ESSAYS ON REPORTING AND INFORMATION ACQUISITION UNDER CONFLICT OF INTEREST

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Dedicated to Grim Berge
(1922-2005)

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CONTENTS

1. GENERAL INTRODUCTION

In this Ph.D. dissertation, I investigate issues concerning decision-facilitation from a behavioral perspective. Decision-facilitation is broadly defined as a process in which information is acquired, communicated, and used to improve decision-making (Demski & Feltham, 1976). In the following sections of this introduction, I describe the general research motivation for the dissertation, provide an overview of the chapters and how they are related, and end with a note on methodology.

1.1. General Motivation

With the recent data explosion, firms are increasingly concerned with honing their capabilities to transform available data into actionable knowledge (Chen, Chiang, & Storey, 2012; Mikalef, Boura, Lekakos, & Krogstie, 2019). Academics and practitioners alike relate firms' capabilities in extracting information from data to their competitive advantage and long-term profitability (KPMG, 2015; LaValle, Lesser, Shockley, Hopkins, & Kruschwitz, 2011). In response, firms increasingly delegate the responsibility for information acquisition and hire employees with expertise in transforming data into actionable information (e.g., data scientists) (Davenport & Patil, 2012).

Although employees with expertise are more effective in acquiring valuable information, their interests often diverge from those who, in the end, use the information in decision-making (Ramanna, 2015). Analysts, managers, and consultants often have interests in recommending a course of action that will benefit themselves and their business unit (Bentley, Bloomfield, Vidai, & Ferguson, 2019). For example, superiors might rely on project managers' expert knowledge in selecting the best projects to invest in. However, project managers might have incentives to bias their reports in a self-serving manner. Another example is participative budgeting, where subordinates might choose to misreport actual cost predictions to receive slack benefits (Brüggen & Luft, 2011).

Conflicts of interest are particularly problematic when the superiors' cost of obtaining the information is prohibitively high (Demski & Sappington, 1987). In settings where the acquired information can be considered *private*, classical agency theory suggests that employees have "narrow self-interest" and will therefore not hesitate to act upon opportunities to serve their self-interest at the firm's expense (Douthit & Majerczyk, 2019; Stevens & Thevaranjan, 2010). However, accumulated

evidence from experimental research shows that people often have moral reservations for acting unethically (Blay, Douthit, & Fulmer, 2018; Evans, Hannan, Krishnan, & Moser, 2001; Gneezy, Kajackaite, & Sobel, 2018) and that contextual factors significantly affect decisions made under conflict of interest (Cardinaels, 2016; Shalvi, Gino, Barkan, & Ayal, 2015).

In this dissertation, I present four chapters that offer new perspectives on the decision-facilitation process in firms, focusing on settings with conflict of interest. The first three chapters present three experimental studies. Chapters I and II explore how preparers strategically *avoid* and *collect* information to self-justify misreporting in settings with conflicting interests. Unlike the preceding chapters, Chapter III focuses on employees' *use* of contextual information when deciding whether to behave opportunistically toward their employer. Chapter IV presents a comprehensive review of the extant experimental research literature concerned with decision-facilitation. This final chapter introduces a conceptual framework of the decision-facilitation process that encompasses three distinct phases: *information acquisition*, *communication*, and *information usage.* I use the framework to systematize the previous literature, identify gaps, and motivate suggestions for future research.

The below figure provides an overview of the three phases of the decision-facilitating process and illustrates how the four chapters of this dissertation are related.

