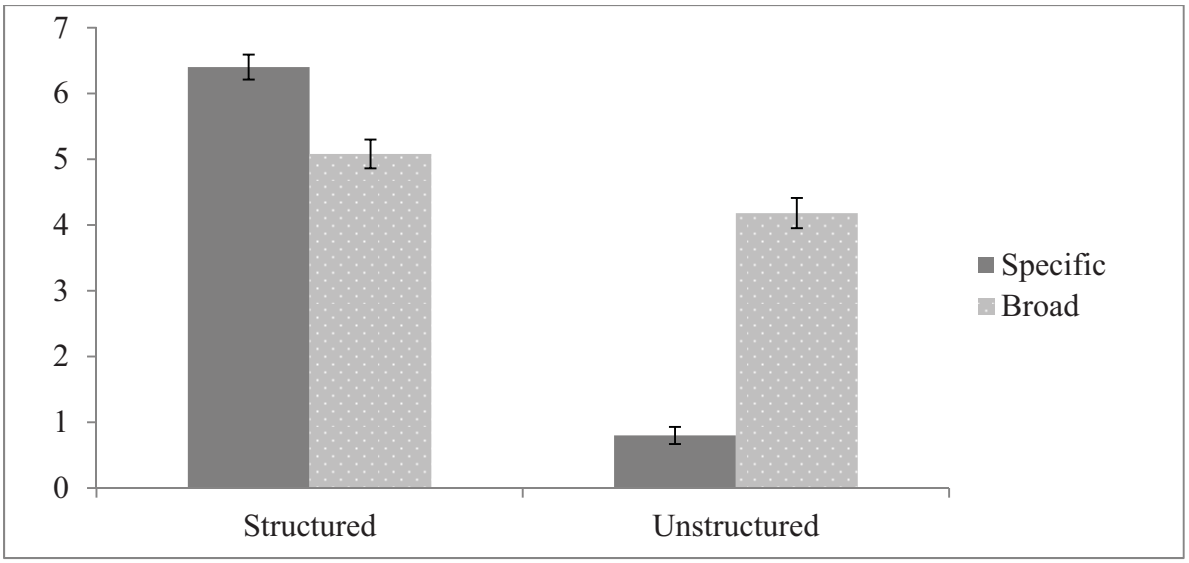
Decision making performance. We recorded whether an optimal decision was made in each of the structured and unstructured decisions (1 = optimal alternative chosen; 0 = a suboptimal alternative was chosen).

2.3.2. Study 1 Results

Manipulation check. As expected, participants in the specific goal condition (M = 2.52, SD = 1.33) rated their assigned goals as significantly more specific than did the participants in the broad-goal condition (M = 3.76, SD = 1.83) ($t(98) = -3.89$, $p<.001$, $d = -0.78$). In line with expectations, there were no significant differences between specific goal recipients (M = 3.10, SD = 1.15) and broad goal recipients (M = 3.42, SD = 1.18) in terms of perceived goal difficulty ($t(98) = -1.38$, $p = .172$).

Information capture and processing. Next, we examined the participants' scores on the information capture and processing scale by goal condition. As expected, participants who were assigned broad goals (M = 18.72, SD = 4.90) indicated that they captured and processed more information than the participants who were assigned specific goals (M = 11.14, SD = 4.83), providing support for *Hypothesis 1* ($t(98) = 7.79$, $p<.001$, $d = 1.56$). Evaluating each item separately, compared to the participants in the specific goal condition, the participants in the broad goal condition were less likely to indicate that they had time to examine performance only along a few dimensions ($t(98) = 4.67$, $p<.001$, $d = 0.93$), less likely to discount the useful information provided under additional information section ($t(98) = 7.83$, $p = .001$, $d = 1.57$), more likely to take a step back and evaluate the "big picture" before they made a final decision ($t(98) = 5.10$, $p <.001$, $d = 1.02$) and more likely to take into consideration all data when making a decision ($t(98) = 5.47$, $p<.001$, $d = 1.09$).

Decision Making Performance. As predicted in *Hypothesis 2*, participants who received broad goals performed significantly better than the participants who received specific goals in unstructured decision making tasks with uncertainty and ambiguity ($t(98) = 13.09$, $p<.001$, $d = 3.04$). In contrast, in structured decision making tasks with no uncertainty and ambiguity, participants in specific goal condition performed significantly better than those in the broad goal condition ($t(98) = 4.65$, $p<.001$, $d = 0.93$). (see Figure 1).



Note: Error bars represent standard errors.

Figure 1. Number of Optimal Decisions Made in Structured and Unstructured Decision Making Tasks by Goal Type (Study 2)

Next, the performance in each structured and unstructured decision by goal condition was examined separately through a series of binary logistic regression analyses. In structured decision making contexts where participants did not have to contend with ambiguous information and stochastic data with uncertainty, specific goals enabled individuals to make decisions more effectively and efficiently; participants in the specific goal condition reached the optimal decision more often (range - 84% to 96%) than the participants in the broad goal condition (range – 60% to 80%) in each of the 7 structured decision making situations (p-values range from $p<.01$ to $p<.05$) (see Table 3).

In contrast, participants in the broad goals condition reached the optimal decision more often (range - 46% to 80%) than the participants in the specific goal condition (range – 8% to 22%) in each of the 7 unstructured decision making tasks. Providing further support for *Hypothesis 2*, the performance gap between the two goal conditions was significant for all unstructured decisions ($p<.001$) (see Table 3).

In all rounds, participants in the broad goals condition needed to review the information in all rows (8-11 rows) before they made a decision (because the broadly-stated goals did not single out any performance criteria), while participants in the specific goals condition – by using the distinguishing performance criteria highlighted in specific goals – could reach the optimal decision based only on 2-5 rows of data. Interestingly, despite the fact that they could reach an optimal decision by examining a smaller subset of available data, specific goal recipients performed significantly worse than the broad goal recipients in unstructured decision making tasks.

Table 3. The effect of goal specificity on decision optimality in structured and unstructured decision making tasks (Study 1)

	Optimal Decision Made (%)			
	Specific Goal	**Broad Goal**	**Constant (SE)**	**B (SE)**
Unstructured				
#1	16%	56%	-1.66*** (0.39)	1.90*** (0.48)
#2	8%	46%	-2.44*** (0.29)	2.28*** (0.59)
#3	18%	54%	-1.52*** (0.37)	1.68*** (0.47)
#4	10%	50%	-2.20*** (0.47)	2.20*** (0.55)
#5	22%	54%	-1.27*** (0.34)	1.43*** (0.44)
#6	10%	80%	-2.20*** (0.47)	3.58*** (0.59)
#7	14%	78%	-1.82*** (0.41)	3.08*** (0.53)
Structured				
#1	84%	60%	1.66*** (0.39)	-1.25** (0.48)
#2	86%	66%	1.82*** (0.41)	-1.15* (0.51)
#3	94%	80%	2.75*** (0.60)	-1.36* (0.69)
#4	90%	74%	2.20 *** (0.47)	-1.15* (0.57)
#5	96%	80%	3.18*** (0.72)	-1.79* (0.80)
#6	94%	80%	2.75*** (0.60)	-1.37* (0.69)
#7	96%	68%	3.18*** (0.72)	-2.42** (0.78)

*** p<.001** p<.01 *p<.05 CI = Confidence interval SE = Standard error

Information utilization and performance. Specific goal recipients' inferior performance on unstructured decision making tasks and their responses on the information capture and processing questionnaire indicate that they satisficed with and excessively narrowed their

attention on the first set of relevant data points shown on the top section of the table and overlooked other crucial data points included in the additional information section of the table (that was directly related to the criteria specified in specific goals).

For example, in the production method question (see Table 2), participants in the specific goals condition were asked to identify the production method that was most likely to produce more than 25 products per hour, while the participants in the broad goals condition were asked to identify the production method that was most likely to perform the best. The two options that were most likely to satisfy either the specific or the broad goal were Option C (expected production rate for main unit 25-29/hr) and Option E (expected production rate for main unit 24-29/hr). If participants in either goal condition satisficed and/or excessively narrowed their focus on these production forecasts, ignored the stochastic nature of this data and did not look for more information on the two options, they would select Option C.

However, optimal C was a suboptimal choice. If participants took into account the stochastic nature of the data (e.g., "these are *expected* production levels with a lot of variation, and these two options are very close to each other; can I find any other relevant information that would allow me to set these two apart?") and took into account all the relevant information, they would observe that Option E was more likely to satisfy the goals (specific or broad) they were given, because: (1) the reliability of production forecasts for Option E was 99%, while reliability of forecasts for Option C was much lower at 70%. (2) Moreover, Option E had additional capacity (3 products/hr) at an auxiliary unit (which brought the expected production rate to 27-32/hr) while Option C had none (expected capacity remained at 25-29/hr).

Specific goal recipients were more likely to satisfice and excessively focus on the first set of relevant data than broad goal recipients because of the high information content of the specific

goal (i.e., the metric used in the specific goal (hourly production rate) and the specific threshold level (25)); 56% of the specific goal recipients chose the suboptimal Option C, while only 16% of the broad goal recipients chose this suboptimal choice. As mentioned before, only 22% of specific goal recipients processed all the relevant information and chose the optimal alternative (Option E) while 54% of broad goal recipients were able to do so.

To summarize, goal specificity affected the amount of relevant information participants took into account, which, in turn, affected the quality of decision making. Therefore, we formally tested whether participants' information capture and processing scores mediated (Baron & Kenny, 1986) the relationship between goal specificity and unstructured decision making performance (*Hypothesis 3*) using a bootstrapping procedure (Hayes, 2012). We find some support for a partial mediation. Including participants' ratings on information capture and processing in the model decreased the effect of goal specificity on decision optimality by 12% – the regression coefficient for goal specificity was reduced from $\beta = 3.38$, $p < .001$ to $\beta = 2.96$, $p < .001$ (95% bias-corrected CI = [.07, 0.80]) – while the information capture and processing scores predicted unstructured decision optimality ($\beta = 0.06$, $p = .039$).

2.3.3. Study 1 Discussion

Study 1 findings indicate that individuals who are assigned specific goals capture and process less relevant information than the individuals who receive broad goals in unstructured decision making tasks with uncertainty and ambiguity; they also make more suboptimal decisions in these types of tasks. When a significant amount of uncertainty and ambiguity is removed from the decision making environment, specific goals focus attention effectively and lead to better decision making performance.

Compared to broad goal recipients, specific goal recipients are significantly more likely to display bounded awareness in unstructured decision making tasks; they fail to utilize easily-accessible, useful information that would allow them to choose the alternative that is most likely to satisfy the criteria stated in their goals. The findings also suggest that specific goal recipients are more likely than broad goal recipients to overlook uncertainty and ambiguity embedded in data (e.g., the natural amount of variance exhibited in stochastic data such as forecasts, estimates), and apply rule-based, deterministic reasoning to stochastic data in an inappropriate manner (e.g., estimates of performance are treated as actual performance, historical performance is expected to be replicated identically).

Following prior research on goal-setting, we focused on *mere goals* in Study 1 to avoid confounding the results with the addition of incentives (Lee, Locke & Phan, 1997; Locke & Latham, 2002). However, in the real world, financial incentives are often attached to goals ("reward goals"). Therefore, following prior research (Schweitzer et al., 2004), we reran Study 1 using reward goals to demonstrate that the negative effects of specific goals on unstructured decision making performance cannot be mitigated by offering performance-based financial incentives.

2.4. Study 2

2.4.1. Study 2 Methods

Study 2 followed the same procedures as Study 1. However, in Study 2, a different incentive system was used. At the beginning of the study, participants were informed that they would earn $0.10 for each optimal recommendation they make to their clients (in addition to $3 participation fee).

Participants and design. One hundred and twenty participants (52% male; M_{age} = 32.61, SD =9.59, range 19-64) were recruited from Amazon's Mechanical Turk website to complete the study.

2.4.2. Study 2 Results

Information capture and processing. As predicted, participants who were assigned broad goals (M = 19.20, SD = 4.43) indicated that they captured and processed more information than the participants who were assigned specific goals (M = 10.85, SD = 4.67), providing support for *Hypothesis 1* (t(118) = 10.05, p<.001, d = 1.84). Compared to the participants in the specific goal condition, the participants in the broad goal condition were less likely to indicate that they had time to examine only a few performance dimensions (t(118) = 5.88, p<.001, d = 1.08), less likely to discount the useful information provided under additional information section (t(118) = 8.26, p = .001, d = 1.51), more likely to evaluate the "big picture" before they made a final decision (t(118) = 8.07, p <.001, d = 1.48) and more likely to take into consideration all performance data when making a decision (t(118) = 8.20, p<.001, d = 1.49).

Decision Making Performance. As predicted in *Hypothesis 2*, compared to the participants who were assigned specific goals, participants who were assigned broad goals performed significantly better in unstructured decision making task (t(118) = 13.09, p<.001, d = 3.04). On average, broad goal recipients made 4.37 (SD = 1.43) optimal unstructured decisions, while specific goal recipients made 1.23 (SD = 1.13) optimal unstructured decisions (out of a total of 7). On the other hand, those who received specific goals performed significantly better in structured decision making tasks than those who received broadly-defined goals (t(118) = 5.58, p<.001, d = 0.93). Specific goal recipients made 6.42 (SD = 1.03) optimal structured decisions,

while broad goal recipients made 5.20 (SD = 1.34) optimal structured decisions (out of a total of 7).

Next, using logistic regression analysis, we analyzed the performance gap between the participants in specific goals and broad goals condition in each of the structured and unstructured decision tasks. Broad goal recipients performed significantly better in each of the 7 unstructured decision tasks (p-values range from p<.001 to p<.01) while the specific goal recipients performed significantly better in each of the 7 structured decision tasks (p-values range from p<.05 to p<.01) (see Table 4).

Table 4. The effect of goal specificity on decision optimality in structured and unstructured decision making tasks (Study 2)

	Optimal Decision Made (%)			
	Specific Goal	**Broad Goal**	**Constant (SE)**	**B (SE)**
Unstructured				
#1	22%	60%	-1.29*** (0.31)	1.69*** (0.41)
#2	17%	40%	-1.61*** (0.35)	1.21** (0.44)
#3	20%	75%	-1.39*** (0.32)	2.49*** (0.44)
#4	15%	58%	-1.61*** (0.35)	1.95*** (0.43)
#5	22%	54%	-1.74*** (0.36)	2.07*** (0.45)
#6	18%	80%	-1.50*** (0.33)	2.88*** (0.46)
#7	15%	65%	-1.74*** (0.36)	2.35*** (0.45)
Structured				
#1	80%	63%	1.39*** (0.32)	-0.84* (0.42)
#2	87%	62%	1.87*** (0.38)	-1.40** (0.46)
#3	95%	78%	2.94*** (0.59)	-1.66* (0.67)
#4	92%	77%	2.40 *** (0.47)	-1.21* (0.56)
#5	97%	83%	3.37*** (0.72)	-1.76* (0.80)
#6	95%	77%	2.94*** (0.59)	-1.76** (0.67)
#7	97%	80%	3.37*** (0.72)	-1.98** (0.79)

*** p<.001** p<.01 *p<.05 CI = Confidence interval SE = Standard error

Information utilization and performance. We tested whether information capture and processing mediated the relationship between goal specificity and unstructured decision making performance (Hypothesis 3). We find some support for a partial mediation. When we included

participants' information capture and processing scores in the model, the effect of goal specificity on decision optimality was reduced by 17% – the regression coefficient for goal specificity was reduced from $\beta = 3.13$, $p < .001$ to $\beta = 2.61$, $p < .001$ (95% bias-corrected CI = [.12, 1.02]), while participants' ratings of information capture and processing predicted unstructured decision optimality ($\beta = 0.06$, $p = .015$).

2.4.3. Study 2 Discussion

In Study 2, specific goals impaired unstructured decision making performance even when individuals received financial incentives for goal attainment. In contrast, specific goals coupled with financial incentives led to significantly better performance when the decision making environment was structured.

To summarize, both in Study 1 and 2, specific goals were more effective than broadly-defined goals *only when* available information was not ambiguous and did not contain any uncertainty, and only when all data points unambiguously led decision makers to the optimal task strategy or outcome. When decision makers had to contend with uncertainty and ambiguity (e.g., needed to rely on stochastic or forecasted data that contained a natural amount of variance and ambiguity, make predictions based on past data, or utilize a data point that can be interpreted differently when evaluated simultaneously with another piece of data), broadly-defined goals led to significantly better decision making.

However, most real-world decision making tasks are unstructured (Simon, 1990; Wood et al., 2001). In particular, organizational decision making tasks have become unstructured as the economy's focus shifted towards service and technology-driven sectors (Bureau of Labor Statistics, 2012). Given that past goal-setting research thoroughly studied *structured* task contexts (Wood et al., 1987; Wood et al., 2001) and given the prevalence of *unstructured*

decision making tasks in our personal and professional lives, we focus on further examining the effect of goal specificity in different unstructured decision making contexts in Study 3.

Studies 1 and 2 relied on participants' post hoc ratings to examine information gathering and processing behavior. In contrast, in Study 3, real-time, overt behavioral data on participants' information gathering and processing activity was collected. Therefore, Study 3's design allowed a closer and more thorough examination of the mediating role of information search and the attentional effects of goal specificity.

Furthermore, Studies 1 and 2 examined the relationship among goal specificity, information capture and processing, and performance when information was not costly. In real life, information gathering is often costly. Therefore, an important question remains as to whether goal specificity has similar effects on attention and performance when information gathering is costly. Study 3 addressed this question by making information gathering costly. Study 3 also did not impose any time pressure on decision makers while they gathered and processed information.

Finally, Study 3 tested Hypotheses 1-3 using a different decision task (an investment decision task rather than a consulting task) to ensure that Study 1 and 2 findings were not driven by task idiosyncrasies.

2.5. Study 3

2.5.1. Study 3 Methods

A laboratory experiment examined differences in information gathering and processing strategies and performance of specific-, moderately broad-, and broad-goal recipients in an unstructured investment decision task.

Participants. One hundred and seventy six participants with an average of 5-10 years of work experience (51% female, M_{age}=34, SD = 10.34, range 18-65) were recruited from Amazon's Mechanical Turk website for an investment decisions study. They completed the study for $3.50.

Task overview. The participants assumed the role of investment advisers and were asked to evaluate four companies as investment alternatives for their clients. The participants were informed that the companies were real companies whose names were disguised. They were presented with *actual historical data from 2008 to 2009* (data taken from a Bloomberg terminal) and asked to make investment recommendations for the 2010 year end.

Experimental conditions. One fourth of the participants proceeded to the rest of the task without receiving any additional instructions ("perfect information" condition – to be explained in detail). The remaining participants were assigned to one of the three goal conditions. The specificity of the assigned goal varied in each group. One fourth of the participants were told that their goal was to identify the company that is most likely to generate at least a 12% profit margin in 2010 ("specific goal" condition). Another one fourth was assigned the moderately broad goal of identifying the company that is most likely to generate the highest profit margin in 2010 ("moderately broad goal" condition). The remaining participants were assigned the most broadly defined goal, which was to identify the company that is likely to perform the best in 2010 ("broad goal" condition). Therefore, all the goals asked the participants to make a decision based on *their assessments of the future profitability* of the firms.

Basic information on investment alternatives. Next, all participants read a description of the four companies. All four companies were described as global, large-scale pharmaceutical

companies. The participants were told that additional information existed on each of the companies.

Additional information on investment alternatives. There were four more pieces of information available on each of the four companies. The participants in the perfect-information condition automatically received all of this additional information. The participants in the three goal conditions did not automatically receive this additional information. Instead, they were informed that any of the additional information they wished to see would be furnished to them upon their request.

Cost of gathering additional information. In the real world, decision makers incur pecuniary costs and spend valuable time gathering information. For this reason, the experiment was designed such that participants in the goal conditions bore some cost when they gathered additional information. Before they made any information requests, these participants were informed that they would need to wait a few seconds before receiving each information request. For each company, the participants indicated which categories of information they wanted to view. Next, they waited ten seconds for each piece of information, then received the information. The participants could spend as much time as they wished reading the information they requested. Participants collected and reviewed information (if they chose to do so) on the companies one-by-one, sequentially. However, all the information they collected was presented to them once again before they made their final decision (such that participants did not have to rely on their memory to make a decision).

Description of available additional information. Additional information on the four companies existed under four categories: 1) information on historical profitability (i.e., how profitable the company was in 2008 and 2009; data was taken from companies' 10-K

filings(annual reports)), 2) additional financial information (i.e., the total value of the company's assets, inventories, and/or cash flow in 2008 and 2009; data was taken from companies' 10-K filings (annual reports)), 3) information on company operations (i.e., current information on company operations, such as the effect of competitors' actions on the company's market share, analyst's view of the company, and company footprint; data was taken from Bloomberg profiles and news reports on the company), and 4) miscellaneous information (i.e., information on change in executive leadership, legal settlements, FDA approvals, and suspended drug trials; data was taken from company news releases/8-K filings (reports on material company events)) (see Appendix 1).

Based solely on the historical profitability information, Company Brown was the most attractive option for the participants in all three goal conditions: during the past two years, it had performed the best, had the highest profitability, and was the only company that had profit margins slightly higher than 12%. Company Yellow was the second-most attractive option based on historical profitability, but fell short on all three goals (historical profit margins were ~10%, as opposed to Brown's historical profit margins of 12-13%). Compared to Brown and Yellow, the other two companies (Gray and White) had much lower profitability historically, and did not appear to be promising options for meeting any of the goals.

Additional financial information provided on the companies did not alter the standing of the companies with respect to meeting any of the three goals, but rendered Company Yellow slightly more attractive than it had previously appeared.

In conjunction with the information provided on historical financial data, the information on company operations and miscellaneous information categories provided critical information for goal attainment. The more information the participants gathered on these categories, the more

likely they were to realize that Company Brown (the seemingly best investment option based solely on past financial data) was on a downward trajectory and would not meet any of the three investment goals. (The company had just agreed to pay $609 million under a legal settlement, which was expected to bring company profitability to 0% in 2010, and a competitor was expected to steal market share from Brown.) In contrast, the more information the participants gathered on Company Yellow, the more likely they were to realize that Yellow was on an upward trajectory and was the most likely company to meet all three investment goals. (It already had very strong earnings and was expected to increase its profitability further in 2010 due to a new FDA approval of a profitable infant formula.) The additional information provided on Company Gray and Company White did not change their standings because it contained mildly negative information, such as the temporary suspension of a drug trial or the replacement of a key executive.