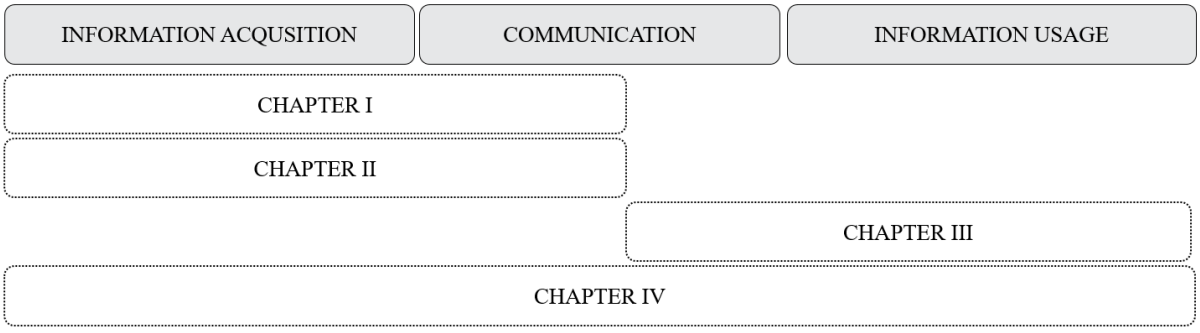

FIGURE 1.—Thematic overview of the chapters in the dissertation

1.2. Overview of Chapters

1.2.1 Chapter I

In the first chapter, which is single-authored, I use a laboratory experiment to examine managers' tendency to avoid information in a trust-based reporting-setting. Although information acquisition is a

crucial aspect of managers' reporting tasks, little experimental research exists on how reporting-managers collect and process data when preparing reports (Haesebrouck, 2017; Luft, 2016).

In the project-selection setting, superiors often rely on the recommendations of better-informed managers whose interests are misaligned with the superiors. Prior research finds that managers often feel morally compelled to report honestly and, therefore, tend to sacrifice private benefits to produce honest reports (Evans et al., 2001). However, project managers might self-justify recommending suboptimal projects by avoiding relevant information because the ignorance can be used to convince themselves that they would have reported otherwise if they fully knew the project was sub-optimal.

In the experiment, participants are randomly assigned to the roles of project managers and superiors. The project managers' task is to assess their project's profitability and report to superiors whether implementing it is also in the firm's best interest. I manipulate whether project managers have discretion in acquiring complete profitability information and whether obtaining this information requires both collecting and processing data. Among project managers who have to actively acquire information, I manipulate whether obtaining this information requires just clicking a button (high information accessibility) or analyzing a dataset (low information accessibility).

Results from the experiment provide evidence that managers with discretion rarely avoid collecting data—even when obtaining the underlying information requires data processing. However, managers with discretion report significantly more opportunistically when obtaining information requires data processing. This increase is best explained by managers' enhanced ability to engage in a process of cognitive maneuvering to avoid drawing unfavorable conclusions when processing data. Because accounting systems largely determine how readily available information is to its users, the main practical implication of this study is that improving internal accounting systems can serve as an indirect control against misreporting.

1.2.2 Chapter II

In the second chapter, co-authored with Ceren F. Ay and Katrine Nødtvedt, we investigate whether people use curiosity in a strategic manner to justify dishonest behavior. Specifically, we propose that individuals experiencing a want-should conflict will be motivated to acquire information that can serve as a potential justification to act in line with their temptations. Just as people might be strategically

ignorant (Dana, Weber, & Kuang, 2007; Golman, Hagmann, & Loewenstein, 2017), we propose that people also tend to acquire non-instrumental information for the sake of justifying their selfishness—we call this behavior "strategic curiosity".[2]

To test our predictions, we conduct a dice-rolling game (Shalvi, Dana, Handgraaf, & De Dreu, 2011). Participants roll a fair virtual dice and report the outcome of the first roll for monetary rewards - with higher reported numbers resulting in higher payments. We vary whether people can collect non-instrumental information and the content of the additional information.

We pre-registered hypotheses stating that a demand for justifications arises when there is a conflict between reporting honestly and self-serving reporting. This demand for justifications will be greater the larger the perceived distance is between factual reality (e.g., rolling a 'one') and the reality one would prefer to report ('six'). Therefore, people are more likely to acquire information that could reduce the perceived distance between the factual outcome and the wealth-maximizing outcome when this distance is large (e.g., rolling a one) compared to when there is less or no distance (e.g., rolling a five or six)—and obtaining more information would increase dishonesty.

Our main finding is that people tend to strategically collect non-instrumental information strategically but allowing people to be curious does not result in a higher level of dishonesty. We provide further evidence on our main results and show that people acquire additional information—not only to search for justifications—but also to distract themselves from moral conflict. Thus, our study provides insights that increase our understanding of the link between information and moral decisions in online settings.

1.2.3 Chapter III

The third chapter—co-authored with Farah M. Arshad—is concerned with how contextual information about the employer's CSR initiatives is incorporated into employees' decisions to act opportunistically toward their employer. A classical understanding of CSR is that firms have a social responsibility to sacrifice some of their profits in society's interest (Benabou & Tirole, 2010; Sprinkle & Maines, 2010).