Unstructured nature of the decision making environment. Participants were trying to make a decision related to future performance of an investment. This kind of task inherently contains uncertainty and structural ambiguity that typifies unstructured decision making tasks. The data naturally exhibited variance and uncertainty; performance of companies varied from year to year due to a variety of factors (health of economy, management team's performance, competitor entry, legal disputes, etc.). The information was ambiguous to a certain degree (e.g., "How much of a difference a new FDA approval will make to the bottom line next year?"; "Will the company perform as well next year as it did last year?"). Consequently, the participants could not be entirely certain that (1) they have acquired the optimal amount of information and that they were weighing the available information optimally (2) dedicated the appropriate amount of time and effort to the task (3) they made the optimal decision once they reached a decision.

Investment decision. Next, the participants in the goal conditions were presented with all the information they had collected and were told to choose one of the investment alternatives in line with their assigned goals. Once the participants made their investment decision, they were asked to provide a rationale for it.

The participants in the perfect-information condition (who were given all the available information at no cost) were asked to predict, over three separate questions, which company was the most likely to have a profit margin of at least 12% in 2010, which company was the most likely to have the highest profit margin in 2010, and which company was the most likely to show the best performance in 2010 (the optimal decision was the same for participants in all goal conditions – to choose Company Yellow[1]). These three questions were asked in the perfect information condition in order to establish that the participants were able to make the optimal decision when they reviewed all the available information.

Information gathering and processing. Information search strategy was measured by the total number of information requests made, and the total number of requests made for information on company operations and miscellaneous information. The total number of requests made for these two latter categories was measured separately, because it was expected that the participants in the specific goal condition would be most likely to ignore this useful data on current and future profitability due to excessively narrowed attention and satisficing. Information on current company operations (such as market share, competitor actions, legal settlements, new FDA approvals, and suspended drug trials) are at least as pertinent to a company's future profitability as the company's historical track record, yet it is not as easy to evaluate and

[1] Based on real data from Bloomberg, Company Yellow (i.e., real name Perrigo) did actually meet the assigned goals at the end of 2010 with a 12.31% profit margin.

compare as past financial data vis-à-vis performance metrics stated in goals and can be easily ignored when narrowing attention excessively and satisficing.

Decision making performance. Finally, the ultimate investment decision the participants made was tracked. Optimal investment decisions (i.e., choosing Company Yellow, which met the investment goals given in all three conditions in 2010) were coded "1"; all other decisions were coded "0."

Goal manipulation checks and understanding of basic concepts. As a manipulation check, after the participants had a chance to gather additional information on the investment alternatives, they were asked what their assigned goals were. Additionally, participants in the goal conditions answered questions about the specificity and difficulty level of their assigned goals ("How specific or broad was your assigned goal?"; "How easy or difficult was your assigned goal?").

No specialized knowledge of finance was required to complete the study; the definition of three financial terms (profit margin, assets, and inventories) used in the study was provided to all of the participants.

2.5.2. Study 3 Results

Perfect-information condition. Participants in the perfect-information condition were given all the available information at no cost. They were then asked to make an investment decision in line with each of the three investment goals used in the three goal conditions. Eighty-eight percent of the participants in the perfect-information condition made the optimal decision under each investment goal.[2] This result confirms that when participants examine all the

[2] The five participants who were not able to make the optimal decision appeared not to have read the information carefully (e.g., mixed up the names of the companies).

available information, they are able to make the optimal investment decision and choose Company Yellow.

Goal manipulation checks. A one-way ANOVA using perceived goal specificity as the dependent variable revealed a significant difference among the three goal conditions ($F(2,129) = 14.18$, $p<.001$, $\eta^2_p = .18$). The participants in the specific-goal condition ($M=1.30$, $SD = 0.46$) and moderately broad-goal condition ($M = 1.50$, $SD = .76$) perceived their goals to be more specific than did the participants in the broad-goal condition ($M=2.11$, $SD = .95$) ($t(129) = -5.12$, $p<.001$, $d = -1.09$ and $t(129) = -3.84$, $p<.001$, $d = -0.71$ respectively). The difference in perceived goal specificity was not statistically significant between the specific-goal condition and moderately broad-goal condition ($t(129) = -1.28$, $p=.203$). As expected, a one-way ANOVA revealed no significant differences in perceived goal difficulty among the three goal conditions ($F(2,129) = 1.59$, $p = .209$).

Information search and goals. The total number of information requests by goal condition was analyzed. The participants could request zero to 16 pieces of information. Participants in the specific-goal condition gathered the least amount of available information ($M = 10.07$, $SD = 3.78$); participants in the moderately broad- and broad-goal conditions searched for more information ($M = 11.95$, $SD = 4.40$ and $M = 12.20$, $SD = 4.37$, respectively). A one-way ANOVA revealed that when goal specificity decreased, the participants requested and searched for more information ($F(2,129) = 3.41$, $p = .036$, $\eta^2_p = .05$), providing support for *Hypothesis 1*. A planned contrast indicated that moderately broad and broad goal recipients were significantly more likely to conduct a more extensive information search ($t(129) = 2.60$, $p = .010$, $d = 0.49$).

Furthermore, when goal specificity decreased, the participants gathered more information under company operations and miscellaneous categories ($F(2,129) = 5.38$, $p = .006$, $\eta^2_p = .08$), which were pertinent to the investment decision. Planned contrasts indicated that the participants in the broad goal and moderately broad goal conditions were more likely to collect this set of information than were the participants in the specific goal condition ($t(129) = 3.26$, $p = .001$, $d = 0.61$). On average, specific goal recipients collected 2.95 (SD = 3.09) out of 8 pieces of information under these two categories, while the moderately broad and broad goal recipients collected 4.80 (SD = 3.33) and 5.02 (SD = 3.31) pieces, respectively. In other words, narrowing the goal from finding the company that is likely to generate the "highest profit margin in 2010" to finding the company that is likely to generate "at least 12% profit margin in 2010" was sufficient to convince the participants that they could narrow their attention excessively by using a very limited set of backward-looking information and could ignore potentially useful data on current company operations.

To summarize, compared to the participants who were assigned specific goals, the participants who were assigned broad goals conducted a wider and more protracted information search; in particular, they sought information other than past financial data which has limited predictive value.

Decision optimality and goals. 70% of broad goal recipients, 61% of moderately broad goal recipients, and 41% of specific goal recipients reached the optimal investment decision. A logistic regression analysis indicated that the participants in the moderately broad and broad goal conditions were significantly more likely to reach an optimal decision than were the participants in the specific goal condition ($p = .007$), providing support for *Hypothesis 2.*

Next, the mediating role of information gathering and processing on the relationship between goal specificity and decision optimality was examined using the process procedure (Hayes, 2012). Information search activity was operationalized by the number of information requests made. Information search predicted decision optimality (β= 0.46, p <.001) and including the number of information requests in the model reduced the influence of goal specificity on decision optimality to non-significance (from β= 1.03, p = .007 to β= .60, p = .241; 95% bias-corrected CI = [.22, 1.80]). As predicted in *Hypothesis 3*, information search activity mediated the relationship between goal specificity and decision making performance (see Table 5).

Table 5. Mediation Analysis (Study 3) – Goal specificity, information search and decision optimality

Variable	**Information search X→M**	**Decision optimality X→Y**	**Decision optimality X, M→Y**
Goal specificity	2.01*	1.03**	0.60
Information search (# requests)			0.46***
R^2	0.05	0.07 (Nagelkerke)	0.58 (Nagelkerke)
95% bias-corrected CI			[0.22, 1.80]

* p<.05 **p<.01 ***p<.001. CI = Confidence Interval

2.5.3. Study 3 Discussion

The findings of Study 3 indicate that specific goals prompt individuals to adopt excessively narrow and curtailed information-search strategies in unstructured decision making tasks and exacerbate satisficing, when information gathering is costly.

Goal specificity increased bounded awareness and led to suboptimal performance in unstructured decision making tasks, even when decision makers did not perform under time pressure. Furthermore, Study 3 documented excessive focusing of specific goal recipients by using behavioral measures for participants' attentional efforts (i.e., explicit requests for information). This behavioral data also provided more substantial evidence on the mediating role

of information gathering and processing on the relationship between goal specificity and decision making performance.

However, information gathering was not very costly in Study 3 (10-second wait per information request). In contrast, real-world information gathering often costs time and money. Therefore, information gathering was made more costly in Study 4; each information request required a monetary fee in addition to a wait time. Additionally, as opposed to Studies 1 and Study 3 that examined the effects of mere goals, Study 4 tested the relationship between goal specificity and decision optimality using economic incentives for goal attainment. Finally, to increase the validity and generalizability of findings, we recruited participants from a different participant pool for Study 4. The study participants were undergraduate and graduate students recruited from the standing participant pool of a university. The participants completed Study 4 in a laboratory rather than online.

2.6. Study 4

2.6.1. Study 4 Methods

Participants. Seventy-five undergraduate and graduate students (52% male, M_{age}=20.7, SD = 1.85, range 18-27) from the standing subject pool of a large private university in the Northeast participated in the study. Participants were paid a $10 fee plus a performance-based fee.

Procedures. Study 4 procedures were very similar to Study 3 procedures; any deviations will be noted below.

Goal conditions. Once again, the level of goal specificity was manipulated. In Study 4, half the participants received a specific goal ("your goal is to select the company that is most

likely to generate at least a 12% profit margin in 2010"), while the other half received a broad goal ("your goal is to select the company that is most likely to perform the best in 2010").

Incentives for goal attainment. Participants were given economic incentives (a $5 bonus) for accomplishing their goals (i.e., when they reached the optimal decision in line with their goals).

Cost of information. Information search was more costly in Study 4. For each information request, the participants waited for eight seconds *and* paid ten cents. At the beginning of the study, the participants received a "research budget" of $1.60. They were informed that they could purchase any of the available information they would like with this money. They were also told that they would keep any leftover money from this research budget at the end of the study.

2.6.2. Study 4 Results

Information search and goals. As predicted in *Hypothesis 1*, when goal specificity decreased, the participants gathered more current and forward-looking information from company operations and miscellaneous categories ($t(73) = 3.57$, $p = .001$, $d = 0.82$), which were pertinent to the investment decision. On average, specific goal recipients collected 4.81 (SD = 2.20) out of 8 pieces of information under these two categories, while the broad goal recipients collected 6.47 (SD = 1.83) pieces of information.

Next, the total number of information requests by goal condition was analyzed. Participants in the broad-goal condition gathered significantly more information than the participants in the specific-goal condition ($t(73) = 4.22$, $p<.001$, $d = 0.98$), providing further support for *Hypothesis 1*. On average, the participants who received specific goals requested and

analyzed 7.05 (SD = 4.61) pieces of information, whereas the participants who received broad goals requested and analyzed 11.32 (SD = 4.14) pieces of information.

Decision optimality and goals. Eighty-two percent of broad goal recipients and 38% of specific goal recipients reached the optimal investment decision. A logistic regression analysis was used to examine the effect of goal specificity on decision optimality. As predicted in *Hypothesis 2*, participants who worked towards broad goals were significantly more likely to perform better and reach an optimal decision than the participants who worked towards specific goals ($p < .001$).

As predicted in *Hypothesis 3*, information search activity mediated the relationship between goal specificity and decision making performance. Including the number of information requests in the model reduced the influence of goal specificity on decision optimality to non-significance (from $\beta = 1.99$, $p < .001$ to $\beta = 1.08$, $p = .120$; 95% bias-corrected CI = [0.87, 4.00]), and the number of information requests predicted decision optimality ($\beta = 0.49$, $p < .001$).

2.6.3 Study 4 Discussion

The results of Study 4 indicate that increased goal specificity leads to rigid, excessively narrow information search and satisficing, even when economic incentives are attached to goal attainment. In addition, Study 4 replicates the finding of Study 3 that information search mediates the relationship between goal specificity and decision making optimality.

Individuals who were assigned specific goals (>12% profit margin for next year-end) failed to ask important, obvious questions (e.g., “What is the current state of company’s operations?”; “Can I find any clues on how the company will perform next year, for the period on which I am asked to make a decision?”), searched and analyzed 40% less information, and were substantially less likely to make an optimal investment decision as a result.

2.7. Chapter 1 General Discussion

2.7.1. Theoretical and Practical Contributions

Previous research on goal setting focused on decision making contexts that contained little or no ambiguity and uncertainty. These are the decision making contexts where all the available information points, unambiguously, in one direction; the optimal task strategy is obvious or can easily be summarized into a rigid set of rules; the "right" decision is relatively easy to identify. In these types of highly structured decision making tasks, specific goals focus attention more effectively than broad goals and improve decision making. Unfortunately, structured decision making tasks are typically confined to highly-controlled work settings such as entry-level or assembly line work and are relatively rare in today's fast-paced, "big data" driven world.

In managerial work, and in innovative, technology-driven industries, unstructured decision making tasks are the norm; individuals often have to contend with noise, uncertainty, and ambiguous information while making decisions. The dynamic nature of work requires that individuals be cognizant of uncertainty and ambiguity embedded in data, factor in all accessible, relevant information, be flexible with attentional resources and capitalize on emerging opportunities and threats. Findings in this chapter show that rigidly-defined, specific performance goals can be detrimental to attention allocation and performance in these types of unstructured decision making contexts.

These results suggest that "matching" the goal specificity to the decision making environment is important. Specific goals allow decision makers to approach the decision task efficiently, in a highly-structured manner when the task environment is structured. However, when the task environment is unstructured (i.e., uncertain and ambiguous), specific goal

recipients' structured approach causes bounded awareness, rigidity and poor performance. In contrast, broad goals allow decision makers to capture all relevant information effectively and flexibly in unstructured task environments, but they increase inefficiency and lower decision making quality in highly structured environments.

Current findings contribute to the existing goal-setting and decision making literature by establishing a link between increased goal specificity and bounded awareness, or the tendency to overlook or miss accessible and useful information in unstructured decision making environments. In contrast to its beneficial effect on attention and performance in structured task environments with no ambiguity and uncertainty, results show that increased goal specificity increases the utilization of defective attentional strategies in unstructured decision making environments with uncertainty and ambiguity. In particular, specific goals increase the propensity to ignore uncertainty and ambiguity embedded in data, excessively narrow attentional width, and curtail scanning or searching for relevant information. The results suggest that well-intentioned specific performance goals, such as threshold rates of return that are widely used across a variety of industries, can ironically lead to a failure to notice obvious and relevant information, and harm performance in unstructured task environments.

Additionally, the present findings show that goal specificity has a motivational function in addition to its previously demonstrated attentional function (Locke et al, 1989; Staw & Boettger, 1990). Specifically, the high information content of specific goals makes them more likely to be used for satisficing, which is often detrimental to decision making performance. In contrast, broadly-defined goals discourage task performers from satisficing and excessively narrowing their attention, and improve unstructured decision making performance.

Furthermore, these findings shed light on the motivational and attentional mechanisms that lead to goal-induced drops in labor supply or effort (Camerer, Babcock, Loewenstein & Thaler, 1997) and performance. In addition, the findings contribute to an existing stream of research showing that working toward broadly defined, do-your-best goals can be preferable to specific goals (Earley et al., 1989a; Heath, Larrick & Wu, 1999; Larrick, Heath & Wu, 2009; Ordóñez & Wu, 2014; Schweitzer et al., 2004; Staw & Boettger, 1990). The results also show that a trade-off among different performance dimensions (such as a trade-off between quality and quantity [Gilliland & Landis, 1992] or between correcting grammar errors and revising content [Staw & Boettger, 1990]) is not necessary for specific goals to have this kind of negative effect on performance.

Prior work has shown that immediate feedback (Earley, Connolly, & Lee, 1989b) can effectively be used to optimize attention and motivation in some complex task domains and in some decision making contexts. However, immediate feedback is often not feasible in unstructured decision making tasks due to uncertainty and ambiguity. For example, it would not be possible to give immediate or simultaneous feedback on the optimality of a real investment decision until the end of the investment horizon. The results indicate that, in decision making contexts where fine-tuning of task strategy by immediate feedback is not possible, broadly-defined goals can be an effective tool in improving task performers' attentional and motivational strategies.

Past research demonstrated that specific learning goals (Kanfer & Ackerman, 1989; Winters & Latham, 1996) can effectively be used in some decision making contexts with limited uncertainty and ambiguity where participants can learn rules or strategies that can be applied repeatedly with equally satisfactory results. However, specific learning goals might not be

feasible or advisable in unstructured decision making contexts. First, the necessity to generate customized, dynamic solutions makes identification of appropriate specific learning goals inefficient and costly in unstructured decision making environments. Furthermore, specific learning goals can become dangerous if they mislead decision makers into thinking that there is a mechanized solution that can be applied repeatedly when faced with similar but not identical decisions. Finally, assigning specific learning goals might be inappropriate or unrealistic in various outcome-oriented professional contexts. For example, a brokerage client might not be taken seriously when she or he demands that an investment adviser learns at least five important things about possible investment alternatives or takes a certain number of new certification courses on investing strategies. Current findings demonstrate that in unstructured decision making contexts where specific learning goals are not feasible or advisable, broadly-defined goals can be effectively used to boost decision making performance.

2.7.2. Limitations and Future Research

Intense, narrow focus and reduced effort can be the fastest means of achieving a goal, even in some unstructured decision making contexts. For example, in Studies 3 and 4, if participants were asked to make a decision for 2009 year-end, instead of 2010 year-end, specific-goal seekers would have been able to make the optimal decision only by looking only at historical profits. Broad-goal seekers would still be able to make the optimal decision, albeit less efficiently, after a more protracted information search. Therefore, it can be argued that specific goals can be more efficient than broad goals when individuals feel certain that a limited search will capture all the relevant information to make a good decision. Unstructured decision making tasks, however, are defined by the absence of this kind of certainty. Information that is ambiguous or uncertain (e.g., forecasts, estimates, scattered/disorganized set of information)

rarely allow such certainty. Therefore, specific goals can only be preferred over broad goals in unstructured decision making tasks when information or strategy search is relatively expensive and when making the wrong decision or performing suboptimally is relatively cheap. Future field research should examine the conditions under which such cost assessments can be made accurately in unstructured task environments.

Furthermore, additional research is needed on how broadly-defined goals can be used to effectively focus attention, boost motivation and maximize performance in unstructured decision making environments. For example, assigning broadly-defined goals during information gathering and processing stages and assigning specific performance goals during the later stages of the decision making process can discourage decision makers from satisficing and excessive focusing during critical stages, and might prove even more effective than using broadly-defined goals in all stages of the decision making process. Also, future research could examine the effectiveness of multiple goals in unstructured decision making tasks. Multiple goals (either multiple specific goals that would prompt decision makers to cast their attentional resources widely and effectively or simultaneous utilization of specific and broad goals) can be more efficient than broadly-defined goals in certain unstructured decision making contexts.

While specific learning goals can be inefficient or unadvisable in unstructured decision making environments, broadly-defined learning goals (e.g., learn as many things as possible about the product alternatives) can be used effectively in decision making tasks when the professional context is amenable to the use of such learning tasks (e.g., brokerage clients might not be able to assign learning goals to their investment advisers, but a CEO should be able to assign broad learning goals to subordinates when the company is developing a new product).

Future research should examine the effect of broadly-defined learning goals on attention, motivation and decision making optimality.

Motivated reasoning affects how individuals capture and process information, and work towards goals (Kunda, 1990). In organizational settings, incentives can prompt motivated reasoning and bias individuals' attentional strategies and their perception of available information and goals. Increased goal specificity can be a defense against such motivated reasoning; in other instances, the content of specific performance goals or metrics can provide fodder for motivated reasoning (Kunda, 1990; Simmons, Nelson & Simonsohn,2011), especially when the decision making environment contains uncertainty and ambiguity. Feature research could identify under which conditions increased goal specificity is likely to exacerbate or alleviate motivated reasoning and biased cognition.

Finally, broadly defined goals are not vaguely defined goals. Across all four experiments, broadly defined goals did not interfere with individuals' understanding of what needed to be achieved; decision makers who were assigned broad goals comprehended their goals and the task they were trying to accomplish (recommending the business solution that would serve clients' specific needs the best in Study 1 and 2, and identifying the best investment option in Study 3 and 4). In contrast, vaguely defined goals are not likely to provide any effective direction to task performers. Future research could explore the difference between vaguely defined goals and broad ones, and examine the effect of vaguely defined goals on attention, motivation and performance.

2.7.3. Chapter 1 Conclusion

The findings in this chapter shows that goal specificity can cause bounded awareness in unstructured decision making tasks by triggering deleterious satisficing behavior, and excessive

and rigid focusing on an inappropriately small subset of available information. In task environments of this type, broadly defined goals can be the best tool for convincing decision makers to take a step back, and fully appreciate the particular informational demands of a situation. Broadly-defined goals do not provide convenient benchmarks or justifications for satisficing, discourage excessive and premature focusing, and improve unstructured decision making performance.

Chapter 1 analyzed the effect of goal specificity on attention and task performance. Chapter 2 will broaden this analysis and will examine the effect of various commonly used motivational tools on the ability to notice important, accessible information and subsequent performance. For example, Chapter 2 will analyze the effect of goals that vary both in specificity and difficulty. Additionally, Chapter 2 will measure the effect of competitive incentive schemes and performance feedback systems on attention and performance.

Furthermore, Chapter 1 measured individuals' ability to notice and utilize accessible, relevant information in structured and unstructured decision making tasks exclusively. Chapter 2 will expand this analysis beyond decision making tasks. Specifically, in Chapter 2, I will measure individuals' ability to notice highly-salient, important information that serves their primary goals while they are focused on a less important/secondary, structured verbal task.

3. CHAPTER 2: WORKING HARD AT NOT SEEING THE OBVIOUS

3.1 Overview

Our attentional capacity is surprisingly limited. Daniel Simons and his colleagues provided perhaps the most thought provoking demonstration of our attentional limits in their video of the "invisible gorilla", which garnered more than 13 million views on YouTube. In this video, a gorilla walks among a group of ball players, thumps her chest and is clearly visible in the middle of the screen for several seconds. Surprisingly, in controlled laboratory experiments, about 65% of viewers of this video fail to notice the gorilla because they are too focused on counting the ball passes among the players, as instructed (Simons & Chabris, 1999; Simons, 2000a). Yet, most people would agree that it is more important to be aware of a gorilla lurking around than keeping accurate count of ball passes.

Suboptimal allocation of attention to less critical stimuli at the expense of more critical, yet highly-salient information often has costly and even catastrophic consequences for individuals, organizations and the society (Bazerman, 2014; Bazerman & Watkins, 2004; Chabris & Simons, 2009; Hendricks, Fell & Freedman, 2000). For example, pedestrians and drivers often get into serious traffic accidents while talking on their cell phones (Hendricks et al. 2000; Strayer, Drews & Johnston, 2003). Drivers cause injury to others because they overlook less frequent or unexpected hazards (e.g., pedestrians on a left-turn or motorcycles) and focus only on expected and more frequent hazards (e.g., other cars) (Strayer, et al., 2003). A US Department of Transportation safety report has dedicated a whole accident category to "driver inattention and perceptual errors" and an accident sub-category of "looked, did not see", because accidents caused by avoidable attentional failures are so common (Hendricks, et al., 2000; Hyman, Boss, Wise, McKenzie, & Caggiano, 2009; Strayer, et al., 2003).

The type of noticing failures and deficient attentional strategies described above are examples of *bounded awareness* and *inattentional blindness*. While inattentional blindness refers to the unintentional tendency to miss highly salient visual stimuli specifically (Chabris & Simons, 2009), bounded awareness refers to the unintentional tendency to miss or overlook highly accessible, critical information (visual stimuli or otherwise) (Bazerman & Chugh, 2005).

Occurrences of bounded awareness or inattentional blindness are not confined to the domain of traffic accidents. Inattentional blindness and bounded awareness are very costly to many organizations in industries as diverse as accounting, finance, medicine, national security, police force and transportation (Bazerman, 2014; Chabris & Simons, 2009; Financial Times, 2013; Drew, Vo, & Wolfe, 2013). Yet, most organizations do not take any precautions against such predictable and systematic attentional failures (Bazerman, 2014; Bazerman & Watkins, 2004). This organizational inertia can be attributed to a phenomenon called "illusion of attention" or "inattentional/change blindness blindness" – overconfidence in our ability to see, notice and process information that is salient and easily accessible to us (Bazerman, 2014; Levin, Momen, Drivdahl, & Simons, 2000; Chabris & Simons, 2009).

In this chapter, I will demonstrate that organizations not only fail to take precautions against these attentional failures, but consistently and inappropriately utilize motivational tools that increase bounded awareness and, ironically, decrease performance. Past research on attentional failures has focused on exploring the properties of stimuli that affect individuals' ability to notice salient and relevant objects such as uniqueness, color contrast or spatial proximity (Most, et al., 2005; Simons, 2000b; Simons & Rensink, 2005). In contrast, this chapter focuses on examining the attributes of the social or organizational context that affect perceivers'

ability to notice, and aims to identify motivational tools that would optimize individuals' attentional strategies and subsequent performance.

3.2. Hypotheses

3.2.1. Motivational tools commonly used in organizations and attentional failures

Scholars have long prescribed the use of specific and challenging goals, competitive, winner-takes-incentive schemes and comparative performance feedback systems to increase employee motivation, focus and performance (Locke & Latham, 2002; Lazear, 2000; Prendergast, 1999). Indeed, many organizations utilize these types of motivational tools frequently (Charness, et al., 2014; Locke & Latham, 1990; Ordóñez et al., 2009). Therefore, it is important to thoroughly analyze the effect these motivational tools have on individuals' attention, and ability to notice and incorporate available, high-priority information. Without noticing (and ultimately utilizing) all available and relevant information, organizations cannot make informed and optimal decisions (Bazerman, 2014).

I propose that these types of goal-setting and competitive tools can cause excessively narrow and rigid focus in organizational contexts that require agility, creativity and innovation. These motivational tools that are originally designed to bolster performance may interfere with individuals' ability to contend with unexpected information, opportunities and adversity, exacerbate bounded awareness and ironically decrease organizational performance.

Section 3.2.2 will present a hypothesis about the relationship among goal-setting, attention and performance, while Section 3.2.3 will examine the relationship among competitive, winner-takes-all incentive schemes and comparative performance feedback systems (i.e., feedback on an individuals' performance relative to others), attention and performance.

3.2.2. Goal-setting and failure to notice

Goal-setting (Locke & Latham, 1990; Locke & Latham, 2002) and goal-shielding research (Shah, et al., 2002) have argued that goals increase performance by "focusing and narrowing attention". In particular, goal-setting and motivation literature have advocated the use *specific and challenging goals* (Locke & Latham, 2002; Locke & Latham, 1990) to increase performance. According to goal-setting theory, specific and challenging goals prompt individuals to capture and process relevant information in the most efficient and effective manner, and have a categorically positive effect on attention and subsequent task performance (Locke & Latham, 2002). However, this is not a comprehensive description of the effect of goals on attention.

Goals increase individuals' drive and motivation (Locke & Latham, 2002). Increases in drive and arousal, in turn, reduce the "range of cues/information" individuals notice and process (Easterbrook, 1959; Eysenck, Derakshan, Santos & Calvo, 2007). Highly aroused/driven individuals are especially likely to ignore information at the "periphery" of their area of concentration (Easterbrook, 1959). Furthermore, at higher arousal levels, individuals have more trouble shifting their attention from one set of information /stimuli to another; their attentional strategies become rigid (Easterbrook, 1959; Eysenck, et al., 2007). In other words, when individuals' motivation and arousal increase due to the goals they are assigned, they focus on a smaller subset of information in a more rigid manner. Therefore, the effect of goals on attention can be more accurately described as a narrowing and rigidizing effect rather than a categorically positive focusing effect.

In some situations, a rigid, narrow focus can help individuals to process relevant information efficiently and effectively. For example, a narrow and rigid focus would not allow individuals to be distracted by irrelevant information (Locke & Latham, 2002). At other times,

rigid, narrow attentional strategies can be detrimental to task performance; in particular information that would be considered "at the periphery" – just because it falls under the current area of focus – might be overlooked even such information is relevant and important (Easterbrook, 1959; Eysenck, et al., 2007). Unexpected information, information that is in a different format, information from a different source and/or late-arrival information are more likely to be perceived as "peripheral information", and be missed when attentional focus becomes narrow and rigid.

Indeed, findings from inattentional blindness studies provide some support for the assertion that individuals are significantly less likely to notice these types of unexpected information even when they are very salient (Most, et al., 2005; Simons, 2000a; Simons & Rensink, 2005). Moreover, this stream of research demonstrates that the failure to notice salient information is not intentional, or the product of a conscious decision making (Chabris & Simons, 1999; Bazerman & Moore, 2013). Therefore, it would be natural to assume that unexpected information is likely to go unnoticed due to increased, goal-driven arousal and anxiety, even when attending to such information is critical for attaining individuals' primary goals and more important than any secondary task individuals are focusing on.

Goal-setting researchers prescribe that goals set at such extremely challenging levels that there is only 10-15% chance of attainment (Locke & Latham, 2002; Welsh & Ordóñez, 2014). Needless to say, these types of difficult to achieve goals are likely to induce considerable anxiety, stress and emotional arousal due to the low likelihood of success and the level of effort required (Welsh & Ordóñez, 2014). These negative emotions and arousal use a portion of individuals' limited attentional resources (Baumeister & Showers, 1986; Broadbent, 1971; Kahneman, 1973) and tend to narrow the scope of attention (Easterbrook, 1959; Fredrickson &

Branigan, 2005). Therefore, individuals who are given specific and challenging goals are likely to display extremely narrow and rigid attention.

In contrast, broad ("do-your-best") goals and specific and attainable goals are, by definition, more attainable. Therefore, they are likely to cause less arousal, anxiety and stress. As a result, individuals are likely to adopt broader and more flexible attentional strategies when given broad, do-your-best goals or specific and attainable goals than they do when they are given specific and challenging goals. Consequently, these individuals would also be more adept at shifting their focus from lower-priority information to emergent, higher-priority information that serves their primary goals. In other words, those who are assigned specific and attainable goals, or broad, do-your-best type of goals would be in a better position to capture high-priority unexpected information than those who are assigned specific and challenging goals. Formally:

> *Hypothesis 4: Compared to those who are assigned specific and challenging goals, individuals who are assigned specific and attainable goals or broad, do-your-best goals are more likely to notice unexpected and salient information critical to the attainment of their primary objectives while they are focused on a less important task.*

In other words, I hypothesize that specific and challenging goals can cause excessive and rigid focusing, and lead individuals to miss unexpected yet highly accessible and important information that deserves prioritization. Put differently, I propose that broad, maximization type of goals and specific, attainable goals are more appropriate when changes or uncertainty in the organizational environment require that individuals use sophisticated and flexible attentional strategies, and shift their attention from one information set to another.

3.2.3. Competition and Failure to Notice

Organizations often use winner-takes-all type of incentive schemes (e.g., employee of the month awards, exclusive prizes or bonuses for top performers) and comparative performance feedback systems (e.g., 360º reviews) to foster intraorganizational competition in the hope that it will increase employee motivation and performance (Ariely, Gneezy, Loewenstein & Mazar, 2009; Charness, et al., 2014; Lazear, 2000; Mas & Moretti, 2009). However, similar to specific and challenging goals, these types of extremely competitive incentive schemes and performance feedback systems are likely to cause significant amounts of anxiety, stress and negative arousal (Ariely, et al., 2009; Baumeister & Showers, 1986) and might detrimentally affect attentional performance.

While competing against somebody else might not be as difficult as trying to achieve a goal with a 10% chance of success, competition, by itself, tends to increase negative arousal and anxiety levels (Baumeister, 1984). Negative arousal and anxiety levels escalate when competitive pressures on individuals increase. Competitive pressures increase when: (1) competitions feature performance contingent rewards or punishments (e.g., bonus for winning or getting fired for losing), (2) there is an audience (e.g., judgment of coworkers who are not involved in the competition), (3) losing in the competitions is harmful to the way individuals view themselves (i.e., losing is associated with high levels of ego threat) (Baumeister, 1984; Baumeister & Showers, 1986). Because competitions with winner-takes-all type incentive schemes and comparative performance feedback systems feature many of these characteristics, they maximize competition related pressure, drive, anxiety and negative arousal (Ariely, et al., 2009; Baumeister & Showers, 1986).

As mentioned previously, increased drive, anxiety and negative arousal lead to excessively narrow, rigid attentional strategies, increasing the likelihood that accessible, high-priority information will be overlooked (Ariely, et al., 2009; Baumeister & Showers, 1986; Easterbrook, 1959; Fredrickson & Branigan, 2005), especially when such information is unexpected, comes at an unexpected time or from an unexpected source and, therefore, presents itself at the periphery of the attention span (Easterbrook, 1959; Chabris & Simons, 2009).

When individuals are not asked to compete with others directly, given flat-wages, and are provided with feedback only on their own performance, most of the factors that induce competitive pressure, anxiety and negative arousal are either eliminated or minimized. Consequently, compared to individuals who are given competitive incentives and comparative performance feedback, individuals working under these conditions are more likely to use broader, more flexible attentional strategies, shift their attention from one information set to another as needed, and capture any unexpected (yet accessible and salient) information that serve their primary purposes. Formally:

> *Hypothesis 5: Compared to those who are in competitions with winner-takes-all incentive schemes and comparative performance feedback, individuals who are given flat wages and feedback on their own performance are more likely to notice unexpected, salient information that is critical to attainment of their primary objectives while they are focused on a less important task.*

To summarize, I hypothesize that highly-competitive incentive and performance feedback systems lead to excessively narrow and rigid focus and increase the likelihood that important and accessible information will be missed. Moreover, I propose that non-competitive incentive schemes or performance feedback systems that focus on individual accomplishment might be

more appropriate for situations where individuals are expected to capture and respond to unexpected, yet important information, opportunities and threats.

3.2.4. Present Research

Three laboratory experiments tested whether specific and challenging goals (Study 5), and competitive schemes (winner-takes-all incentives with comparative performance feedback) (Studies 6 and 7) lead to excessive and rigid focus on secondary tasks/stimuli at the expense of unexpected, yet highly salient information critical to the attainment of individuals' primary objective/task.

Two different tasks and participant populations were used in the three studies to increase the validity and generalizability of results. Study 5 used the student participant pool of a laboratory located in a top-tier North American university, while Studies 6 and 7 used participants from Amazon's Mechanical Turk platform. An anagram task (with a z-tree interface; Fischbacher, 2007) was used in Study 5; Studies 6 and 7 utilized a word matching task (with a Qualtrics interface).

In Studies 5 and 6, the overlooked information that served participants' primary goals was not relevant to the participants' secondary goals/task. In Study 7, the overlooked information that served participants' primary goals was also relevant to the participants' secondary task/goals; indeed, noticing the information relevant to primary goals was highly likely to increase performance on the secondary task.

Finally, Study 7 explored the mediating role of increased drive and arousal on the relationship between motivational tools and attentional performance by collecting information on participants' level of arousal and anxiety.

3.3. Study 5

3.3.1. Study 5 Methods

Study 5 examined whether, compared to specific and challenging goals, broadly-defined do-your best goals or specific and attainable goals improve individuals' ability to shift their focus from less relevant stimuli to unexpected, yet more important, salient stimuli.

Participants and design. Two hundred and one students (46% male; M_{age} = 21.32, SD = 2.40) from the standing participant pool of a top-tier American university participated in the study for monetary compensation. They were randomly assigned to one of the three conditions: specific and challenging goal, specific and attainable goal, or broadly-defined, do your best goal.

Procedures and goal conditions. Upon checking in, all participants received a *payment sheet*. Participants were informed that they were going to complete an anagram task which would involve creating 4-letter words out of scrambled letters. They were told that they would complete 15 anagram questions for a $15 flat participation fee. Finally, participants were informed that, during the study, there will be a separate opportunity to earn an additional $4 in bonuses. Thus, participants were aware that they could earn a bonus during the study but were not informed about the timing and delivery method of bonus payments. In previous studies of inattentional blindness, participants were completely uninformed about the unexpected stimuli they were about to be presented (e.g., the gorilla in the video) (Most, et al., 2005; Simons, 2000a). Therefore, the methods of this study are more conservative as they provide forewarning (albeit somewhat vague) to the participants about the unexpected stimuli.

Next, participants were given information on the user interface[3]. Participants submitted answers by clicking on the appropriate letters displayed on their computer screens and hitting the submit button. Participants had 30 seconds to work on each question. There was a 10 second

[3] The experiment was programmed in z-tree (Fischbacher, 2007).

waiting/resting period in between questions (participants were informed about these waiting periods at the beginning of the experiment). All participants completed a practice anagram question to get used to the interface.

After the practice question, participants were assigned goals. Past research on goal-setting argued that goals can consistently and effectively increase performance only when they are specific and set at challenging levels such that only 10-15% of task performers could attain goals (Locke & Latham, 2002). Based on the performance of participants in a previous study that utilized the same task (N=228, M = 4.13, SD =1.37), those in the specific and challenging goal condition were asked to identify "at least 6 words in each anagram question" (a level attainable for ~15% of participants in each question). Participants in the specific and attainable goal condition were asked to identify "at least 4 words in each anagram question" (a level attainable for ~50% of participants). Finally participants in the broad goal condition were asked to identify "as many words as possible in each anagram question".

Bonus opportunities. Anagram questions were presented on the upper 90% of the screen. Unbeknownst to the participants, in questions #3, #5, #10, and #13, participants were given instructions on earning four bonus payments on the lower 10% of the screen. Each of the four bonus words was worth $1 which translated into a bonus range of $0-4.

The instructions for bonus payments were increasingly salient. For example, the first set of bonus instructions in question # 3 were given in size-18 font in black, unbolded letters, while participants were instructed "For $1 bonus, write the word "dad" on your payment sheet during the waiting period" in bolded, bright orange letters in size-30 font in question #13.

Noticing rates and bonus pay. Once the participants completed the anagram task, we asked them which of the bonus words they noticed. The number of bonus words participants

noticed determined the amount of bonus the participants were able to earn during the study (i.e., $1 * the number of bonus words noticed; range $0-4) - the main dependent variable in the study.

Manipulation check. After the bonus question, we asked participants to rate the specificity (1 = "Very broad"; 7 = "Very specific") and difficulty (1 = "Very easy"; 7 = "Very difficult") of their assigned goals on a 7-point Likert scale.

Additional measures. Throughout the study, participants' performance on the anagram task (0-150 scale) was measured and recorded.

After the manipulation checks, participants were asked what their primary goal was for participating in the study using a multiple choice question (1 = "To advance my knowledge about the research conducted"; 2 = "To earn money"; 3 = "To help researchers collect data" 4 = "Other"). Next, participants were asked if they saw anything unexpected during the study. Finally, information on participants' gender, age, race and native language was collected.

3.3.2. Study 5 Results

Goal manipulation checks. We analyzed perceived goal specificity and difficulty by condition using a one-way ANOVA. There was a significant difference in perceived specificity and difficulty among the three goal conditions ($F(2,198) = 4.74$, $p = .01$, $\eta^2_p = .05$ for specificity and $F(2,198) = 68.71$, $p < .001$, $\eta^2_p = .41$ for difficulty) (See Table 6 for descriptive statistics on manipulation checks and behavioral measures). Simple contrasts revealed that the participants in the specific and challenging goal condition and specific and attainable goal condition perceived their goals to be more specific than did the participants in the broad-goal condition ($p = .004$ and $p = .024$, respectively). Furthermore, the participants in the specific and challenging goal condition perceived their goals to be more difficult than did the participants in the specific and attainable and broad goal conditions ($p < .001$).

Table 6. Manipulation checks and primary behavioral measures by goal condition

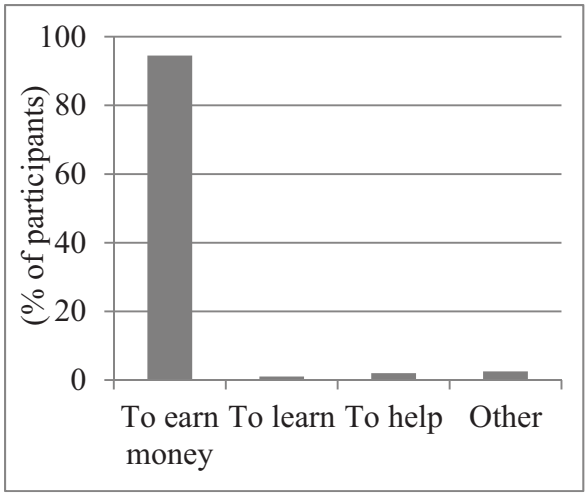
Goal Condition	Perceived Specificity	Perceived Difficulty	Bonus Word Noticing Rates (%)				Total Bonus Pay ($)	Score (nb. of words)
			1st	2nd	3rd	4th		
Broad	4.67 (1.46)	3.76 (1.40)	7	10	24	39	0.81 (1.22)	56.06 (18.87)
Specific & attainable	5.19 (1.27)	3.51 (1.56)	7	9	18	40	0.75 (1.13)	51.55 (15.42)
Specific & challenging	5.34 (1.24)	5.96 (1.09)	1	7	10	18	0.37 (0.92)	61.67 (15.24)

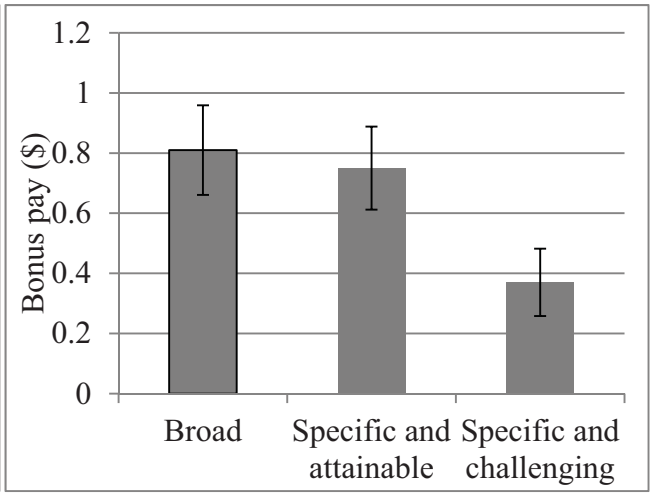
Numbers in parentheses are standard deviations.

Primary goal of participants. Unsurprisingly, almost all of the participants indicated that their primary goal in participating in the study was to earn money (95%) (see Figure 2).

Effect of goals on noticing and bonus payments. The bonus words participants noticed (and thereby the amount of bonus participants were able to earn) varied significantly by goal condition ($F(2,198) = 3.06$, $p = .049$, $\eta^2_p = .03$). As hypothesized, participants who were assigned the specific and challenging goal in the anagram task were significantly less likely to notice the bonus words and earned significantly less bonus pay than the participants in the broad goal condition and the specific and attainable goal condition ($t(127) = -2.32$, $p = 0.038$ and $t(127) = -2.09$, $p = .038$, respectively)[4] (see Figure 2 and 3). On average, participants in broad goal and specific and attainable goal condition earned 81 cents and 75 cents of bonus pay, while the participants in the specific and challenging goal condition earned only 37 cents.

[4] Correction applied for unequal variances. Levene's test (2, 198) = 4.95, p = .008.Without correction for unequal variances, the contrast test between specific and challenging condition and the broad goal condition is t(198) = -2.28, p = .024; the contrast test between specific and goal condition and the specific and attainable goal condition is t(198) = -1.97, p = .051).





Note: Error bars in Figure 3 are standard errors.

Figure 2. Primary goal of participants **Figure 3. Bonus pay by goal condition**

To summarize, those who were given specific and challenging goals had significantly more difficulty in capturing the unexpected, yet highly salient bonus instructions that served their primary purpose of maximizing payoffs. Specific and challenging goals caused excessive and rigid focusing, and interfered with individuals' ability to attend to emergent, important information that they needed to prioritize.