[2] Because this phenomenon has not yet been documented, the writing of this paper is targeted toward general behavioral economics journals and the paper therefore has a different format and style than the other chapters that are targeted at accounting journals.

However, firms have recently started to rethink CSR from being about sacrificing profits to endeavors that could benefit both the society and the firm's bottom-line (e.g., Porter & Kramer, 2011), i.e., win-win CSR. Even though a large body of research has investigated the consequences of engaging in philanthropic CSR, comparable research on the win-win approach to CSR is non-existent.

This chapter makes a unique contribution to the research by investigating whether the presence of a profit motive in CSR has adverse effects on employee opportunism. We pre-registered hypotheses that employees tend to use the presence of a profit motive in CSR to form self-serving beliefs about the employer (e.g., the employer only cares about the money) that help employees justify behaving opportunistically.

We hired 1,500 high-quality US workers on Amazon Mechanical Turk (MTurk) to work for a sole proprietorship. Depending on the treatment condition, workers received a message about one of three initiatives recently undertaken by the employer: marketing campaign, philanthropic CSR initiative, and win-win CSR initiative. While working, we measured employees' propensity to act opportunistically.

Although we observe substantial employee opportunism across all conditions, we find that engagements in either philanthropic or win-win CSR do not significantly affect employee opportunism. We do, however, find that engaging in CSR significantly influences employees' perceptions of the employer and that engaging in win-win CSR adversely affects these perceptions compared to philanthropic CSR. Though employee-perceptions are correlated with employee opportunism, engaging in CSR seems to affect many perceptions that have offsetting effects on employee opportunism—likely resulting in insignificant treatment effects. Thus, this study shows that, although engaging in win-win CSR undermines the positive perceptions of engaging in CSR, its effect on employee opportunism depends on the relative strength of the perceptions affected by the initiative.

1.2.1 Chapter IV

The last chapter is single-authored and is a systematic and comprehensive literature review of the last 20 years of experimental management accounting research on decision-facilitation. Despite being one of the most prominent roles of accounting information, prior research provides only a general description

that does not specify key tasks and responsibilities of the decision-facilitation process (e.g., Bromwich, 2006; Demski & Feltham, 1976; Luft, 2016; Sprinkle, 2003).

This chapter presents a conceptual framework based on the General Communication Model (Shannon, 1948) but modified to the decision-facilitating approach where relevance, measurement, and evaluation of information depend on the decision and the user of the information (Demski & Feltham, 1976). The conceptual framework allows for a systematic review of the existing literature and the identification of important gaps in this literature. In addition, the chapter introduces new theoretical lenses that propose interesting and testable behavioral predictions that deviate from the baseline predictions of classical information economics. On this basis, Chapter IV provides suggestions for future experimental research—not by mere "gap-spotting"—but by drawing on trends in practice and recent insights from psychology and behavioral economics.

1.3. A Note on Methodology

This dissertation uses the experimental method to investigate research questions. An experiment is a scientific investigation involving active and purposeful manipulation and measurement of independent variables and observing their effects on other dependent variables (Bloomfield, Nelson, & Soltes, 2016). In the following, I outline the rationale for focusing on and using the experimental method in this dissertation.

1.3.1 The Rationale for Using Experiments

The ultimate goal of positivistic research is to make causal claims that can inform theories that generalize beyond the specific context in which the data has been collected (Bloomfield et al., 2016; Floyd & List, 2016). According to the philosophical approach of constructive empiricism, theories play an intermediate role in specifying the causal link between unobservable constructs that are semantically meaningful. Causal links are not directly observable, but effects leave empirical traces that enable researchers to infer the nature of the relationships between constructs through empirical investigation (Shadish & Sullivan, 2012). Different from scientific realism, constructive empiricism argues that theory can be accepted without believing that its constructs are real; it is enough to accept them as *useful* (Bloomfield et al., 2016, p. 348).