The inferior attentional performance of those in the specific and challenging goal condition was particularly pronounced as the task progressed and instructions for bonus payments became more salient (see Figure 4 and Table 6). For example, the difference between the noticing rates of participants in the broad goal condition and specific and challenging goal condition was 6% for the first bonus word (during question #3) (B = 1.67, SE = 1.11, exp(B) = 5.32, p = .132), 3% for the second bonus word (during question #5) (B = 0.37, SE = 0.61, exp(B) = 1. 45, p = .547), 14% for the third bonus word (during question #10) (B = 0.99, SE = 0.49, exp(B) = 2.69, p = .044), and 21% for the fourth bonus word (during question #13) (B = 1.07, SE = 0.41, exp(B) = 2.91, p = .008). The difference between the noticing rates of participants in the specific and attainable goal condition and specific and challenging goal condition was 6% for the

first bonus word (during question #3) (B = 1.67, SE = 1.11, exp(B) = 5.32, p = .132), 2% for the second bonus word (during question #5) (B = 0.20, SE = 0.63, exp(B) = 1.22, p = .753), 8% for the third bonus word (during question #10) (B = 0.63, SE = 0.51, exp(B) = 1.87, p = .220), and 22% for the fourth bonus word (during question #13) (B = 1.13, SE = 0.40, exp(B) = 3.09, p = .005).

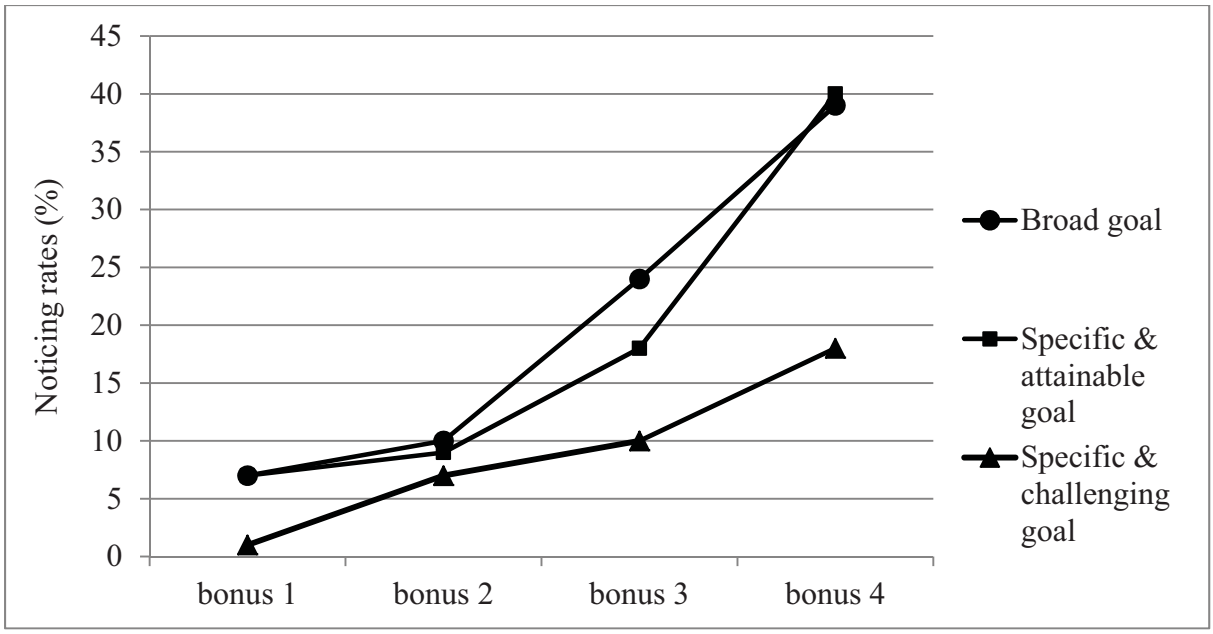


Figure 4. Noticing rates for each bonus word by goal condition

Anagram task performance. Performance on the anagram task varied by goal condition ($F(2,198) = 6.25$, $p = .002$, $\eta^2_p = .06$). Participants in the specific and challenging goal condition scored higher (see Table 6) than those in the specific and attainable goal condition, and those in the broad goal condition ($t(198) = 10.12$, $p < .001$, $d = 0.66$ and $t(198) = 5.61$, $p = .052$, $d = 0.33$, respectively). However, as mentioned above, higher anagram task performance in the specific and challenging goal condition came at a cost – participants in this condition performed better at this flat-wage task but they – allocating their attention suboptimally – were more likely to miss the highly-visible bonus instructions that they valued the most.

The nature of (not) noticing. When asked whether they have seen anything unexpected at the end of the experiment, participants who noticed the bonus words commented on the bonus instructions they were given (e.g., "the words at the bottom of the screen"; "yes, the secret words at the bottom"). In contrast, the responses of the participants to this question demonstrated that they overlooked these bonus instructions unintentionally and non-consciously. These participants dismissed the question entirely (e.g., "No. I was looking for a way bonus payments would be assigned outside of the letter game due to lack of information about the bonus payments but did not see anything"; "not really"; "nope").

Summary. As predicted, specific and challenging goals resulted in rigid, excessive focusing. Compared to the participants who were assigned specific and attainable goals or broadly defined goals, participants who were assigned specific and challenging goals were significantly less likely to shift their attention from the less important stimulus (anagram task that yielded a flat wage regardless of performance level) to information that should have been prioritized based on participants' primary goals (i.e., to earn bonus payments and maximize pay).

3.4. Study 6

Study 5 focused on examining the effect of a single motivational tool commonly used in organizations – goal setting – on individuals' ability to attend to important, unexpected information that deserves prioritization. Study 6 will extend this analysis to typical intraorganizational competition schemes to determine whether these findings would generalize to motivational tools that strictly and rigidly focus attention on one dimension of performance.

3.4.1. Study 6 Methods

Study 6 will compare the attentional performance of individuals in competitive schemes (winner-takes-all pay combined with comparative performance feedback) to individuals in non-

competitive schemes (flat wages combined with non-comparative performance feedback) to determine whether competing individuals are less likely to notice unexpected, yet salient and high-priority information.

Participants and design. One hundred participants (55% male; M_{age} = 32.88, SD = 8.60) from Amazon's Mechanical Turk website participated in the study for monetary compensation. They were randomly assigned to one of the two conditions: competition and no competition.

Procedures and conditions. At the beginning of the study, participants were informed that they were going to solve a series of word puzzles which would involve identifying 4-letter words in a set of scrambled letters. They were told that they would complete 20 such word puzzles.

Next, participants in the competition condition were informed that they would be competing with another participant who has completed the same study. They were told that they would be paid a $2.5 participation fee for completing the study. Additionally, they were offered a $0.50 bonus provided that they scored higher than their competitor in the study (the competitor was a randomly selected individual who had participated in a pilot study (N=30)). In contrast, participants in the no competition condition were only told that they would be paid a $2.75 participation fee for completing the study. Therefore, expected value of the payments for completing the verbal task was the same in the two conditions (i.e., $2.75).

The competition manipulation was accomplished through the payment scheme described above (i.e., competitive, winner-takes-all versus non-competitive, flat wage), as well as performance feedback throughout the study. After each puzzle question, participants in the competition condition were informed of their own score as well as that of their competitor's. In

contrast, participants in the no competition condition were informed only of their own score after each question.

The task. After the instructions on payment scheme and performance feedback, participants received more information on the task and the user interface.

Participants were asked to look at a matrix of scrambled letters in the top portion of the screen. Right underneath the matrix of scrambled letters, they were given a list of 10 words. Some of these words existed within the matrix of scrambled letters, others did not. Under each word, there was a dropdown menu with two choices: "Yes" or "No". Participants were asked to search for each of these words in the matrix and indicate whether they existed within the matrix by clicking on "Yes" or "No" as appropriate; they had 30 seconds to work on each question. Before beginning the task, all participants completed a practice question to get used to the interface.

A slightly different task was used in Study 6 because the task used in Study 5 was programmed in z-tree and could not be deployed in a study conducted online. Furthermore, the average/baseline noticing rate in Study 5 was very low (16% across all words), suggesting a potential floor effect that made it difficult to capture the differences between conditions. Task deployed in this study required participants to naturally shift their gaze between the top and bottom of the screen (i.e., between the matrix of scrambled letters and the list of words) and was thus expected to increase baseline noticing rates and eliminate any potential floor effects.

Bonus opportunities. At the beginning of the experiment, participants in both conditions were informed that there would be an opportunity to earn additional bonuses of up to $3.00 during the study.

Word matching questions were presented on the upper 80% of the screen. Unbeknownst to the participants, in questions #3, #7, #11, #14, and #17, participants were given instructions on earning bonus payments on the lower 20% of the screen (e.g., "For $0.60 bonus, write the word "man" on your scratch sheet during score display"). Each of the five bonus words was worth $0.60 which translated into a bonus range of $0-3.

Once again, the instructions for bonus payments were increasingly salient. For example, in question #17, bonus instructions were in size-16 bolded letters while the first set of instructions in question # 3 were in size-12 font, unbolded letters.

Primary goal of participants. Once the participants completed the anagram task, participants were asked "What was your primary goal/purpose for completing this study?". The answer choices were "To earn money", "To pass time", "To learn", "To perform well on the puzzles" and "Something else".

Noticing rates and bonus pay. Next, participants indicated which of the bonus words they noticed, if any. The main dependent variable in the study was the amount of bonus the participants were able to earn. The amount of bonus participants earned was determined by the number of bonus words participants were able to notice (i.e., $0.60 * the number of bonus words noticed; range $0-3).

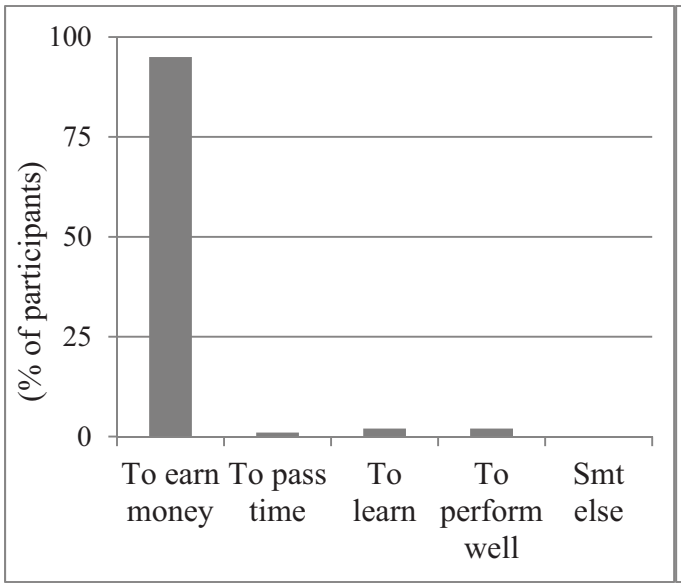
Performance on word matching task. Throughout the study, participants' performance on the word matching task was measured (1 point for each accurate answer; 0-200 scale) was measured.

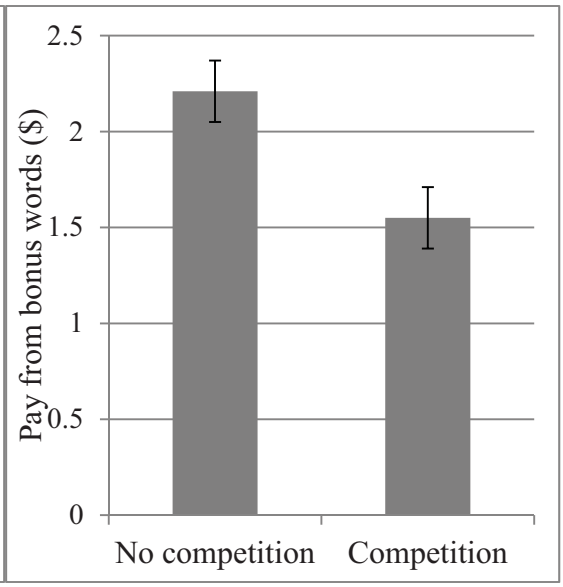
Additional measures. After entering any bonus words they noticed, participants were asked if they saw anything unexpected during the study. Finally, information on participants' gender, age, and native language was collected.

3.4.2. Study 6 Results

Primary goal of participants. Once again, almost all of the participants indicated that their primary goal in participating in the study was to earn money (95%) (see Figure 5).

Effect of competition on noticing and bonus payments. As hypothesized, participants in the no competition condition noticed significantly more bonus words and, therefore, earned significantly more bonus payments than the participants in the competition condition ($t(198) = 2.90$, $p = .005$, $d = 0.58$). These results demonstrate that, compared to the participants in the competition condition, participants in the no competition condition were able to use their attentional resources more optimally and flexibly, and fared significantly better with respect to their primary goal of earning money (see Figure 5 and 6).





Note: Error bars in Figure 6 are standard errors

Figure 5. Primary goal of participants **Figure 6. Bonus pay by goal condition**

As predicted, the overall noticing rate of bonus words with the word matching task was higher (63%) across all bonus words than it was with the anagram task (16%). Participants in the no competition condition were more likely to notice the bonus words than the participants in the competition condition throughout the study (see Figure 7 and Table 7). The difference between

the noticing rates of participants in the competition condition and no competition condition was 28% for the first bonus word (during question #3) (B = 1.16, SE = 0.42, exp(B) = 3.19, p = .006), 22% for the second bonus word (during question #7) (B = 0.97, SE = 0.43, exp(B) = 2.63, p = .024), 20% for the third bonus word (during question #11) (B = 0.89, SE = 0.43, exp(B) = 2.43, p = .039), 20% for the fourth bonus word (during question #14) (B = 0.94, SE = 0.45, exp(B) = 2.57, p = .034), and 20% for the fifth bonus word (during question #17) (B = 1.03, SE = 0.47, exp(B) = 2.79, p = .029). These results suggest that competitive schemes result in sustained excessive and rigid focus.

Table 7. Primary behavioral measures by competition condition

Condition	Pay from bonus words	Total pay	Bonus Word Noticing Rates (%)					Score (# of words)
			1st	2nd	3rd	4th	5th	
No competition	2.21 (1.15)	2.33 (1.17)	60	74	74	78	82	81.10 (34.62)
Competition	1.55 (1.13)	1.64 (1.21)	32	52	54	54	58	92.00 (29.16)

Numbers in parentheses are standard deviations.

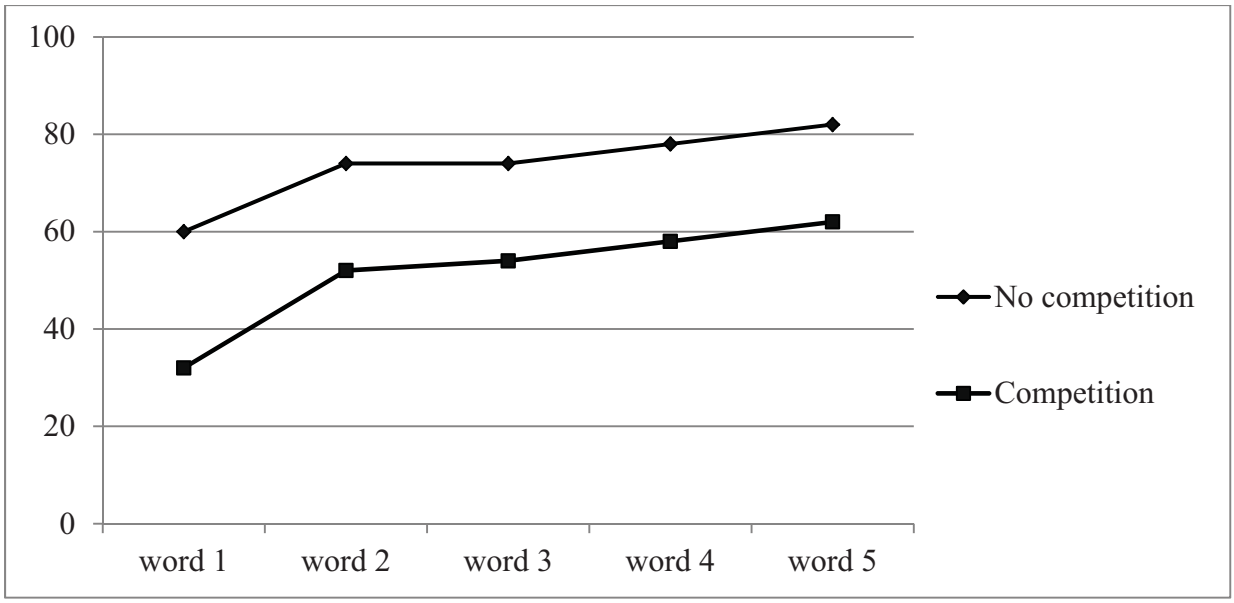


Figure 7. Noticing rates for each bonus word by competition condition

Performance on word matching task and total pay. Participants in the competition condition performed marginally better on the word matching task than the participants in the no competition condition ($t(198) = 1.70$, $p = .092$, $d = 0.34$). On average, participants in competition scored 92.00 while participants who were not competing scored 81.10 points (see Table 7).

As a reminder, participants in the no competition condition earned a flat wage of $2.75 for completing the word matching task. Therefore, their total pay was equal to $2.75 plus any bonus payments from noticing bonus words. On the other hand, participants in the competition condition earned a flat wage of $2.50 plus a $0.50 bonus when they scored higher than their competitor (with a total expected value of $2.75). Therefore, the total pay of competing participants were equal to $2.50 plus $0.50 bonus if they scored higher than their competitor, plus any bonus payments from noticing bonus words.

As mentioned previously, participants in the competition condition performed only marginally better than the participants in the competition condition. Moreover, bonus payments related to bonus words were much higher than the bonus competition condition participants

could get by beating their competitor ($3 vs $0.50). Therefore, unsurprisingly, participants in the no competition condition earned significantly more money in the study overall than the participants in the competition condition by allocating their attention more broadly and flexibly to bonus words over the word matching task, and by noticing more bonus words ($t(98) = 3.47$, $p = 001$, $d = 0.70$). On average, participants who did not compete earned a total pay of $4.96, while competing participants earned only $4.14 (see Table 7).

To summarize, participants in competitions were significantly less likely to capture the unexpected (yet very salient), higher-paying bonus words that served their primary purpose of maximizing payoffs. In return, they performed only marginally better than non-competing participants on the lower-paying word matching task. Put differently, competitive pressures caused excessive and rigid focusing, and interfered with individuals' ability to attend to emergent information of highest priority.

Nature of (not) noticing. Once again, those who did not notice the bonus words missed these words unintentionally. When asked whether they have seen anything unexpected at the end of the experiment, participants who did not notice the bonus words dismissed the question by making comments such as "nope" "no" (one participant mentioned "I saw something at the bottom that said bonus, but I missed it and it makes me sad"), while participants who noticed mentioned the bonus words (e.g., "yes, the bonus words at the bottom"; "the bonus words were a surprise"; "didn't expect to see the 'secret' words at the bottom of the puzzle").

3.5. Study 7

In Studies 5 and 6, the unexpected information related to the bonus words was not relevant to the word matching task the participants were otherwise engaged in and did not benefit

participants' performance on the word matching task (nevertheless, bonus words was the higher-priority information given participants' primary goals).

Research on inattentional blindness demonstrates that individuals are not aware of the highly-salient stimuli they overlook (Chabris & Simons, 2009; Levin, et al., 2000). Findings from Studies 5 and 6 also suggest that participants' failure to notice the bonus words is unintentional and not a product of conscious decision making. Therefore, I predict that individuals who are given attention-narrowing motivational tools are likely to miss unexpected, salient information even when that information is directly relevant to the tasks they are performing (e.g., the anagram or word matching task in the experiments).

In other words, I hypothesize that individuals would ironically overlook information that can boost their performance on the task they are working on by concentrating too hard on that very task. Study 7 tested this thesis; it examined whether competitive incentives and performance feedback systems increased the likelihood that individuals will miss unexpected information that is directly relevant to the current task at hand (i.e., word matching task) alongside highest-priority information related to earning bonus payments.

3.5.1 Study 7 Methods

Participants. One hundred participants (63% male; M_{age} = 32.59, SD = 10.82) from Amazon's Mechanical Turk website completed the study for monetary compensation. They were randomly assigned to one of the two conditions: competition and no competition.

Procedures. Study 7 followed mostly the same procedures as Study 6. Any exceptions will be noted below.

Bonus instructions. Study 6 participants received bonus payments whenever they noticed unexpected, yet highly salient information regarding bonus words (i.e., "For $0.60 bonus, write

the word “man” on your scratch paper during score display”). Consequently, they increased their pay in line with their primary goals. However, their performance on the word matching task was not improved by noticing of the bonus words. In contrast, Study 7 participants were given information that helped them increase their performance on the word matching task alongside bonus payments. In other words, participants were given unexpected, yet salient information that pertained to the current task at hand (i.e., word matching task) as well as information that helped them reach their primary goals (i.e., earn more money).

Specifically, in Study 7, each time participants noticed a bonus word they were given an additional five seconds to solve each of the last five word matching questions (question #15-20) (e.g., “For $0.60 bonus and to gain a time advantage on the word task, write the word ‘Cat’ on your scratch sheet during score display”) . For example, if a participant noticed two bonus words in total, that participant would have 40 seconds (instead of only 30 seconds) to solve each of the last five questions (i.e., questions 15 through 20). These unexpected bonus instructions were presented in question #3, #5, #7, #11, and #14 in an increasingly salient manner as described in Study 6.

Noticing rates. Participants were asked whether they noticed any of the bonus instructions after completing Question #15. The main dependent variable was the number of times participants noticed the unexpected, yet salient instructions on how to earn bonus payments and how to gain extra time to solve the word matching questions. The number of instructions participants noticed determined the amount of bonus the participants were able to earn during the study (i.e., $0.60 * the number of bonus words noticed; range $0-3) and the amount of time advantage participants gained in each of the last five word matching questions (i.e., 5 seconds * the number of bonus words noticed; range 0-25 seconds).

Performance on word matching task. Throughout the study, participants' performance on the word matching task was measured (1 point for each accurate answer). We separately recorded participants' performance on the first 15 word matching questions (0-150 scale) and the last 5 word matching questions (0-50 scale), because participants could earn a performance-boosting advantage (more time to solve questions) for the last 5 questions by noticing the unexpected instructions.

Additional measures. As mentioned previously, increased drive/arousal and anxiety were theorized to prompt narrow and rigid attention (Easterbrook, 1959; Baumeister & Showers, 1986). Therefore, in Study 7, we examined whether competitive incentives and performance feedback systems led to increased arousal/drive and anxiety, and whether this proposed increase in arousal and anxiety eventually resulted in excessively narrowed and rigid focus (i.e., failure to notice the bonus instructions).

To study arousal/drive and anxiety levels, we asked participants to rate their level of arousal ("Please rate the degree to which you found the word task dull or stimulating" 1 = "Extremely dull"; 7 = "Extremely stimulating") and anxiety ("How relaxing or stressful was it to complete the word task?" 1 = Extremely relaxing"; "7 = Extremely stressful") during task performance on a 7-point Likert scale.