The primary strength of controlled experiments is the ability to support causal claims and inferences (Angrist & Pischke, 2009). Empirically, causal claims imply that there is a covariance between the cause and effect (if X then Y, if not X then not Y), the cause should appear before the effect (temporal precedence), and that there are no other alternative explanations for the observed effect (Cook & Campbell, 1979; Shadish & Sullivan, 2012). To this end, there are two features to experiments that are essential. First, experiments do not merely measure the covariance between variables of interest but purposefully introduce exogenous variation in the independent variable(s) before observing the effect(s) on the dependent variable (Bloomfield et al., 2016). This ensures temporal precedence. Second, experiments can support *counterfactual arguments* through randomization. By randomly assigning a sufficiently large number of subjects into either control or treatment groups, the groups are statistically identical in terms of observable and unobservable characteristics. Because there are no ex-ante differences between groups, differences observed after the treatment manipulation can be attributed to the manipulation.

Another advantage of experiments is that they excel at studying micro-level phenomena such as human decision-making processes and behavior (van Pelt, 2019). Using archival or field data to assess the relationship between dependent and independent variables poses challenges as they may be contaminated by effects beyond the researcher's control (Sprinkle, 2003). Controlled experiments help to overcome such limitations and allow researchers to examine questions that otherwise would go unexamined.

1.3.2 Benefits of Experiments in the Dissertation

The chapters in this dissertation benefit from controlled experiments as they allow for examining how individuals avoid, over-acquire, or use non-relevant information to excuse misreporting. Studying dishonesty in practice is particularly challenging as people rarely admit their dishonesty in an unbiased manner in surveys or interviews. Moreover, prior research suggests that individuals conduct a mental cost-benefit analysis between misreporting for higher monetary gains and maintaining a positive moral self-image (Cardinaels, 2016; Mazar, Amir, & Ariely, 2008). Without using an experimental approach, it would be impossible to build theories that shed light on the micro-level processes that guide an individual's moral behavior. For example, the laboratory experiment in Chapter I investigates how

making information more easily accessible might affect managers' tendency to misreport to their superiors. In practice, observing managers' decisions to avoid relevant information is extremely difficult. The researcher would have to know what information the manager should acquire and whether the manager did acquire it before reporting. The laboratory experiment makes it possible to control what information is relevant, randomly endow information to some while giving others the discretion to avoid the information, and to obtain precise measures on managers' information acquisition.[3]

1.3.3 A Note on Generalizability

A common critique of experiments is that they often lack external validity, meaning that the experimental setting does not resemble the real world and, therefore, its findings cannot be generalized outside the experimental setting (mundane realism). However, the purpose of experiments is not to resemble real-world settings but to facilitate clean tests of theories to further develop the theories. Rather than basing the generalizability on how well the experimental setting resembles the real world, the *theories* are the basis of generalization across "actors and settings" (Swieringa & Weick, 1982, p. 57). To that end, the experimental events must be believed, attended to, and taken seriously by participants (experimental realism).

In all the experiments in this dissertation, experimental realism is ensured by adequately incentivizing decisions relevant to the underlying theory. The experimental studies also abstain from using any form of explicit deception to ensure that instructions are believed and taken seriously by participants (Libby & Salterio, 2019).

[3] Two of the three experiments in this dissertation were conducted online where complete control over the setting is not possible. We decided to not conduct the experiment in Chapter II in the laboratory because of the trade-off between internal and statistical validity favored a setting in which we could increase statistical power. The research question in Chapter III warranted the use of actual workers and an actual firm.

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CHAPTER I

Plausible Honesty:
Information Avoidance in the Managerial Reporting Context and the Role of Accounting Systems

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ABSTRACT

In this paper, I use an experiment to examine managers' tendency to avoid information in a trust-based reporting-setting. Participants are randomly assigned to the roles of project managers and superiors (without rejection authority). The project managers' task is to assess the profitability of their project and report to superiors whether implementing it is also in the firm's best interest. I manipulate whether project managers have discretion in acquiring complete profitability information and whether obtaining this information requires both collecting and processing data. Results show that managers with discretion rarely avoid collecting data—even when obtaining the underlying information requires data processing. However, managers with discretion report significantly more opportunistically when obtaining information requires data processing. I find that spending insufficient time analyzing data, analytical abilities, or unawareness of misreporting cannot explain the increase in opportunistic reporting. Instead, the increase is best explained by managers' enhanced ability to engage in a process of cognitive maneuvering to avoid drawing unfavorable conclusions when processing data. The main practical implication of this study is that improving internal accounting systems can serve as an indirect control against misreporting.