3.5.1 Study 7 Results

Primary goal of participants. Once again, almost all of the participants indicated that their primary goal in participating in the study was to earn money (92%).

Effect of competition on noticing and bonus payments. As hypothesized, participants in the no competition condition noticed significantly more bonus instructions and, therefore, earned significantly more bonus payments than the participants in the competition condition (t(198) =

2.80, p = .006, d = 0.56). On average, participants in the no competition condition earned $2.15 in bonus payments while participants in the competition condition earned only $1.49 (see Table 8). These results demonstrate that, compared to the participants in the competition condition, participants in the no competition condition were able to use their attentional resources more optimally and flexibly, and fared significantly better with respect to their primary goal of earning money.

Competition resulted in sustained excessive and rigid focus; participants in the no competition condition were more likely to notice the bonus words than the participants in the competition condition throughout study (see Table 8). The difference between the noticing rates of participants in the no competition condition and competition condition was 24% for the first bonus word (during question #3) (B = 0.99, SE = 0.41, exp(B) = 2.68, p = .017), 20% for the second bonus word (during question #5) (B = 0.82, SE = 0.41, exp(B) = 2.26, p = .046), 20% for the third bonus word (during question #7) (B = 0.86, SE = 0.42, exp(B) = 2.37, p = .041), 20% for the fourth bonus word (during question #11) (B = 0.94, SE = 0.45, exp(B) = 2.57, p = .034), and 26% for the fifth bonus word (during question #14) (B = 1.41, SE = 0.50, exp(B) = 4.10, p = .005).

Table 8. Primary behavioral measures by competition condition

Condition	Time gained for word task (sec)	Pay from bonus words ($)	Total pay ($)	Bonus Word Noticing Rates (%)					Score (First 15 Qs)	Score (Last 5 Qs)
				1st	2nd	3rd	4th	5th		
No competition	17.90 (8.93)	2.15 (1.15)	4.90 (1.07)	58	64	72	78	86	61.64 (24.14)	29.10 (8.05)
Competition	12.40 (10.65)	1.49 (1.28)	4.23 (1.44)	34	44	52	58	60	70.30 (21.86)	25.42 (8.75)

Numbers in parentheses are standard deviations.

Effect of competition on noticing and extra time gained on word task. As hypothesized, compared to the competing participants, participants in the no competition condition performed significantly better in terms of capturing the unexpected yet salient information that was relevant to the word matching task ($t(98) = 2.80$, $p = .006$, $d = 0.56$). Consequently, participants in the no competition condition had an average of extra 17.9 extra seconds to solve each of the last 5 word matching questions. In contrast, participants in the competition condition earned only 12.4 extra seconds to complete those questions (see Table 8).

Performance on word matching task. On the first 15 word matching questions, participants in the competition condition performed marginally better on the word matching task than the participants in the no competition condition ($t(98) = 1.88$, $p = .063$, $d = 0.38$). However, participants in the no competition condition performed significantly better on the last five questions because, earlier in the study, non-competing participants were more likely to notice the unexpected, yet salient bonus instructions that gave them a time advantage on these final five questions ($t(98) = 2.19$, $p = .031$, $d = 0.44$). Consequently, over all 20 of the word matching questions, there was no significant difference in task performance of those who competed ($M = 95.72$) and those who did not ($M = 90.74$) ($t(98) = 0.84$, *n.s.*).

Total pay. Because non-competing participants were significantly better than competing participants in noticing the unexpected yet clearly visible instructions that gave them relatively bonus payments and extra time to solve the final 5 word matching questions, non-competing participants earned significantly more than competing participants ($t(98) = 2.64$, $p = .010$, $d = 0.53$). On average, participants who did not compete earned a total pay of $4.90, while competing participants earned only $4.23 (see Table 8).

To summarize, compared to non-competing participants, participants in competition condition were significantly less likely to capture the unexpected (yet very salient) instructions that granted them bonus payments and helped them reach their primary goal of maximizing pay. In return, they performed only marginally better than non-competing participants on the first 15 questions of the lower-paying word matching task. However, competing participants did not perform significantly better than non-competing participants on the word matching task as a whole because they were significantly more likely to miss the instructions that gave them a performance-boosting time advantage in the later phases of the word matching task.

Put differently, competitive pressures caused excessive and rigid focusing, and interfered with individuals' ability to notice information that served their primary goals (of maximizing pay) as well as information that was relevant to the word matching task they were focusing on.

Nature of (not) noticing. Once again, participants' comments indicated that those who did not notice the bonus instructions missed these instructions unintentionally (e.g., "I saw two of the bonus words. I'm wondering if I missed any others because I was so focused on the task"; "Yes the words at the bottom"; "There was a bonus word, and I'm thinking there's a good chance there was more than I found").

Additional measures. Participants who competed reported significantly higher levels of arousal/stimulation (M = 5.56 SD = 1.47) than participants who did not (M = 4.84 SD = 1.18) ($t(98) = 2.69$, $p = .008$, $d = 0.54$). Participants in competition condition (M = 4.54 SD = 1.33) also reported significantly higher levels of anxiety than did the participants in the no competition condition (M = 5.26 SD = 1.34) ($t(98) = 2.70$, $p = .008$, $d = 0.54$).

Next, we tested whether participants' self-reported arousal and anxiety levels mediated the relationship between competition and noticing using a bootstrapping procedure (Baron & Kenny, 1986; Hayes, 2012).

We found some support for partial mediation for self-reported arousal levels. Including participants' self-reported arousal levels in a regression model decreased the effect of competition on noticing rates (of unexpected yet salient bonus information) by 22% – the regression coefficient for competition was reduced from $\beta = -0.660$, $p = .006$ to $\beta = -0.515$, $p = .034$ (95% bias-corrected CI = [-0.342, -0.040]) – while the arousal/stimulation scores predicted noticing rates ($\beta = -0.202$, $p = .023$).

We also found support for partial mediation for self-reported anxiety levels. Including participants' self-reported anxiety/stress levels in a regression model decreases the effect of competition on noticing rates (of unexpected yet salient bonus information) by 30% – the regression coefficient for competition was reduced from $\beta = -0.660$, $p = .006$ to $\beta = -0.462$, $p = .051$ (95% bias-corrected CI = [-0.436, -0.049]) – while the anxiety/stress scores predicted noticing rates ($\beta = -0.276$, $p = .002$).

3.6. Chapter 2 General Discussion

3.6.1. Theoretical and practical contributions

Findings from three laboratory experiments show that some motivational tools commonly used by organizations lead to excessively narrowed attention. In particular, specific and challenging goals, and winner-takes-all type incentive schemes coupled with comparative performance feedback systems (e.g., 360° reviews) prompt excessive, rigid focus and increase individuals' propensity to miss unexpected, yet highly important and accessible information.

Findings from Study 5 contribute to an existing stream of research on the negative effects of specific and challenging goals on performance (Earley et al., 1989a; Gilliland & Landis, 1992; Heath, Larrick & Wu, 1999; Schweitzer et al., 2004; Staw & Boettger, 1990; Welsh & Ordóñez, 2014). Additionally, results from Study 5 show that goal level or difficulty not only has an energizing or motivational effect (Locke, et al., 1989) but also an attentional or focusing effect. Specifically, current findings demonstrate that goal difficulty shrinks the range of data individuals consider, and negatively affects individuals' ability to capture unexpected, yet highly relevant and salient information.

Furthermore, results from Studies 6 and 7 contribute to an established stream of research that focuses on the negative effects of competitive incentive schemes (Ariely et al., 2014; Baumeister & Showers, 1986; Eriksson, Poulsen & Villeval, 2009; Harbring & Irlenbusch, 2011) and performance feedback systems (Charness et al., 2014; Kilduff, et al., 2010; Moran & Schweitzer, 2008). Current findings demonstrate that tournament-type incentive schemes and comparative performance feedback systems prompt excessively narrow and rigid focus. Rigid and narrow focus might explain why individuals enter into competitions they cannot win (Camerer & Lovallo, 1999) and why they ignore important, salient information in competitive negotiations (Idson, Chugh, Bereby-Meyer, Moran, Grosskopf, & Bazerman, 2004).

Additionally, this chapter establishes a link between motivation literature (more specifically, competition and goal-setting literature) and attention literature (Chugh & Bazerman, 2007; Bazerman & Chugh, 2005; Simons, 2000a; Most et al, 2005) by examining the organizational/contextual factors that increase bounded awareness and inattentional blindness. Studies 5 through 7 identify specific motivational tools (i.e., specific and challenging goals, and winner-takes-all type incentive schemes coupled with comparative performance feedback

systems) that escalate the tendency for bounded awareness and inattentional blindness. In all experiments, participants who received these types of motivational tools were less likely to notice unexpected yet crucial and salient information, and performed suboptimally in terms of their primary goals.

Furthermore, current findings provide support for existing theories on the relationship between arousal and attention that assert increased arousal or drive causes a decrease in the "range of cues" noticed (Easterbrook, 1959; Eysenck, et al, 2007). In all three experiments, participants noticed and processed a smaller subset of available and relevant information when their drive increased due to goal-setting or competitive schemes. In particular, results are consistent with Easterbrook's prediction (1959) that when attention narrows and becomes rigid due to increased arousal, even highly-relevant and accessible information will be discarded provided that such information lies outside the individuals' current area of concentration.

In all three experiments participants who noticed less and performed worse in terms of their primary goals had to deal with an extra level of adversity; in Study 5, this adversity was posed by specific and challenging goals; in Studies 6 and 7, competitive incentive and performance feedback systems represented adversity. "Threat rigidity thesis" proposes that individuals respond to adversity by a "restriction in information processing, such as narrowing in the field of attention, a simplification in information codes, or a reduction in the number of channels used" (Staw, Sandelands, & Dutton, 1981, p. 502). Therefore, current findings provide support for the proposed psychological mechanisms underlying the threat rigidity effects (Staw, et al., 1981).

Changes in "high velocity" industries such as technology are rapid, irregular and unexpected; responding to changes in these kinds of environments requires organizations to

notice crucial information efficiently as it surfaces unexpectedly (Eisenhardt, 1989; Eisenhardt & Martin, 2000). The same is applicable to industries where organizational learning, innovation and "exploration" activities are critical for optimal performance (Benner & Tushman, 2003; March, 1991; Tushman & O'Reilly, 2006; O'Reilly & Tushman, 2008). In all of the experiments conducted in this chapter, individuals were less likely to capture unexpected opportunities (e.g., the opportunity to earn more money) and changes in the environment (e.g., emergence of new, important information about bonus words or bonus time) when given specific and challenging goals or competitive incentives and performance feedback. Therefore, current findings suggest that organizations that strive to be agile and innovative, and those that operate in high-velocity industries should be wary of utilizing these types of motivational tools to increase performance; these types of motivational tools designed to increase performance can ironically harm performance in these types of industries.

More generally, the results indicate that organizations need to carefully consider the characteristics of their industries and environment, and their organizational priorities before they design and implement motivational tools to increase performance. In Study 5, participants who were given specific and challenging goals performed better on the verbal task that did not require noticing of any unexpected information, opportunities or shifts in the task environment. However, they performed significantly worse in terms of their primary goals because they were less likely to capture the unexpected opportunity to earn bonus payments. Similarly, in Studies 6 and 7, compared to the participants who did not compete, competing participants did marginally better on the routine, structured verbal task but were significantly less likely to notice unexpected, important information and earned significantly less money. These findings show that organizations would be better off using motivational tools that prompt narrow focus (e.g.,

specific and challenging goals, winner-takes-all incentives and 360 reviews) for "exploitation" activities that do not require innovation, creativity and responding to unexpected information or environmental shifts. In contrast, organizations would be better served by motivational tools that prompt broad focus (e.g., broad, maximization type of goals, incentive schemes and performance feedback that focus on individual growth and accomplishment) for "exploration" activities that require innovation and creativity, and when organizational priorities dictate that employees be responsive to unexpected shifts, opportunities and threats (Benner & Tushman, 2003; March, 1991; Tushman & O'Reilly, 2006). However, it should be noted that all organizations need to innovate, respond to changes in the industry landscape, and tackle unexpected adversity at some point during their organizational life cycle (Staw et al. 1981). In other words, even those individuals who are in "exploitation" industries or jobs might need to allocate their attention more flexibly and broadly in some circumstances. Therefore, managers need to be aware of the pros and cons of each motivational tool they use at all times, and should not presume that these tools that have been championed for their tendency to "focus attention" are appropriate in all situations.

3.6.2. Future directions and limitations

Study 7 examined the mediating role of increased arousal and anxiety on the relationship between motivational tools that narrow attention and bounded awareness, and found support for partial mediation. However, this analysis relied on participants' self-reports of their arousal/stimulation and anxiety level after task performance. Therefore, a fruitful avenue for future research would be a more thorough and comprehensive study of the mediating role of increased arousal and anxiety on the relationship between certain types of motivational tools and

bounded awareness. Such research should ideally include physiological measures of arousal and anxiety during task performance.

In Study 5, we compared the attentional performances of individuals who received specific and challenging goals (i.e., such that an estimated 85% of participants would attain their assigned goal) to those who received broad, maximization type of goals (i.e., "do your best" goals), or specific and attainable goals (i.e., such that an estimated 50% of participants would attain their assigned goal). As mentioned previously, the extremely challenging performance levels used in "specific and challenging" goal condition was dictated by the prescriptions of previous goal-setting research (Locke & Latham, 1990). We found that these extremely challenging goals were more likely to cause bounded awareness. Future research should examine the effect of goal level on attentional strategies more granularly to determine whether goal levels that can be attained by 51-85% of individuals cause a similar negative effect on attention and performance.

Similarly, in Studies 6 and 7, we focused on examining the effect of tournament (i.e., winner-takes-all) type of incentives and highly comparative performance feedback systems (i.e., individuals received continuous feedback on their own and competitor's performance) and found that these types of competitive schemes increase the likelihood that individuals miss unexpected, yet highly salient and crucial information. Yet, many other types of competitive incentive and performance feedback systems are available such as intermittent feedback on relative performance (Eriksson, et al., 2009). Therefore, future research can explore the effects of other competitive incentive schemes and performance feedback systems on individuals' propensity for bounded awareness and inattentional blindness.

3.6.3. Chapter 2 Conclusion

Specific and challenging goals, and winner-takes-all incentive schemes coupled with comparative performance feedback increase the likelihood that unexpected, yet highly-salient and important information will be missed. Findings in Chapter 2 show that organizations need to use these types of motivational tools with care in environments that require agility, innovation and creativity.

Chapter 1 and 2 focused on exploring the negative effects of motivational tools on task performance. However, the negative effects of goal-setting (Heath, et al., 1999; Ordóñez & Wu, 2014; Schweitzer et al., 2004) and competitive schemes (Baumeister, 1984; Camerer & Lovallo, 1999; Charness, et al., 2014; Harbring & Irlenbusch, 2011) are numerous and varied. In particular, specific and challenging goals, tournament-type incentive schemes, and comparative performance feedback increase the tendency for morally-questionable behavior such as cheating and sabotage (Charness, et al., 2014; Harbring & Irlenbusch, 2011; Schweitzer, et al., 2004). Therefore, Chapter 3 turns to exploring the effect of competitive schemes on propensity for sabotage and sabotage-like behavior (or, more generally, destructive competitive behavior). Departing from previous research on this subject and consistent with the theme of this dissertation, Chapter 3 explores the attentional causes of such destructive competitive behavior. Given strong gender differences in propensity for competitive behavior (Gneezy, Niederle & Rustichini, 2003; Niederle & Vesterlund, 2007), Chapter 3 also explores gender differences in propensity for destructive competitive behavior and attentional strategies that lead to the decision to engage in such competitive behavior.

4. CHAPTER 3: COMPETING AT ALL COSTS: DYSFUNCTIONAL COMPETITION AND GENDER

4.1. Overview

Competitive behavior is fostered in most societies. In some contexts, even destructive competitive behavior (e.g., intentional destruction of value, sabotage and sabotage-like behavior) is deemed acceptable if it enhances the likelihood of winning in a competition. Destructive competitive behavior is so common within organizations that career network sites and career coaches offer advice for how to deal with sabotage from coworkers and supervisors. The justification for destructive competitive behavior within organizations is often straightforward. Exerting effort to make one's high performing colleagues look bad can have high payoffs in organizations offering bonuses and promotions based solely on competitive metrics. Nevertheless, instigators of destructive competitive behavior often incur costs or risk incurring costs from displaying such behavior. Employees can get ostracized or fired when they bad-mouth colleagues' work to enhance their own career prospects. Corporate takeovers often leave shareholders of the acquiring as well as the acquired firm worse off (Andrade, Mitchell & Stafford, 2001). Politicians risk losing voters' support when they engage in negative campaigns intended to damage their opponents' reputations. In the sports arena, athletes often risk hurting themselves to compromise their competitors – contact with another player is the leading cause of injuries in sports competitions (Gessel et al., 2007).

Analyses of aggressive behavior in sports suggest that men may be more likely than women to engage in destructive competitive behavior at the risk of hurting themselves (Conroy et al., 2001). In sports played by both sexes, men get injured most often because of contact with another player, while women get injured primarily because of contact with the play apparatus or ground (Gessel et al., 2007; Nelson et al., 2007; Rechel et al., 2008). This gender difference may also emerge in organizations. Men may be more likely than women to engage in value-

destroying competitive behavior through corporate actions given that firms with higher numbers of female directors are associated with fewer and more profitable takeover deals (Levi, Li & Zhang, 2014).

Recent research points to cultural norms as a critical underpinning of gender differences in competitiveness (Gneezy, Leonard & List, 2009). In many cultures, men are often expected to and do select into and increase their effort in competitive settings, while women are expected to and do select into non-competitive settings (Croson & Gneezy, 2009; Gneezy, et al., 2003). Adhering to these normative dictates comes at a cost to both men and women. Past research has shown that women forego better financial outcomes by being too reluctant to display competitive behavior, while men hurt their financial prospects by being too eager to compete (Dato & Nieken, 2014; Niederle & Vesterlund, 2007). Gender differences in competitive behavior have been simultaneously and paradoxically offered as an explanation for the persistently low numbers of women in top leadership positions (Gneezy et al., 2003) and the higher likelihood that followers of female, relative to male, leaders view their bosses as transformational leaders (Eagly et al., 2003). Nevertheless, research has primarily problematized women's lower propensity to display competitive behavior and investigated interventions that would increase their willingness to compete (Niederle & Vesterlund, 2011; Niederle, Segal & Vesterlund, 2013; Wozniak, 2012).

Little is known about men and women's ability to evaluate benefits of competitive behavior against its costs in different competitive organizational contexts because prior research focused primarily on competitive behavior that confers pure benefits (and no costs) to the focal individual (Carpenter, Matthews & Schirm, 2010; Harbring & Irlenbusch, 2011), and on a single competitive context (i.e., winner-takes-all with no comparative performance feedback) that limits

variations in terms of expected costs and benefits of displaying competitive behavior (see Niederle & Vesterlund, 2011). To maximize possible payoffs across the range of contexts in which people can compete, both men and women need to accurately weigh the expected benefits against the expected costs of displaying competitive behavior and customize their behavior accordingly. This kind of assessment and behavioral customization requires that individuals carefully scrutinize the competitive context (e.g. number of competitors, incentives offered) (Camerer & Lovallo, 1999). This chapter analyzes men and women's ability to benefit from displays of competitive behavior across contexts that vary in the costs and benefits of competition.

The focus of this chapter is *destructive competitive behavior* – risky competitive behavior that aims to hurt the instigator's competitor(s) and has the potential to confer net losses or net gains to the instigator. An organizational analogue would be bad-mouthing a colleague at the risk of being ostracized, losing a promotion or getting fired. The chapter examines destructive competitive behavior in a set of organizational contexts that systematically vary in terms of competition intensity and expected payoffs derived from this kind of competitive behavior.

This research contributes to the understanding of gender differences in competitive behavior by investigating men's and women's propensity to engage in destructive competitive behavior in high and low intensity competitions. This chapter focuses on three organizational features that recognize, emphasize and reward competitive behavior: incentive structure (winner-takes-all v variable pay); performance feedback (presence or absence of social comparison information); and normative cues (competitive or non-competitive behavioral norms set by leader(s)). These contextual factors: (1) establish expected net payoffs of competitive behavior in most organizations (i.e., both the level of payoffs and (un)certainty associated with payoffs)

(Carpenter, et al., 2010; Charness, et al., 2014; Harbring & Irlenbusch, 2011; Salin, 2003; Wozniak, 2010); and (2) motivate gender differences in assertive behavior (Bowles, Babcock, & McGinn, 2005; Deaux & Major, 1987; Niederle & Vesterlund, 2007). Put differently, this chapter examines whether men and women distinguish organizational contexts where destructive competitive behavior is more "dysfunctional" (i.e., expected gross benefits are lower, more uncertain, and more likely to be overshadowed by expected costs) from those where such competitive behavior is more "rational" (i.e., expected gross benefits are higher, more certain, and more likely to outweigh associated costs). In answering this question, this body of work simultaneously explores whether organizations can reduce destructive competitive behavior by utilizing competition structures and normative behavioral cues that render expected net payoffs of destructive competitive behavior lower and more uncertain.

The results show that men engage in destructive competitive behavior at relatively high levels regardless of the context in which they are performing the task, while women's competitive behavior varies with expected payoffs. Women and men display a similar propensity for destructive competitive behavior in high intensity competitions, organizational contexts where situational cues signal such behavior is likely to maximize payoffs—settings with winner-takes-all payoffs, feedback on relative performance, and leaders who engage in destructive competition. In contrast, men are more likely than women to undertake destructive competitive behavior in ambiguous situations where expected net payoffs are lower and less certain—settings with variable pay, feedback on one's own performance only, and leaders who do not engage in destructive competition. Moreover, payoffs to destructive competitive behavior differed by gender. Comparing the earnings of participants who engaged in destructive competitive behavior to what they would have earned had they not done so, we find that

women's responsiveness to differences in the competitive context results in higher payoffs for women across treatments.