Keywords: Information Avoidance; Accounting Systems; Opportunistic Reporting; Moral Identity

JEL-Classifications: C91, D82, M40, M50

1. INTRODUCTION

A key challenge for firms is to make sense of a broad range of data and apply that knowledge to business planning, forecasting, and decision support (PWC, 2016). In a digital world with abundant data access, firms increasingly rely on managers with expertise in transforming a broad set of data into decision-relevant information (Mohr & Hürtgen, 2018). Despite being effective at acquiring information, reporting-managers often have diverging interests from their superiors. For instance, managers can create budgetary slack by biasing budget proposals (e.g., Antle & Eppen, 1985) or recommend suboptimal courses of action to benefit themselves (e.g., Aghion & Tirole, 1997).

Prior research finds that managers with misaligned interests often feel morally compelled to report honestly and tend to sacrifice private benefits to produce honest reports (e.g. Evans, Hannan, Krishnan, & Moser, 2001). However, this line of research often assumes that managers possess complete information such that their only decision is whether to report truthfully (Luft, 2016). Recently, Haesebrouck (2017) examines whether the process of acquiring information can influence managers' reporting choices and finds that managers who must make an effort to obtain information report more opportunistically when the reporting context does not trigger honesty concerns. Though obtaining information can be effortful, the recent data explosion in firms also require managers to discern what information is relevant for various decisions and *decide* what information to acquire (Deloitte, 2018b). In settings with misaligned interests, managers can exploit this newfound discretion to strategically avoid information that provides them with a *moral wiggle room* that can justify reporting in line with their self-interest (Dana, Weber, & Kuang, 2007; Grossman & van der Weele, 2017).

In this paper, I use an experiment to investigate managers' tendency to avoid relevant information that varies in accessibility in a managerial reporting setting.[1] Distinguishing aspects of the managerial reporting settings are that they are often based on trust (Douthit & Majerczyk, 2019) and reports typically contain factual assertions (Rankin, Schwartz, & Young, 2008). These aspects are important as trust-based settings make people more hesitant to strategically avoid information (van der Weele, Kulisa, Kosfeld, & Friebel, 2014) and factual assertions trigger honesty concerns (Haesebrouck, 2017). Indeed,

[1] Accessibility refers to the ease in which managers can infer the informational content from available data

Church, Hannan, and Kuang (2014) find that opportunistic reporting does not differ between participants who can choose whether to *collect* information and participants endowed with information in a managerial reporting setting. However, information avoidance is not limited to instances where managers decide to not even bother collecting information that is easily accessible but extends to situations where avoid information by choosing not to draw unfavorable conclusions from the data they collect (Golman, Hagmann, & Loewenstein, 2017).

The distinction between ways to avoid information is important in the managerial reporting context for the following reasons: First, physically avoiding data is a salient act of opportunism in the managerial reporting context. Because managers are entrusted to report information in good faith (Douthit & Majerczyk, 2019), choosing to blatantly avoid collecting relevant information might defeat the purpose of self-justifying reporting opportunistically. The trust-setting can therefore reduce the viability of using blatant ignorance as a justification to behave selfishly (van der Weele, Kulisa, Kosfeld, & Friebel, 2014). In contrast, failing to draw unfavorable conclusions when processing collected data is a less salient act of opportunism particularly because drawing self-serving conclusions could be justified as an "honest mistake", enabling managers to appear (plausibly) honest to themselves while reporting self-servingly (Shalvi, Gino, Barkan, & Ayal, 2015).

Second, accounting systems excel at easing the processing of data (e.g., using API to integrate different types of data) but are often unable to ensure that managers collect all relevant data (Bloom, Garicano, Sadun, & Van Reenen, 2014),[2] particularly if the manager has expertise in discerning what data is relevant for various decisions (Demski & Sappington, 1987). Monitoring whether expert managers have attended to all relevant information is challenging for non-expert superiors—unless data relevance has been pre-specified (Lewis & Sappington, 1993; Labro, Lang, & Omartian, 2019). Easing the processing of data limits managers' ability to cognitively maneuver away from drawing unfavorable conclusions when processing data because the data's informational content becomes easier to infer, thereby making it harder to reasonably defend self-serving conclusions (Kunda, 1990; Peysakhovich &

[2] Designing incentive schemes that effectively induce managers to both acquire and report truthfully is particularly difficult (Balakrishnan, 1991) and not particularly widespread in practice (Brüggen & Luft, 2016).