Prior research demonstrated that overconfidence can cause excessive or reflexive competitive behavior (Camerer & Lovallo, 1999). Findings in this chapter suggest that this type of competitive behavior can also be driven by bounded awareness (Chugh & Bazerman, 2007), a tendency to miss or ignore relevant information or contextual cues. In the studies described in this chapter, some individuals undertake costly sabotage "blindly" when they do not have information on their competitors' performance or the likely benefits of sabotage. This type of reflexive competitive behavior is more likely to be caused by a defensive competitive posture (i.e., anticipation of a loss) than by overconfidence (i.e., anticipation of a win).

Furthermore, the findings demonstrate that women are more likely than men to pay attention to contextual cues and curb costly sabotage behavior in response to changes in the competitive context. Consequently, women reap more net benefits than men when they engage in sabotage. These findings suggest that men are more likely than women to display reflexive competitive behavior, and men's higher (and less selective) propensity for competitive behavior might hurt rather than help them in some organizational contexts.

The remainder of this chapter is organized as follows: Section 4.2 introduces the concept of competition intensity and presents hypotheses about men's and women's behavior in different competitive contexts. Section 4.3 and Section 4.4 detail the procedures and findings testing differences in men's and women's likelihood of engaging in destructive competitive behavior in high competitive intensity and low competitive intensity settings (Study 8/Section 4.3) and high, low and mixed competitive intensity settings (Study 9/Section 4.4). Section 4.5 offers Study 10, which investigates men's and women's responsiveness to behavioral norms (i.e. behavioral

precedents set by others) regarding destructive competitive behavior. Section 4.6 is a general discussion of the findings across the three studies.

4.2. Hypotheses

Organizations use incentive schemes and performance feedback to induce intraorganizational competition. These two organizational tools determine the *competitive intensity* of the workplace, establish expected payoffs from competitive behavior, and influence men's and women's propensity to exhibit destructive competitive behavior (Charness et al., 2014; Chen, 2003; Garcia & Tor, 2007; Kilduff, et al., 2010). In *high-intensity competitions*, the focus is exclusively on performance *relative to others*, rather than on individual performance, growth and accomplishments. In *low-intensity competitions*, incentive schemes and performance feedback systems recognize, emphasize and reward *absolute levels of individual accomplishments and growth*, rather than exclusively emphasizing and rewarding performance relative to others.

High-intensity competitions involve winner-takes-all incentive schemes with high levels of social comparison. Winner-takes-all incentive schemes (e.g., employee of the month awards, certain types of up or out promotion systems) emphasize relative performance by rewarding employees only if they perform better than others (Kilduff, et al., 2010; Nalebuff & Stieglitz, 1983). Similarly, high social comparison performance feedback systems (e.g., 360º reviews) explicitly and emphatically compare a focal employee's performance to that of others. For example, in a high social comparison environment, a sales professional might be told during her annual performance review that she has generated $X amount of revenues compared to the $Y amount of revenues generated by her peer(s).

In contrast, organizations can structure workplaces as *low-intensity competitions*, using variable reward schemes and feedback systems emphasizing individual accomplishments. Under variable reward schemes, lower-performers are eligible to receive performance-based rewards, albeit smaller than the ones top performers receive. For example, in typical profit-sharing programs, organizations allow all employees to receive bonus payments as a function of their performance, though the top performer(s) would typically earn more than others. In low or no social comparison environments, performance feedback focuses on how an employee's performance has evolved over time or compare how an individual has performed against an objectively-defined performance benchmark. For example, a sales professional might be told that she has generated $X amount of revenues during the current year compared to the $Y amount of revenues she generated in the previous year, or compared to $Y amount of the revenue target she or the organization set for the period.

In high intensity competitions, expected benefits of exhibiting competitive behavior and winning are higher and more certain than in low intensity competitions because only (superior) performance relative to others is recognized, emphasized and rewarded. Compared to low intensity competitions, high intensity competitions are thus more likely to lead individuals to disregard potential costs of displaying competitive behavior. Furthermore, high intensity competitions are more likely to trigger feelings of envy and a preoccupation with performance, or status, relative to others. Individuals are more likely to engage in sabotage or sabotage-like destructive competitive behavior when more is at stake (Carpenter et al., 2010; Harbring & Irlenbusch, 2011; Harbring & Irlenbusch, 2008), and when they are preoccupied with their status or ranking relative to others (Charness et al., 2014; Kilduff, et al., 2010; Moran & Schweitzer, 2008). Therefore:

Hypothesis 6: Individuals are more likely to engage in destructive competitive behavior in high intensity competitions than in low intensity competitions.

4.2.1. Gender, Competition Context & Destructive Competition

Gender of decision makers is likely to affect the above relationship between competition intensity and destructive competitive behavior. As mentioned previously, men and women differ in their propensity to enter into competitions and exert extra effort once they are placed in a competitive environment (Bowles, et al., 2005; Gneezy et al., 2003; Niederle & Vesterlund, 2011). These differences in individualistic, achievement-oriented behavior are partially caused by prescriptive gender stereotypes directing women to be concerned with non-utilitarian and socially-oriented outcomes, while directing men toward competitive, utilitarian, individualistic and achievement-oriented behavior (Heilman & Chen, 2005; Heilman, 2001; Lee & Tannenbaum, 2014; Kray & Haselhuhn, 2012; Moss-Racusin, Phelan & Rudman, 2010). Gender differences in propensity to compete are likely to extend to destructive competitive behavior that imposes direct, unjustified costs on others (Dreber & Johannesson, 2008; Kray & Haselhuhn, 2012; Lewicki & Robinson, 1998). Put differently, men are more likely than women to justify costly competitive behavior by self-serving, utilitarian reasoning (Kray & Haselhuhn, 2012). Consequently, they will be more likely than women to resort to costly competitive behavior. Formally:

Hypothesis 7: Men will be more likely to engage in destructive competitive behavior than women.

Situational factors moderate the extent to which individuals follow gender-based prescriptions. When there is little ambiguity and uncertainty, situational effects dominate, leaving little room for individual differences such as gender to have a noticeable effect on

behavior (Bowles et al., 2005; Mischel, 1977). As a result, men and women behave similarly when situational cues regarding appropriate or acceptable behavior are strong and unambiguous. In contrast, when situational factors are weak and ambiguous, or when situational cues can be interpreted in different ways, there is more room for individual differences. In these "weak" situations, individuals are more likely to behave in line with gender stereotypes (Amanatullah & Morris, 2010; Bowles et al., 2005). For example, in a negotiation context, when there is ambiguity regarding the issues that can be brought to the negotiation table, women perform worse than men; when ambiguity about the appropriateness of negotiation is removed, men and women behave and perform similarly (Bowles et al., 2005; Amanatullah & Morris, 2010).

Competition intensity constitutes an important contextual or situational cue. *High-intensity competitions* represent "strong situations" with little ambiguity and uncertainty because the win-lose incentive structure and the explicit, salient rankings of competitors ensure that expected net payoffs from destructive competition are likely to be high, positive (i.e., costs are offset by benefits), and relatively certain. In high intensity competitions, both men and women receive strong, unambiguous signals to individuals that beating their competitors (i.e., relative performance) is critical to success. Consequently, men and women are likely to show a similar propensity for destructive competitive behavior in "strong", high-intensity competitions.

In contrast, in *low intensity competitions*, individuals receive weak, ambiguous signals about the importance of beating their opponent and the benefits of engaging in destructive competitive behavior. Variable incentive schemes, in which the majority of compensation is based on absolute behavior and the minority on relative behavior, promote a certain level of competitive behavior while also prompting individuals to focus on their own performance and growth (i.e., regardless of their ranking, individuals get paid more when they perform better). A

lack of social comparison in low intensity competitions reinforces this mixed, "weak" message by focusing individuals on maximizing their own potential rather than on where they stand relative to their competitors. Consequently, expected payoffs from destructive behavior are relatively low (and more likely to be negative) and less certain in low intensity competitions. The relatively uncertain and low net benefits of destructive competitive behavior "weaken" the situation, allowing gender stereotypes to creep in.

For men, there is no inherent conflict between prescriptive gender stereotypes and competitive behavior; gender stereotypes for men encourage competitive, assertive behavior (Prentice & Carranza, 2002). As a result, men may engage in competitive behavior reflexively even in low-intensity competitions, ignoring or failing to notice available information suggesting uncertain, low or negative rewards for competitive behavior. On the other hand, women face conflicting behavioral prompts when competition is an option: net benefits from engaging in competition are pitted against broadly held gender-based norms prescribing cooperative behavior for women (Prentice & Carranza, 2002). If women's decisions incorporate normative pressure to cooperate, women are more likely than men to consider all the relevant information regarding the relative benefits and costs of engaging in destructive competition. In high-intensity competitions, net benefits from behaving competitively are clear and compelling, but in low-intensity competitions, where payoffs to competitive behavior are ambiguous, women are more likely than men to engage in conscious decision making rather than reflexive competitive behavior. Consequently, women are likely to display a decreased propensity for destructive competition in "weak", low-intensity competitions relative to "strong", high-intensity competitions, while men are less likely to discriminate between high- and low-intensity competitions. Formally:

Hypothesis 8a: Compared to men, women will be less likely to engage in destructive competitive behavior in low intensity competitions.

Hypothesis 8b: Women will be less likely to engage in destructive competitive behavior in low-intensity competitions than in high intensity competitions.

4.2.2. Gender Differences in Reactions to Competitive Behavioral Norms

In contextually ambiguous, "weak" situations, behavioral norms established in organizations constitute effective cues and can significantly affect individuals' propensity for destructive behavior (Robinson & O'Leary-Kelly, 1998; Sims & Brinkman, 2002; Shamir & Howell, 1999; Trevino & Brown, 2005). Behavioral norms reflected in the behavior of organizational members—especially high status members—remove some of the ambiguity and uncertainty about the acceptability of destructive competitive behavior, providing evidence of associated benefits and costs. When leaders within an organization engage in destructive competitive behavior, they signal that such behavior is acceptable and associated payoffs may be high (Lewis, 1989; Robinson & O'Leary-Kelly 1998; Sims & Brinkman, 2002). On the other hand, when leaders refrain from such behavior, they signal that the behavior is not sanctioned and may be more costly than beneficial. Therefore:

Hypothesis 9: In low intensity competitions, compared to individuals who do not observe any behavioral norms, individuals who observe others engaging in (refraining from) destructive competition will be more (less) likely to engage in destructive competition.

Behavioral norms established in organizations may be reinforced or weakened by consistency or lack of consistency with other behavioral cues, such as gender stereotypes. Behavioral norms supporting competitive behavior are consistent with gender stereotypes for

men; behavioral norms supporting collaborative or cooperative behavior are consistent with gender stereotypes for women. Consistent with prescriptive gender stereotypes, behavioral cues from organizational members supporting competitive behavior are more likely to be heeded by men, while cues supporting less competitive behavior are more likely to be heeded by women. Consequently:

Hypothesis 10a: In low-intensity competitions, men's propensity for destructive competition is likely to increase more than that of women's in response to competitive behavioral norms

Hypothesis 10b: In low-intensity competitions, women's propensity for destructive competition is likely to decrease more than that of men's in response to non-competitive behavioral norms.

4.2.3. Present Research

The hypotheses were tested in three laboratory studies, each using a real-effort task. The controlled laboratory setting allowed us to obtain precise measures of destructive competitive behavior and the costs associated with such behavior. Study 8 tests Hypotheses 6-8b, using a 2 (high/low competition intensity) x 2 (male/female participant) between-subjects design. Study 9 tests the same hypotheses in more detail using a 2 (winner-takes-all/variable reward scheme) x 2 (high/no social comparison) x 2 (male/female participant) between-subjects design. Finally, Study 10 examines the effect of behavioral norms on men and women's propensity for destructive competition in low-intensity competitions (Hypothesis 9-10b).

4.3. Study 8

4.3.1. Study 8 Methods

Participants. 200 participants were recruited (49% male, M_{age} = 31.96, SD = 10.32) from Amazon's Mechanical Turk website to complete a transcription task. Participants completed the study for a $3 participation fee and, potentially, a performance-based bonus.

Task. Participants completed four rounds (one practice, three paid) of a transcription task. Each round was scored independently. Specifically, the participants were asked to rewrite random alphanumeric codes ("captchas") that were given to them on the screen (e.g., 9XCMEE8766). Participants were given 4 minutes per round to transcribe as many captchas as possible.

Competition intensity conditions. After receiving task instructions, the participants were informed that they would be paired with another person who has participated in the study. Half of the female and male participants were randomly assigned to the high-intensity competition condition, while the other half was assigned to the low-intensity competition condition.

In high-intensity competition condition, winner-takes-all incentive schemes were used and participants' performances were evaluated under a high social comparison feedback system. Specifically, participants were informed: "*Your bonus payment will completely depend on how you perform relative to your counterpart."* and learned that, in each round, they would earn a 3-cent bonus per captcha transcribed only if they scored higher than their counterpart. Furthermore, under the high social comparison feedback system, they learned their own score and their counterpart's score at the end of each round. Consequently, in high-intensity competitions, expected payoffs from engaging in destructive competitive behavior were higher, more certain, and more likely to be positive (i.e., benefits offsets associated costs).

In contrast, in low-intensity competition condition, variable reward schemes and no social comparison feedback systems were used. Specifically, they were instructed: "*Your bonus payment will depend primarily on your own performance, and, only partly, how you perform relative to your counterpart."* Participants in the variable reward scheme condition learned that, in each round, they would earn a 2-cent bonus per captcha transcribed and that they would earn an additional 1-cent bonus per captcha if they scored higher than their counterpart. Under the no social comparison feedback system, participants in low intensity competition condition received only their own scores from the current and previous round at the end of each round. As a result, expected payoffs from engaging in destructive competitive behavior were lower, more uncertain, and more likely to be negative (i.e., costs outweigh associated costs) in low-intensity competitions than in high-intensity competitions.

Propensity for destructive competition. Participants were given an option to engage in destructive competition *at the beginning* of Round 3. Specifically, participants were instructed "*Before you begin the next round, you need to make a decision. You have an option to take a number of points off of your counterpart's score in the next round. If you exercise this option, we will deduct a certain number of points from your score as well.*" Because participants were making decisions *a priori* (i.e., before performance), participants in all conditions had to contend with some degree of uncertainty and risk as to whether engaging in destructive competition would result in a net gain or net loss (obviously, the degree of uncertainty was smaller in high intensity competitions than in low intensity competitions due to the incentive scheme and performance feedback system used).

Additional information destructive competition measure. Participants could deduct a certain amount of points from their counterpart (anywhere from 4 to 16 points, in three-point

increments). These point deduction options were costly to the participants, because each point deduction resulted in a reduction of the participant's own score (depending on the points deducted anywhere from 1 to 5 points, in one-point increments). Higher point deductions were more costly. For example, when participants deducted 16 points from their counterpart they lost 5 points from their score (and any associated bonus with those lost points), while participants lost only 1 point when they deducted 4 points from their counterpart. Alternatively, participants could choose to deduct no points from their counterpart (i.e., no destructive competition) and keep all their points. The measure of "propensity for destructive competition" is the number of points the focal players deducted from their counterparts, at a potential cost to themselves. The words "destructive competition" were never used in the participant materials.

Competitor. Prior to the study, 30 participants (50% male, M_{age} = 35.67, SD = 12.57) from Amazon's Mechanical Turk website to completed the transcription task used in the study. Pilot study participants received a $3 participation fee and a 3 cent bonus per captcha transcribed. Using pilot study data, distribution parameters for the transcription task performance were computed. One pilot study participant who consistently performed about one standard deviation above average was selected to assume the role of the counterpart to all participants in the full study. All the participants were paired with the same counterpart. We selected a participant who performed relatively well on the task in order to give all participants a reason to ponder deducting points from their counterpart. No deception was used throughout the study. Participants were informed that "*For the duration of the task, you will be paired with another*

person who has performed the same task."[5] Participants did not receive any information on the gender of their counterpart.

Final questionnaire. Once participants completed all rounds of the transcription task, they were asked an open-ended question about their decision to engage in destructive competitive behavior: "What was the thought process behind your decision to deduct or not to deduct points from the other person's score? Next, participants answered a number of demographic questions (age, gender, race). Finally, they were asked about the assumptions they made about the gender of their counterpart. The options were: "Male / Female / I did not make an assumption either way."

4.3.1. Study 8 Results and Discussion

Fifty one percent of participants engaged in destructive competitive behavior. Using an analysis of covariance (ANCOVA) model, we tested whether competition intensity and gender of focal individual affected individuals' propensity for destructive competitive behavior. The dependent variable was the number of points participants chose to deduct from their counterpart at a (potential) cost to themselves. The previous round performance was entered into the models as a control variable.

Competition intensity and destructive competition. As predicted in *Hypothesis 6*, controlling for performance, individuals were more likely to engage in destructive competition in high-intensity competitions than in low-intensity competitions ($F(4,195) = 7.87$, $p = .006$, $\eta_p^2 = .04$).

[5] 3 participants expressed some amount of doubt that they were paired with a "real" person. Excluding these participants does not change the results. We included these participants in the reported results, because such explanations could be used as post-hoc excuses for destructive competitive behavior.

Gender and destructive competition. Providing support for *Hypothesis 7*, compared to women, men displayed a higher tendency for destructive competition ($F(4,195) = 6.21$, $p = .014$, $\eta_p^2 = .03$). On average, men deducted 2.7 more points than women. Figure 8 summarizes points deducted by men and women in each competitive context.

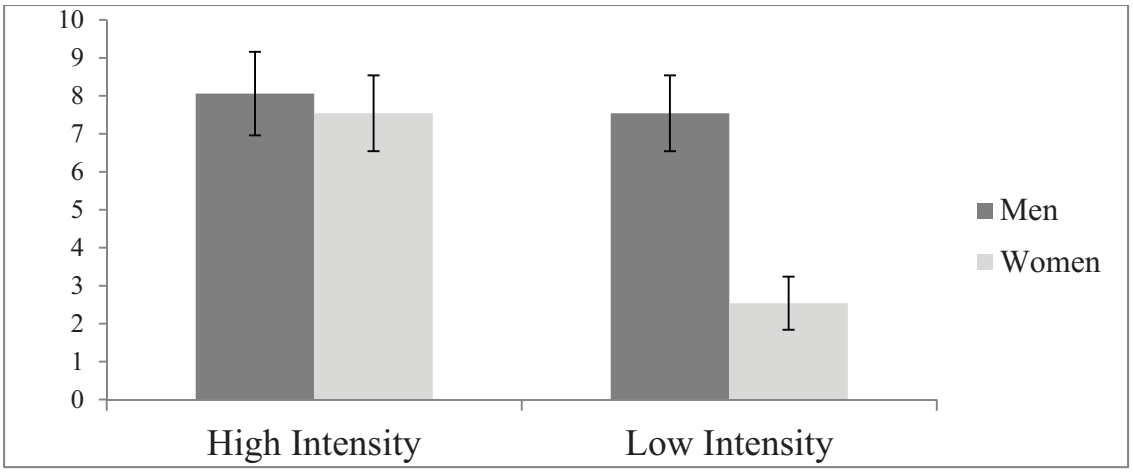


Figure 8. Propensity for destructive competitive behavior by condition.

As predicted, the main effect of gender on destructive competitive behavior was qualified by a significant interaction effect between competition intensity and gender ($F(4,195) = 4.45$, $p = .036$, $\eta_p^2 = .02$). Supporting *Hypothesis 8a*, women showed a significantly lower propensity for destructive competition than men in low-intensity competitions ($F(1,195) = 10.41$, $p = .001$, $\eta_p^2 = .05$), while men and women showed a similar propensity for destructive competition in high-intensity competitions ($F(1,195) = 0.08$, $p = .773$).

Supporting *Hypothesis 8b*, women displayed a significantly lower propensity for destructive competition in low-intensity competitions than in high-intensity competitions ($F(1,195) = 12.27$, $p = .001$, $\eta_p^2 = .06$). In contrast, men's propensity for destructive competition did not change significantly from low-intensity competitions to high-intensity competitions ($F(1,195) = 0.09$, $p = .770$).

Consequences of destructive competitive behavior. We analyzed the actual net benefits/losses participants reaped from destructive competition. To calculate net benefits/losses reaped by all participants who engaged in destructive competitive behavior, we first computed the hypothetical (i.e. no-point deductions) bonus participants would have received if they had not engaged in destructive competitive behavior. We then subtracted this hypothetical bonus from participants' actual bonus to compute the net benefits (or losses) participants reaped from engaging in destructive competition (i.e., deducting points). If a participant did not engage in any point deductions, her net benefit/loss from destructive competition would be zero by definition. Figure 9 summarizes net benefits/losses by condition and round.

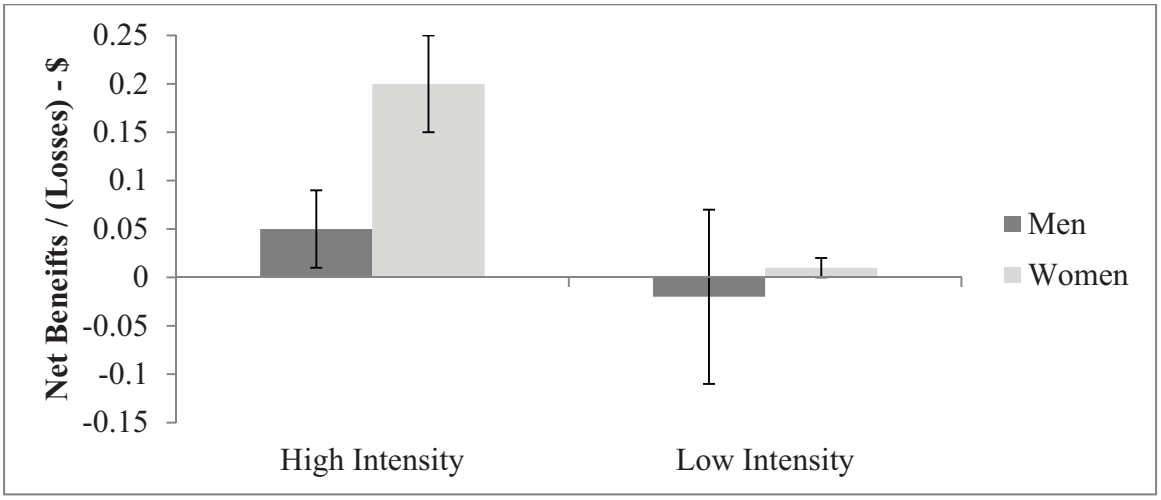


Figure 9. Net benefits/losses reaped from destructive competition by condition.