Karmarkar, 2016). Accounting systems can therefore influence opportunistic reporting by reducing managers' ability to avoid drawing unfavorable conclusions from the data they collect.

I conduct a laboratory experiment to investigate managers' tendency to avoid private information to justify reporting self-servingly. The experimental task is a project-selection decision (Aghion & Tirole, 1997) based on Dana et al. (2007). Participants are randomly assigned to the roles of project managers and superiors. The project managers' task is to assess the profitability of a potential project and report to the superior whether implementing the project is the best option for their firm. However, superiors are passive receivers of the reports, and their payment is thus directly affected by the project managers' reporting choices.[3] Though all project managers have incentives to report to implement their projects, not all projects are optimal to implement for the firm.

In this setting, I manipulate whether project managers are endowed with or have to actively acquire information about whether implementing the project is optimal for the firm. Among project managers who have to actively acquire information, I manipulate whether obtaining this information requires just clicking a button (high information accessibility) or analyzing a dataset (low information accessibility). However, project managers can ignore this information without the superiors knowing about it (Lewis & Sappington, 1993). If they choose to collect data, the project managers determine how much time to spend on analyzing the data.

Consistent with my predictions, managers with discretion in acquiring information rarely physically avoid information—even when obtaining the information requires an effortful analysis of data. Hence, when information is easily accessible, managers with discretion report to implement the sub-optimal project on a similar level as those without discretion. However, when obtaining information requires effortful analysis, managers with discretion are about 30 percent more likely to report to implement sub-optimal projects than those without discretion.

Supplementary analyses provide evidence consistent with the notion that project managers treat honesty as a moral constraint on their reporting decisions. These results suggest that managers report more self-servingly when information is less accessible (requiring analysis of data) because they can

[3] Following previous research, superiors do not have rejection authority in order to facilitate a clean test of honesty concerns without confounding strategic considerations (Rankin et al., 2008).

circumvent internalized moral constraints that compel them to report honestly. Additional analyses show that analytical abilities, level of comprehension, or effort exerted cannot explain the observed increase in opportunistic reporting. Instead, results show that, despite spending significant time analyzing data, project managers in the low-accessibility condition tend to avoid free project information ex-post. Furthermore, results show an asymmetric treatment effect depending on project managers' internalization of moral values (Aquino & Reed, 2002). Together, supplementary analyses seem to suggest that project managers in the low-accessibility condition tend to engage in a process of cognitive maneuvering to avoid drawing conclusions that morally compel them to report against their self-interest.

This study makes some key contributions to the research literature. First, the study fills an important gap in the experimental management accounting research (Luft, 2016) by investigating how diverging interests affect private data collection and data processing. While Church et al. (2014) study how conflict of interest can lead employees not to collect data, this is the first to study how misalignment of interests can affect data collection and processing. Studying data processing is essential because accounting systems can facilitate easier data processing (e.g., integrating data sources) but can often not ensure that all relevant data has been collected (especially when determining relevance is difficult to pre-define).

Second, this study contributes to research concerned with understanding the determinants of honest reporting in accounting. While previous research in accounting attributes honest reporting behavior to preferences for honesty (Douthit & Majerczyk, 2019; Evans et al., 2001; Rankin et al., 2008), the findings in this study suggest that managers tend to treat morality as a constraint to be circumvented. Rabin (1995) shows that treating morality as a constraint rather than a preference has implications for how people acquire information. When reporting honesty is a preference, managers will gather relevant information to ensure that their reports are factually true. When honesty mainly serves as a constraint, managers will avoid information that they suspect would be unfavorable to circumvent honesty constraints, helping them report in line with their self-interest. Thus, this study sheds new light on the determinants of honest reporting.

Third, this study, to the best of my knowledge, is the first to experimentally investigate how improvements in information technology affect reporting honesty in an agency setting. Although research has examined the effects of information technology on the delegation of authority (Bloom et

al., 2014; Garicano, 2000; Labro et al., 2019), no research has examined its effects on reporting behavior. Though advances in information technology are often framed in terms of efficiency gains (i.e., reduce information acquisition costs), I provide evidence that improved information accessibility induces reporting honesty in managers responsible for acquiring information. Hence, this study identifies a previously hidden cost related to under-investment in internal accounting systems.