Next, we analyzed the factors affecting net benefits reaped from destructive competitive behavior by using an analysis of covariance model. Independent variables were gender and competition intensity. We controlled for performance of participants in the round in which destructive competition was possible.[6] As expected, the net benefit of engaging in destructive

[6] Correlation between *previous* round performance and subsequent destructive competitive behavior for women was r=.12, p = .243 (in high intensity r = .02, p=.891; in low intensity r = .13, p=.378); for men correlation between previous performance and destructive competition was r=.182, p=.073 (in high intensity r = .16, p=.266; in low intensity r = .21, p=.152).

competition was higher (by 26 cents) in high-intensity competitions than in low-intensity competitions ($F(4,195) = 21.37$, $p < .001$, $\eta_p^2 = .10$). Nevertheless, deducting points was dysfunctionally competitive (i.e., resulted in a net loss) for some of the participants in both high-intensity and low-intensity competitions. Twenty-five percent and 28 percent of participants sustained a net loss from destructive competitive behavior in high-intensity and low-intensity competitions, respectively.

Women reaped more benefits from destructive competition than men did ($F(4,195) = 4.76$, $p = .03$, $\eta_p^2 = .02$). More importantly, there was a significant interaction effect between competition intensity and gender ($F(4,195) = 6.69$, $p = .010$, $\eta_p^2 = .03$) as women's decisions were more attuned to changes in the competition context. Women reaped significantly more net benefits in high-intensity competitions than in low-intensity competitions ($F(1,195) = 22.38$, $p < .001$, $\eta_p^2 = .05$); on average, women's net gains from destructive competitive behavior were 20 cents in high intensity competitions and 5 cents in low intensity competitions. On the other hand, men gained an average of 5 cents from displaying destructive competitive behavior in high intensity competitions, while they lost an average of 2 cents in low intensity competitions ($F(1,195) = 2.33$, $p = .129$, $\eta_p^2 = .01$).

Reasoning behind destructive competition. Assumptions about the gender of the counterpart did not appear to have any effect on propensity for destructive competition. The majority (74.5%) of the participants indicated that they did not make an assumption about the gender of their counterpart. 18.5% of participants thought that their counterpart was male, while 7.0% of them thought that their counterpart was female. Women were more likely than men to think that their counterpart was a female. Participants who thought their counterpart was male were evenly split between men and women.

To explore the reasons behind participants' choices, content analysis[7] was conducted on the responses to the post-task survey question, *What was the thought process behind your decision to deduct or not to deduct points from the other person's score?* The post hoc justifications participants gave fell under three broad categories: "*utilitarian*" (e.g., "I chose to deduct points so that I could have the higher score in that round." Or "I was doing well enough that there was no need to deduct any points."); "*other-directed*" (e.g., "I thought my opponent would likely deduct points from me so I deducted points from them." Or "I did not want to hurt the other person."); and "*fairness*" (e.g., "I believe in playing fair."). Eighty three percent of participants who engaged in destructive competition used self-serving, utilitarian explanations and 11% used other-directed reasoning. In contrast, when asked their justification for not engaging in destructive competition, 25% of used utilitarian reasoning, 31% used other-directed reasoning, and 58% mentioned concerns about fairness/equity. Percentages of men and women using each category of reasoning are shown in Table 9.

Table 9. Justifications provided for (not) engaging in destructive competitive behavior.

	Utilitarian		**Other -directed**		**Fairness**	
	DC	**NoDC**	**DC**	**NoDC**		
Women (%)	36	18	5	15	n/a	35
Men (%)	48	13	6	10	n/a	21

DC=Destructive competitive behavior NoDC= No destructive competitive behavior

Using logistic regression models, we analyzed whether competition intensity and gender of the individuals had an effect on the rationale individuals provided for engaging or not engaging in destructive competitive behavior, controlling for participants' average performance

[7] We first reviewed the first 25% of participants' statements regarding their reasoning behind engaging or not engaging in destructive competition and identified common themes. All of the statements were then coded based on these categories by one of the authors. Finally, we recruited a research associate who was blind to the hypotheses and conditions to independently code 50% of the participants' statements; there was 97% agreement between the two coders.

across rounds. Individuals were more likely to use self-serving, utilitarian reasoning for engaging in destructive competition in high intensity competitions than in low intensity competitions (B = 1.27, SE = 0.44, p = .004). Men were more likely than women to use utilitarian reasoning for engaging in destructive competition (B = 1.19, SE = 0.44, p = .008). These main effects were qualified by an interaction effect between competition intensity and gender (B = -1.27, SE = 0.34, p < .001). Men and women were equally likely to use utilitarian reasoning for deducting points (48% of men and 50% of women) in high intensity competitions, while women were significantly less likely than men to use such reasoning in low intensity competitions (22% of women and 48% of men). Men were less likely than women to mention fairness as a rationale for *not* engaging in destructive competitive behavior (B = -0.69 SE = 0.32, p = 0.031) (in low intensity competitions, 44% of women versus 20% of men used fairness-based reasoning; in high intensity competitions, 27% of women and 23% of men used fairness-based reasoning). There were no significant differences by competition intensity or gender in any other categories.

Summary. In high-intensity competitions, when expected benefits of engaging in destructive competition were relatively certain and likely to be high and positive, there were no significant gender differences in propensity for destructive competitive behavior. In low-intensity competitions, women's propensity for destructive competitive behavior fell relative to that in high-intensity competitions, while men's tendency for destructive competition did not change significantly in response to the structural changes in the competitive environment.

4.4. Study 9

4.4.1. Study 9 Methods

Procedures and conditions. In Study 8 examined men and women's propensity for destructive competitive behavior under only high and low intensity competitions, linking incentive schemes with performance feedback systems. Study 9 investigated effects of incentive schemes and availability of comparative performance feedback separately, allowing us to explore gender differences in destructive competitive behavior across high, low, and mixed intensity competitions. Study 9 utilized the same procedures as in Study 8 with one exception: Study 9 manipulated incentive scheme and performance feedback system separately in a 2 (winner-takes-all/variable reward scheme) x 2 (high/no social comparison) x 2 (male/female participant) between-subjects design. Male and female participants were randomly assigned either to a winner-takes-all or variable reward scheme, and either a high social comparison or no social comparison feedback system. Study 8 instructions were utilized to describe the two incentive schemes and the two performance feedback systems to the participants.

Participants. 392 participants were recruited (51% male, M_{age} = 29.60, SD = 9.02) from Amazon's Mechanical Turk website to complete a transcription task. Participants completed the study for a $3 participation fee and, potentially, a performance-based bonus.

4.4.2. Study 9 Results and Discussion

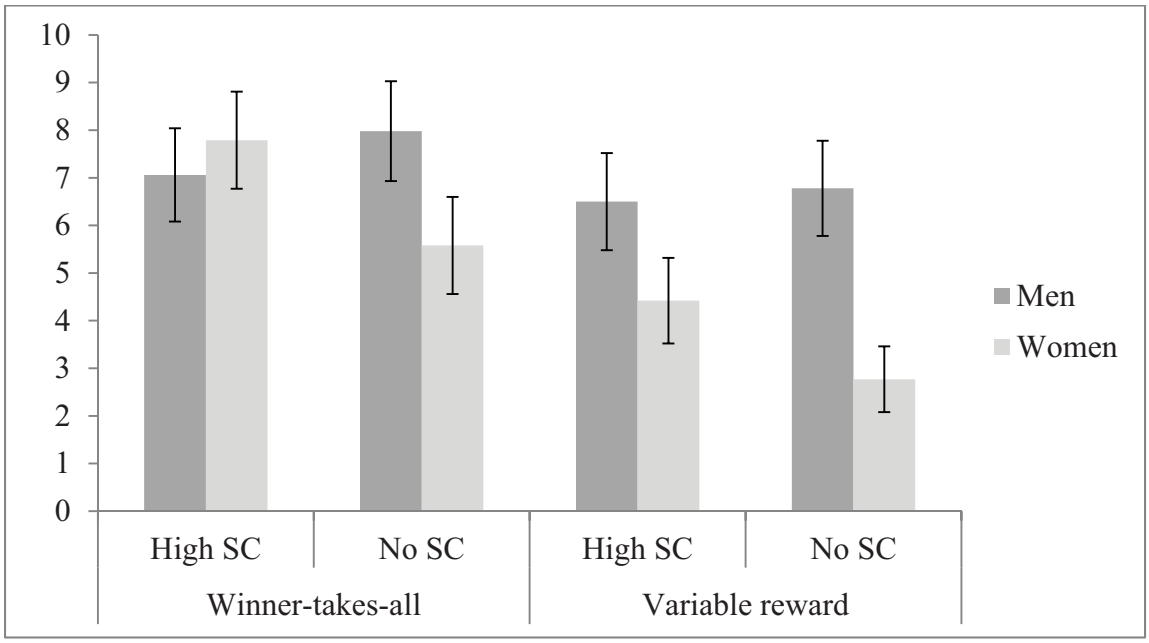
Fifty-one percent of participants in Study 9 engaged in destructive competitive behavior. We used an analysis of covariance (ANCOVA) model to test whether incentive scheme, social comparison, and gender of focal individual affected individuals' propensity for destructive competition. The dependent variable was the total number of points participants chose to deduct from their counterparts at a potential cost to themselves.

Structural elements and destructive competitive behavior. Individuals engaged in higher levels of destructive competition under winner-takes-all schemes than under variable reward schemes ($F(8, 383) = 8.42$, $p = .004$, $\eta_p^2 = .02$). On average, individuals deducted an additional 1.96 points in winner-takes-all schemes than in variable reward schemes. On average, individuals deducted an additional 0.63 points when social comparison information was available, but the main effect of social comparison was not significant ($F(8, 383) = 0.96$, $p = .329$). As predicted in *Hypothesis 7*, compared to women, men displayed a higher tendency for destructive competition ($F(8,383) = 8.03$, $p = .005$, $\eta_p^2 = .02$). These main effects were qualified by a marginally significant interaction between social comparison and gender ($F(8,383) = 3.42$, $p = .065$, $\eta_p^2 = .01$), and between gender and incentive scheme ($F(8,383) = 2.64$, $p = .105$, $\eta_p^2 = .01$).

Gender and destructive competition. As predicted in *Hypothesis 8a*, men showed a significantly higher propensity for destructive competitive behavior than women in low-intensity competitions with variable reward and no social comparison—when the situation was "weak" and structural cues were ambiguous. In low-intensity competitions, men deducted 4.01 more points than women on average ($F(1,383) = 7.87$, $p = .003$, $\eta_p^2 = .02$). In contrast, men and women showed a similar propensity for destructive competition in high-intensity competitions with winner-takes-all reward schemes and high social comparison—when the situational cues were "strong." ($F(1,383) = .26$, $p = .609$). In high-intensity competitions, men deducted an average of 7.8 points while women deducted an average of 7.1 points from their counterpart.

As predicted in *Hypothesis 8b*, women showed a significantly higher propensity for destructive competitive behavior in high-intensity competitions, when net expected benefits for such behavior were higher and relatively certain, than in low intensity competitions ($F(1,383) =$

13.06, p <.001, η_p^2 = .03). On average, women deducted 5.02 fewer points in low-intensity competitions, when expected net benefits were lower and more uncertain. In contrast, men showed a similar propensity for destructive competition across the two competition conditions (F(1,383) = 0.42, p = .838). (See Figure 10).

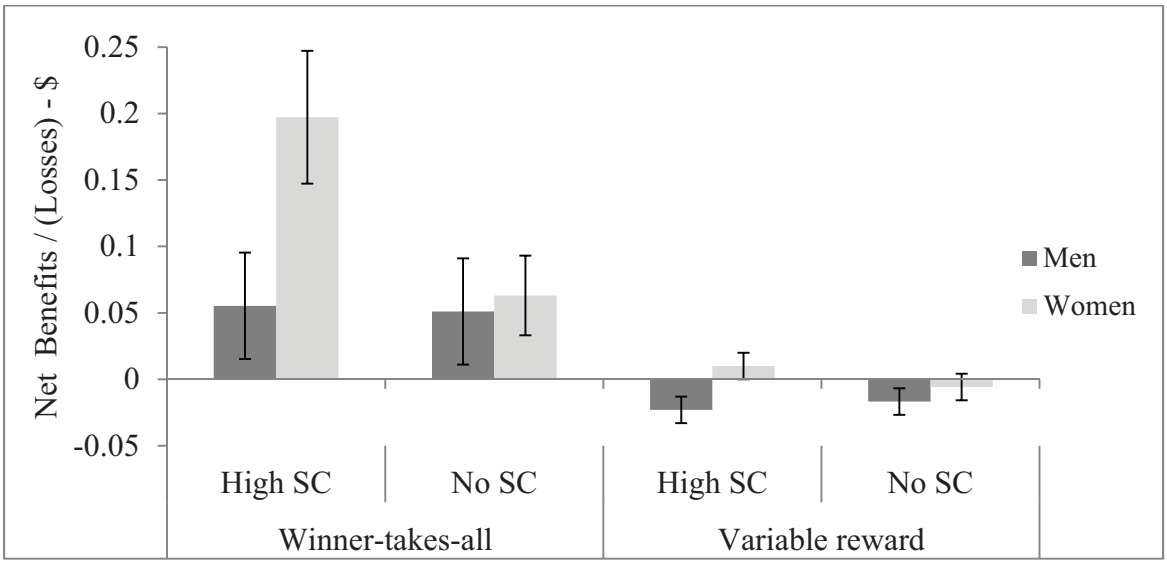


Note: SC = Social Comparison

Figure 10. Propensity for destructive competitive behavior (# points deducted), by gender, incentive scheme and social comparison.

Consequences of destructive competition. We analyzed the net benefits reaped from destructive competitive behavior following the same methodology used in Study 8 (see Figure 11). In general, individuals benefited more from destructive competition under winner-takes-all schemes than under variable reward schemes (F(8,383) = 28.83, p<.001, η_p^2 = .07), and in high social comparison environments than in no social comparison environments (F(8,383) = 5.10, p = .024, η_p^2 = .01). As predicted, individuals reaped more net benefits from destructive competition in high-intensity competitions than in low-intensity competitions (F(1,383) = 25.73, p<.001, η_p^2 = .06). Nevertheless, destructive competitive behavior resulted in a net loss for some

of the participants in both high-intensity and low-intensity competitions; 25% and 32% of the participants incurred a net loss from engaging in destructive competition in high- and low-intensity competitions, respectively.



Note: SC= Social Comparison

Figure 11. Net benefits/losses derived from destructive competition, by gender, incentive scheme and social comparison

Consequences of destructive competition for men and women. The effect of social comparison information on net benefits reaped from destructive competitive behavior was moderated by gender. We found a significant two-way interaction between social comparison and gender ($F(8,383) = 4.59$, $p = .033$, $\eta_p^2 = .01$). The net benefit men reaped from point deductions was the same (2 cents) in both high social comparison and no social comparison environments, while women's net benefits increased from 3 cents in the no social comparison environment to 10 cents when given social comparison information ($F(1,383) = 7.45$, $p = .007$, $\eta_p^2 = .02$). Put differently, men profited significantly less from their destructive competitive

behavior than women because they did not use social comparison information as effectively as women did.

Both men and women reaped significantly more net benefits under winner-takes-all incentive scheme than in variable reward scheme ($F(1,383) = 7.45$, $p = .007$, $\eta_p^2 = .02$ for men; $F(1,383) = 21.75$, $p < .001$, $\eta_p^2 = .05$ for women). The two-way interaction between incentive scheme and gender ($F(8,383) = 2.68$, $p = .103$, $\eta_p^2 = .01$) did not reach traditional levels of statistical significance. However, under winner-takes-all incentive schemes, women reaped significantly more net benefits than men ($F(1,383) = 8.06$, $p = .059$, $\eta_p^2 = .02$); specifically, women reaped an average net benefit of 13 cents while men earned an average net benefit of 5 cents. Under variable incentive schemes, there were no significant gender differences in net benefits reaped from point deductions ($F(1,383) = 0.66$, $p = .417$); under this type of scheme, men sustained an average 2 cent loss, while women earned about a quarter of a cent. The three-way interaction between incentive scheme, social comparison and gender ($F(8,383) = 2.79$, $p = .096$, $\eta_p^2 = .01$) did not reach traditional levels of statistical significance.

Reasoning behind destructive competitive behavior. The assumed gender of the counterpart did not appear to drive point deduction decisions. The majority of participants (72.2%) indicated that they did not make an assumption about the gender of their counterpart; 20.4% thought their counterpart was male; and 7.4% thought that their counterpart was female. For those who assumed something about the sex of their counterpart, both men and women were more likely to think that their counterpart was the same gender as themselves. Participants' assumptions about their counterpart did not have a discernable effect on their destructive competitive behavior.

As in Study 8, content analysis was conducted on participants' reasons behind their competitive choices. The justifications used, and their prevalence, were consistent with those found in Study 8. Ninety three percent of those who deducted points from their counterparts at a risk to themselves cited self-serving, utilitarian explanations, while 6% used other-directed reasoning. In contrast, 25% of those who did not engage in destructive competition cited utilitarian reasoning, while 41% used other-directed reasoning, and 57% mentioned a concern for fairness/equity. The percentage of men and women that utilized each type of reasoning is summarized in Table 10.

Table 10. Justifications provided for (not) engaging in destructive competition.

	Utilitarian		**Other -directed**		**Fairness**	
	DC	**NoDC**	**DC**	**No DC**	**DC**	**No DC**
Women (%)	43	14	2	22	n/a	32
Men (%)	51	10	3	18	n/a	24

Note: DC = Destructive Competition NoDC = No Destructive Competition

Individuals were more likely to mention utilitarian reasons and less likely to mention a concern for the other under winner-takes-all incentive schemes than under variable reward schemes ($B = 0.45$, $SE = 0.20$, $p = .026$ for utilitarian; $B = -0.79$, $SE = 0.26$, $p = .003$ for concern for other). Individuals were less likely to bring up concerns about fairness when they received social comparison information ($B = -0.46$, $SE = 0.23$, $p = .044$). Men were marginally less likely than women to mention concern for fairness when *not* engaging in destructive competitive behavior ($B = -0.38$, $SE = 0.23$, $p = .097$).

Summary. There was no significant gender difference in propensity for destructive competition in high intensity competitions when potential net benefits of engaging in destructive competition were higher and more certain. Gender differences emerged only in low-intensity competitions with variable reward schemes and no social comparison information because

women, but not men, curbed destructive competitive behavior in these high-uncertainty, low expected-payoff environments.

4.5. Study 10

Destructive competition is always costly to the injured counterparty, and may also be costly to the organizations in which value is being destroyed. Results from Studies 8 and 9 illustrate that organizations can curtail such dysfunctional competition among their employees by structuring intra-organizational competition as low-intensity and emphasizing individual performance. Some amount of reflexive, destructive competitive behavior could be observed even in such low-intensity competitions, however, especially among men. Study 10 explored whether organizations can utilize behavioral norms to further decrease destructive competitive behavior of men and women in low-intensity competitions.

Hypothesis 9 predicted that competitive behavior will reflect the behavioral norms observed, with participants observing destructive competitive behavior showing a higher propensity for destructive competition and those observing non-destructive behavior showing a lower propensity for destructive competition. Men and women are more likely to respond to behavioral norms in structurally-weak low intensity competitions, however, when those norms are reinforced by their respective gender stereotypes. Accordingly, men's propensity for destructive competition is likely to increase more than that of women's in response to competitive role models, while women's propensity for destructive competition is likely to decrease more than that of men's in response to non-competitive behavioral norms.

4.5.1. Study 10 Methods

We tested the predictions using a 3 (no behavioral norm/ non-competitive behavioral norm/competitive behavioral norm) x 2 (male/female participant) between-subjects design.

Participants. 129 male and 129 female students were recruited from the standing participant pool of a large, private university in the Northeastern United States (M_{age} = 21.55, SD = 2.92) to complete a transcription task. Participants completed the study for a $20 participation fee and a performance-based bonus ($0-12).

Procedures. The participants were anonymously paired with each other in real time, during the session. They completed four rounds of the transcription task (one practice round and three paid rounds, all mandatory).

Participants received the instructions used in the low-intensity competition condition in Studies 8 and 9. The prizes per captcha transcribed were slightly higher to meet minimum payment standards used in the laboratory, while retaining the winner/loser prize ratio used in Studies 8 and 9. Participants received 4 cents per correctly transcribed captcha; they received an additional 2 cents per captcha when they scored higher than their counterpart. As in the previous studies, each round was scored independently.

Participants made an *a priori* decision about engaging in destructive competition (i.e., point deductions) at the beginning of Round 2 and Round 3. The point deduction options were the same as in Studies 8 and 9.

Selection of behavioral role models. Forty-eight participants from the same standing pool of participants (50% male, M_{age} = 21.55, SD = 2.92) completed a pilot study. Two participants who consistently performed in the top 15th percentile or above were selected to play the role of "leaders"; one of these participants engaged in the maximum amount of point deductions (the "competitive" behavioral norm) while the other participant did not engage in point deductions (the "non-competitive" behavioral norm).

Two top performers were selected as leaders because we wanted the participants to take the behavioral role models/leaders seriously. To reinforce the effectiveness of these behavioral role models, the participants in competitive and non-competitive leader conditions were informed that their team leader would get a proportion of bonus payments earned by all participants in the last round. Next, participants were assured that their team leader was *not* participating in the last round of the task, and that the team leaders' performance would *not* have any effect on *their* outcomes or bonus.

Behavioral norms. Participants were randomly assigned to one of the three behavioral norm conditions. Participants in the "no behavioral norm condition" (i.e., control condition) made point deduction decisions in both rounds without seeing any additional information. In contrast, participants in the "non-competitive behavioral norm" and "competitive behavioral norm" condition received information on how their leaders performed and whether their leaders engaged in destructive competition after Round 2, just before they made a point deduction decision for Round 3.

The leader's performance information was presented in percentiles (e.g., top 10%) while performance feedback for participants was presented in terms of scores (e.g., 20) so that participants could not compare their own performance to those of leaders. Specifically, in the two leader behavioral norm conditions, participants learned that their leader performed in the top 10.2% and top 13.8% in Round 1 and Round 2, respectively and won in both rounds. The participants in the non-competitive behavioral norm condition learned that their leader did not deduct any points from the counterpart in Round 2. The participants in the competitive behavioral norm condition learned that their leader deducted the maximum number points from

the counterpart at the highest cost to him/herself in Round 2. The information on leaders/behavioral norms was presented in gender-neutral terms.

Dependent variables. The main dependent variable was the change in propensity for destructive competition from baseline/Round 2 to post-behavioral-role-model/Round 3 (i.e., points deducted in Round 3 minus points deducted in Round 2).

Final questionnaire. Upon conclusion of the transcription task, the participants indicated the degree to which they agreed/disagreed with a number of statements using a seven-point, bipolar scale (1 = "Strongly disagree"; 7 = "Strongly agree"). All the statements related to the reasons a participant chose to engage/not engage in destructive competition were constructed based on the categories of reasons participants mentioned in Studies 8 and 9 (e.g., "I deducted points because I thought that doing so would increase my bonus"). Finally, participants answered a number of demographic questions (age, gender, race) and a question about the presumed gender of their counterpart.

4.5.2. Study 10 Results and Discussion

Baseline propensity for destructive competition. We used an analysis of covariance model to test whether gender affected individuals' propensity for destructive competition in the second round (prior to exposure to leader). Performance prior to point deductions was entered as a control variable. As predicted in *Hypothesis 8a* and replicating results from Studies 8 and 9, men were more likely than women to display destructive competitive behavior before being exposed to behavioral norms ($F(2,255) = 22.31$, $p < .001$, $\eta_p^2 = .08$).[8]

Behavioral norms and destructive competitive behavior. Next, using an analysis of covariance model, we analyzed the change in propensity for destructive competition from Round

[8] The gender gap in destructive competitive behavior in low-intensity competitions persisted in the final round, even after exposure to behavioral norms. Compared to women, men showed a higher propensity for destructive competition in the third/final round, across all conditions ($F(6,251) = 17.82$, $p < .001$, $\eta_p^2 = .07$).

2 to Round 3, after exposure to behavioral norm manipulation. Performance in previous round (Round 2) was entered as a control variable. See Table 11 for a summary of destructive competitive behavior by condition.

Table 11. Means and standard deviations in change and absolute propensity for destructive competition, by gender and behavioral norm

	Change in destructive competition # points deducted (round 3 – round 2)	**Round 3 Destructive Competition** # points deducted
Men – No behavioral norm	-1.71 (0.90)	8.21 (1.14)
Men – Competitive behavioral norm	2.00 (0.93)	9.13 (1.06)
Men – Non-competitive behavioral norm	-2.43 (1.00)	6.10 (1.07)
Women – No behavioral norm	1.33 (0.79)	4.98 (0.84)
Women – Competitive behavioral norm	-0.48 (0.90)	5.28 (0.90)
Women – Non-competitive behavioral norm	-2.02 (0.67)	2.72 (0.75)
Men	-0.58 (6.46)	7.89 (7.20)
Women	-0.43 (5.28)	4.26 (5.50)
No behavioral norm	-0.18 (5.70)	6.58 (6.65)
Competitive behavioral norm	0.86 (6.16)	7.36 (6.83)
Non-Competitive behavioral norm	-2.21 (5.42)	4.29 (6.13)

As predicted in *Hypothesis 9*, there was a main effect of behavioral norms ($F(6,251) = 5.94$, $p = .003$, $\eta_p^2 = .05$). Compared to the participants who did not observe any behavioral norms, the participants who observed non-competitive behavioral norms were significantly less likely to deduct points from their counterpart ($F(1,251) = 5.42$, $p = 0.021$). On average, participants in the non-competitive behavioral norm condition deducted 2.2 fewer points in the last round after observing their leader's behavior, while the participants in the no behavioral norm condition deducted 0.2 fewer points in the last round. Contrary to expectations, the participants who observed competitive behavioral norms did not behave differently than the

participants who did not have access to behavioral role models ($F(1,251) = 1.21$, $p = .272$). On average, the participants in the competitive behavioral norm condition deducted 0.8 more points in the last round than in the second round.

Gender, behavioral norms and destructive competition. The main effect of behavioral norms on the change in destructive competitive behavior was qualified by an interaction between gender and behavioral norms ($F(6,251) = 5.94$, $p = .003$, $\eta_p^2 = .05$). As predicted, change in men and women's propensity for destructive competition in competitive behavioral norm condition differed significantly ($F(1,251) = 3.81$, $p = .052$). On average, men increased their propensity for destructive competition by 2 points while women decreased their propensity by 0.5 points after observing competitive behavioral norms. Contrary to predictions, men and women decreased their propensity for destructive competition at a similar rate after observing non-competitive behavioral norms ($F(1,251) = 0.10$, $p = .752$). On average, men and women in non-competitive behavioral norm condition deducted 2.4 and 2.0 fewer points in the last round, respectively.

Next, we turn to within-gender, cross treatment comparisons. Compared to women in the control condition (i.e., no behavioral norm condition), women in the non-competitive behavioral norm condition were significantly more likely to curb destructive competitive behavior ($F(1,251) = 7.16$, $p < .001$). There was no significant difference in the change for propensity for destructive competition between women who were assigned to the control condition and the competitive behavioral norm condition. These findings provide some evidence that women are more responsive to non-competitive behavioral role models, who behave in line with female gender norms.

In contrast with women's reactions to behavioral norms, men's propensity for destructive competition was more likely to change in response to competitive role models. Compared to men

in the control condition, men in the competitive behavioral norm condition were significantly more likely to increase destructive competitive behavior ($F(1,251) = 8.81$, $p = .003$). However, there was no significant difference in the change for propensity for destructive competition between men who were assigned to the control condition and the non-competitive behavioral norm condition—both groups reduced destructive competitive behavior in the last round. These results provide some support that men are more responsive to behavioral norms that are in line with male gender norms of assertiveness and competitiveness.

Analyses of rationale for destructive competition. We analyzed participants' responses to the scale-based questions regarding their rationale for engaging/not engaging in competitive behavior using analysis of variance models. Compared to women, men were more likely to use utilitarian justifications to engage in destructive competition ("I deducted points because I thought that doing so would increase my bonus.") ($F(5,252) = 5.67$, $p = .018$, $\eta_p^2 = .05$). In contrast, women were marginally more likely than men to use utilitarian reasoning *not* to engage in destructive competition ("I did not deduct points because I thought that I would be able to win without deducting points.") ($F(5, 252) = 3.54$, $p = .061$, $\eta_p^2 = .01$). Women were more likely than men to use concerns about fairness as a justification for not engaging in destructive competition ($F(5, 252) = 14.00$, $p < .001$, $\eta_p^2 = .05$). This effect was qualified by a significant interaction effect between gender and behavioral norms ($F(5, 252) = 3.89$, $p = .022$, $\eta_p^2 = .03$); there was no gender difference in concerns about fairness between men and women who were exposed to the destructive competitive behavioral norms. Additionally, women were more likely than men not to engage in costly destructive competition with the hope that the other party would not do so as well ($F(5, 252) = 15.47$, $p < .001$, $\eta_p^2 = .06$). Finally, women were marginally more likely than

men to refrain from destructive competition because of concerns about imposing a negative externality on others ($F(5, 252) = 10.92$, $p = .084$, $\eta_p^2 = .01$).[9]

Summary. As in Studies 8 and 9, men displayed a higher propensity for destructive competition than women in low-intensity competitions, even when they were paired with others in real-time and when their counterparts were present in the same room. Men were more likely than women to increase destructive competitive behavior in response to competitive behavioral norms. In contrast, both men and women curbed their destructive competitive behavior at a similar rate after observing non-competitive behavioral norms. Within-gender comparisons suggest that men and women were somewhat more responsive to behavioral norms that are in line with their respective gender stereotypes. Women altered their destructive competitive behavior more after exposure to non-competitive behavioral norms, while men altered their behavior more after observing competitive behavioral norms.

4.6. Chapter 3 General Discussion

4.6.1. Summary of findings

In high-intensity competitions, when situational cues consistently recognize, emphasize and reward competitive behavior, both men and women engage in destructive competition to increase their individual payoffs. Our findings show no gender differences in destructive competitive behavior in winner-takes-all competitions with high social comparison. In these high-intensity competitions, strong and clear signals indicate that competitive behavior is required and expected net benefits of engaging in destructive competition are high and relatively

[9] As in Studies 8 and 9, the majority (79.8%) of the participants indicated that they did not make an assumption about the gender of their counterpart. 11.6% of the participants assumed that their counterpart was male, while the remaining participants assumed that their counterpart was female. Men were more likely than women to think that their counterpart was male while women were more likely than men to think that their counterpart was female. However, these differences were not statistically significant ($p = .124$ and $p = .186$ respectively). Assumptions about counterpart's gender did not have a discernable effect on destructive competitive behavior.

certain. In low-intensity competitions, when situational cues are weaker and send mixed, vague signals regarding appropriate levels of competitive behavior, men exhibit a significantly higher propensity for destructive competition than women. In these low-intensity competitions, with variable incentive schemes and no social comparisons, the benefits derived from such behavior are lower and more uncertain. Gender differences emerge in low-intensity competitions because women curb their destructive competitive behavior in response to situational cues, while men continue the behavior in spite of conflicting social cues. Non-competitive behavioral norms dampen (but do not eliminate) men's and women's destructive competitive behavior in low-intensity competitions. After observing leaders who refrained from engaging in destructive competitive behavior, both men and women curbed their own competitive behavior. Gender differences in propensity for destructive competition in low-intensity competitions remain, however, even after observing behavioral norms.

4.6.2. Future directions and limitations

In the experiments, women reaped greater benefits than men from destructive competitive behavior. Gender differences in payoffs derived from destructive competition primarily reflect women's relative effectiveness in incorporating social comparison information into their decision making. Men factored incentive schemes into their decision making to some extent (albeit, not as effectively as women) before they displayed destructive competitive behavior, but largely ignored the absence of social comparison information on which to base their decisions. Future research can examine gender differences in propensity for destructive competition under other incentive schemes that vary in their emphasis on individual versus relative performance. In particular, gender differences in destructive competitive behavior in purely-self oriented incentive schemes such as piece-rate pay could be examined to determine whether men and

women differ in their evaluation of contextual cues in *non-competitive* environments as they do in competitive environments.

This chapter examined how men and women respond to changes in expected payoffs from destructive competitive behavior and found that men are less responsive than women to changes in expected payoffs. However, in the studies, prizes in winner-takes-all and variable reward schemes differed by a constant ratio, and individuals competed against the same person in Studies 8 and 9. Future research should manipulate prizes (i.e., the spread between expected payoffs under different incentive schemes) and/or effectiveness of competitors to further explore gender differences in responsiveness to the changes in the competitive environment.

In the experiments, destructive competitive behavior was explicit and "sanctioned" in that participants were given a clear option to deduct points from their counterpart by the experimenter. This framing might have exacerbated individuals' propensity to hurt or sabotage their competitors (Harbring and Irlenbusch, 2011). In addition, behavioral norms were demonstrated only through role modeling by a designated leader. In organizations, leaders typically have the power to not only model desired behavior, but also to impose punishments and grant rewards. Leaders may be able to curb both men's and women's propensity for destructive competition more effectively by using a combination of managerial tools.

Our findings offer some insight into why individuals choose to engage (or not engage) in destructive competition. Individuals, especially men, were more likely to use utilitarian justifications for engaging in destructive competition in high-intensity competitions. High-intensity competitions appeared to decrease individuals' concerns about fairness and imposing an unjustified cost on others. Moreover, compared to men, women were more likely to explain their restraint from destructive competition as due to concerns about fairness and burdening others.

While the data were post-hoc, exploring the mediating role of these justifications of destructive competitive behavior offers a fruitful avenue for future research. We caveat that explicitly questioning individuals' reasoning prior to decision making may minimize reflexive behavior and alter individuals' propensity for destructive competition.

In some circumstances, women are more risk averse than men (Charness & Gneezy, 2013; Croson & Gneezy, 2009). Because a decision to engage in destructive competitive behavior involves risk assessment, gender differences in risk aversion are likely to contribute to gender differences in propensity for destructive competition and should be explored in future research. However, it should be noted that risk aversion explains a small portion of gender differences in competitive behavior (Niederle & Vesterlund, 2007; Niederle & Vesterlund, 2011). Moreover, in the experiments, women were able to reap more actual benefits from risky point deduction decisions than men in most circumstances, indicating they did take calculated risks when it was appropriate.

4.6.3. Theoretical and practical contributions

This chapter adds to a growing body of literature on gender differences in competitiveness (Dato & Nieken, 2014; Gneezy et al., 2003; Niederle & Vesterlund, 2007). Prior research focused on examining the gender gap in competitive behavior in primarily winner-takes-all competitions with no social comparison (for exceptions please see Wozniak, 2012 and Wozniak, 2010). In contrast, the studies in this chapter varied incentive schemes and the availability of comparative performance feedback and measured gender effects in destructive competitive behavior. The findings revealed that gender differences are limited to situations where the expected net payoffs of competitive behavior are ambiguous and relatively low; there

were no statistically significant gender differences in competitions with higher and more certain expected payoffs to destructive competition.

Women were more likely than men to take the structural features of the competitive context into account. In particular, women were more effective than men in incorporating social comparison information into their decisions; as a result, they earned greater rewards when engaging in competition. These results are consistent with field research showing that, compared to men, women do more due diligence on the types of environment they will compete in and pay more attention to cues in competitive work environments (Groysberg, 2010).

Men displayed similar levels of destructive competitive behavior both in high-intensity and low-intensity competitions during the experiments. These results suggest that men may display competitive behavior reflexively, and tend to overlook the structural features of the competitive environment. The findings regarding men's destructive competitive behavior adds to a growing body of literature on bounded awareness in competitions—individuals' tendency to overlook or miss useful, salient information and contextual cues such as the "rules of the game" in competitive environments (Chugh & Bazerman, 2007; Idson, et al., 2004). These findings also contribute to the literature on overconfidence and propensity to compete. Prior research demonstrated that overconfidence can cause excessive or reflexive competitive behavior (Camerer & Lovallo, 1999).

Our research also sheds light on the seemingly contradictory findings of past research on gender differences in competitive behavior. While some research finds that women are less willing to compete than men (Dato & Niken, 2014; Niederle & Vesterlund, 2007; Niederle & Vesterlund, 2011), other studies find that women are willing to compete in same-sex settings (Gneezy et al., 2003). Past research findings demonstrate that women are more likely to compete

with each other when they have token status (Staines et al., 1974) or when they are underrepresented in the upper levels of the organization (Ely, 1994). These organizational contexts are likely the circumstances that lead women to think that they are in a high-intensity competition in which extreme competition and sabotage-like behavior are warranted—winner-takes-all competitions with high, explicit social comparisons. In general, when women do not have clear information on the competition structure in male-dominated organizations, they might assume that they are in a low-intensity competition with male coworkers and in a high-intensity competition with their relatively few and conspicuous female coworkers. These assumptions are likely to decrease women's tendency to compete with their male peers and increase their tendency to compete with, or even sabotage, their female peers at a potential cost to themselves, ironically exacerbating the gender gap in male-dominated organizations.

Finally, this chapter contributes to existing research on sabotage (Analoui, 1995; Chen, 2003; Dato & Nieken, 2014; Garicano & Palacios-Huerta, 2005; Harbring & Irlenbusch, 2011) by exploring the tendency to undertake costly and destructive competitive behavior across different forms of intra-organizational competitions. We show that such destructive competitive behavior, which is almost always costly to the organizations in which value is being destroyed, is more likely under a winner-takes-all incentive scheme and when social comparison information is available. These results suggest potentially costly, unintended side effects of certain competition-based organizational practices employed to boost productivity, such as up-or-out promotion policies and 360° performance reviews.

To summarize, gender differences in destructive competitive behavior emerge most clearly under conditions of ambiguity, when the expected payoffs to competing are either unknown or minimal. In these ambiguous situations, women are more likely than men to more

accurately assess the competitive environment and curtail their propensity for destructive competition. Furthermore, the results show that organizations have levers for minimizing the damage due to destructive intra-organizational competition. Low-intensity competition structures, such as non-comparative performance feedback and variable reward systems that emphasize individual accomplishments and growth, along with collaborative behavioral norms, render destructive competition less attractive from the employees' perspective and reduce intra-organizational destructive competition. Our results indicate, however, that some degree of destructive competitive behavior is reflexive and persistent. To eliminate destructive competition completely, organizations need to ascertain that the expected costs of such behavior definitively exceed the expected benefits employees can reap, and find ways to make this fact salient.

5. CONCLUSION

Competitive, winner-takes-all (i.e., tournament) type incentive schemes, high social comparison performance feedback systems (e.g., 360º reviews) and specific and challenging goals have been praised by many researchers and practitioners for increasing employees' focus, motivation and, ultimately, performance (Ariely et al., 2009, Charness, et al., 2014; Locke & Latham, 1990). However, findings across all three chapters show that these motivational tools – designed and implemented with the intention of bolstering performance – can have negative, unintended effects on attention allocation, decision making and performance.

Aforementioned motivational tools induce a single-minded preoccupation with specific performance benchmarks, and concentrate individuals' attention and efforts. However, findings from the ten experiments described in this dissertation show that this concentration of attention and effort might not ultimately have a beneficial effect on performance. These motivational tools can prompt individuals to adopt excessively narrow and rigid attentional strategies; in turn, individuals can fail to notice crucial, accessible information, make suboptimal decisions for themselves and their organizations, perform suboptimally on their primary tasks, fail to capitalize on unexpected opportunities, and engage in destructive behavior.

For example, the first four studies from Chapter 1 show that specific goals direct individuals to satisfice early and narrow attention excessively, interfere with their ability to contend with uncertainty and ambiguity, and prompt them to treat stochastic information (i.e., data with embedded uncertainty) as deterministic information (i.e., data with no uncertainty). As a result, individuals who are given specific goals overlook available, relevant information in unstructured decision making tasks that contain uncertainty and ambiguity, and make suboptimal decisions.

The three studies from Chapter 2 show that specific and challenging goals, and winner-takes-all type incentive schemes coupled with comparative performance feedback systems (e.g., 360° reviews) prompt excessive, rigid focus, and increase individuals' propensity to miss unexpected, yet highly important and accessible information. Consequently, individuals who are given these types of motivational tools fail to capitalize on unexpected opportunities, and perform badly in terms of attaining their primary goals.

Studies from Chapter 3 show that competitive, winner-takes-all-incentive schemes and high social comparison (i.e., comparative) performance feedback systems increase the likelihood that individuals engage in costly, destructive competitive behavior such as sabotage. More importantly, the findings indicate that competitive schemes drive some individuals (especially men) to exhibit excessively narrow attention in the presence of uncertainty and ambiguity about outcomes, overlook important contextual information, and make reflexive, suboptimal decisions that ultimately hurt them as well as their organizations.

In contrast, findings from the experiments indicate that when there is limited uncertainty and ambiguity in the environment, specific and challenging goals, competitive incentive schemes and comparative performance feedback systems are beneficial for performance. Similarly, aforementioned motivational tools increase performance when there are no unexpected opportunities or adversity for individuals to respond to during task performance. However, organizational environments with such a high level of structure, certainty and predictability are increasingly rare and confined mostly to entry level or assembly line work.

In today's corporate environment individuals are required to contend with high levels of uncertainty and ambiguity, respond to rapid shifts in the environments, and capitalize on unexpected opportunities and deflect unforeseen threats (Eisenhardt, 1989; Eisenhardt & Martin,

2000). In these kinds of jobs, employees are expected to respond swiftly to a constant stream of new information, explore new avenues and strategies, and be innovative (Eisenhardt & Martin, 2000; Tushman & O'Reilly, 2006; O'Reilly & Tushman, 2008). Results from all three chapters show that specific and challenging goals, and competitive incentive schemes and performance feedback systems are more likely to cause bounded awareness and harm performance in these kinds of jobs. When the organizational environment requires employees to adopt sophisticated, flexible attentional strategies, managers need to assign broadly-defined goals to their employees and use non-competitive or less competitive incentive schemes and performance feedback systems that focus on individual accomplishment and growth. These types of incentive tools would allow individuals to retain a level of autonomy and creativity, to employ broader, more sophisticated attentional strategies, to capture emergent, important information, and capitalize on new, unexpected opportunities.

6. APPENDICES

6.1. Appendix 1

Available information on Company White: (1) Company White had ~$ 0.23 billion net income and $5.09 billion revenues in 2009; this translates into a profit margin of 4.57% in 2009. The company had $0.18 billion net losses and $5.14 billion revenues in 2008. As a result, the company had a loss margin of -3.53% in 2008. (2) Company White had $10.8 billion of assets in 2009 and $10.41 billion of assets in 2008. (3) The company employs more than 18,000 people and has a footprint in more than 150 countries. (4) In February 2010, Company White named a new Chief Financial Officer.

Available information on Company Yellow: (1) Company Yellow's profit margin was 9.87% in 2009. Its profit margin in 2008 was 7.18%. (2) Company Yellow had $2.44 billion of assets in 2009 and $2.58 billion of assets in 2008. The company reported record revenues, earnings and cash flow from operations in 2009. (3) Morgan Stanley's research department initiated coverage on the company with a Buy/Overweight rating. (4) Company Yellow received FDA (US Food and Drug Administration) approval to manufacture a new infant formula, which is expected to boost company's profits.

Available information on Company Brown: (1) Company Brown had a profit margin of 13.8% and 12.7% in 2009 and 2008, respectively. (2) Company Brown had total assets of $8.31 billion and inventories of $0.2 billion in 2009. Total assets in 2008 were valued at $ 6.79 billion. (3) Company Brown's flagship product is likely to lose market share in 2010, because Brown's main competitor recently won FDA (Food & Drug Administration) approval to sell its products in the United States. (4) Brown recently agreed to pay $609 million to settle charges relating to its US sales and marketing practices of its flagship cosmetics product. The management expects that this settlement will wipe out all of company's profits in 2010.

Available information on Company Gray: (1) Company Gray's 2009 profit margin was 4.97% (i.e., net income of ~$0.51 billion divided by total revenues of $10.29 billion). The profit margin in 2008 was 5.10% (i.e., net income of ~$0.54 billion divided by total revenues of $10.59 billion). (2) Gray had total assets of $23.95 billion in 2009. In 2008, company had assets worth $21.83 billion. (3) The largest shareholders are SunLife Financial (9.56%), Franklin Resources (6.94%), and Barclays (5.6%). (4) In March 2010, the company temporarily suspended its Stimuvax studies in lung cancer; in July 2010, the program has been restored.

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