Overall, this paper investigates an important—but understudied—aspect of managers' reporting tasks, namely the information acquisition phase (Berge, 2020). For many, acquiring information is a tedious process because data is siloed in legacy IT-systems, and the available tools are ineffective in handling different types of data (Deloitte, 2018a). New tools such as automation, application programming interfaces (APIs), and machine learning offer to improve the efficiency in which managers can acquire information (Deloitte, 2018b). As the sophistication of these technologies increases, managers can obtain information, which they previously could only obtain through manual analysis, by "the click of a button" (Deloitte, 2018a; Liu, 2018). Thus, the main implication of this study is that improving internal accounting systems may serve as a control to prevent misreporting and possibly other types of fraud. As such, this study suggests that auditors should consider the digital sophistication of the internal accounting system as a part of their risk-assessment of controls designed to prevent fraud (e.g., PCAOB, 2010).

The rest of the paper is structured as follows. Section 2 explains the setting and provides the theoretical background from which I develop the hypotheses. In Section 3, I explain the experimental design and procedures. Section 4 contains the results with supplementary analyses. Finally, I provide a discussion with suggestions for future research in Section 5.

2. SETTING AND HYPOTHESIS DEVELOPMENT

2.1. Agency Setting and Predictions

Project management is an important managerial task because it often involves significant investments and difficult trade-offs. The management within an organization often sets a policy on how projects are selected and implemented, and the projects are managed based on their direct and indirect contributions (Shin, 2008). In selecting among alternative projects, however, the management often faces a

problematic agency situation. While management seeks to invest in the project that generates the most profit for the firm, management is often reliant on the input of better-informed project managers to make an informed choice (Balakrishnan, 1991). In cases where such information is difficult to acquire, firms usually delegate responsibility to acquire information to individuals who have expertise in making sense of data (Demski & Sappington, 1987) and report their findings to inform management's project-selection decisions.

In delegating the acquisition of information, management is exposed to distinct agency problems. First, the principal often cannot tell whether the agent is sufficiently informed (Lewis & Sappington, 1993). Thus, the principal must deal with problems associated with agents not expending effort on acquiring information (hidden action). Second, the agent might recommend a project alternative that is sub-optimal for the principal because that project generates higher private benefits for the agent (Aghion & Tirole, 1997). Because of information asymmetry, agents may misreport private information to benefit themselves at the firm's expense. Collectively, the agent often has an incentive to save the cost of acquiring information (Lewis & Sappington, 1993). Even if the information is acquired, agents may have an incentive to manipulate the information to reap information rents (Aghion & Tirole, 1997).

There are two types of information asymmetry in this setting (Williamson, 2002). On the one hand, information asymmetry can stem from differences in *direct* costs of acquiring information (e.g., a manager that is closer to operations such that the cost of acquiring specific information is lower than for the principal). For this type of asymmetry, the principal might pre-specify what information should be attended to, making it possible for the principal to ex-post monitor whether agents have reported truthfully by checking the data themselves (e.g., internal audit). On the other hand, information asymmetry can originate from a difference in expertise in acquiring information, i.e., differences in *indirect* costs of acquiring information (Demski & Sappington, 1987).[4] For this type of asymmetry, the principal is less able to pre-specify what information should be attended to (determining relevance is a part of the expertise) and is therefore less able to monitor the agent ex-post.

[4] This type of information asymmetry arises when the expertise is both (1) personally costly to acquire and (2) prohibitively costly to communicate (Demski & Sappington, 1987). For example, a car mechanic has expertise in diagnostics of a car. Although the car owner has access to the same data, the car mechanic has superior information because she knows what data is relevant and how to analyze that data when running a diagnosis.

The distinction is important because of the distinct effect of information and communication technologies on the delegation of acquiring information (Bloom et al., 2014). When information asymmetry stems from direct acquisition costs and the information is not costly to communicate, advances in information technologies will reduce the cost advantage of agents, which leads to less delegation and more centralized decision-making (Garicano, 2000). When the source of information asymmetry is differences in the indirect cost of obtaining expertise, improvements in technologies will primarily reduce the cost of acquisition for managers, leading to more delegation of authority (Bloom et al., 2014).[5]

The project selection setting has clear baseline agency predictions. Assuming that agents optimize their narrow self-interest, agency theory predicts that managers would (i) only acquire private information when the expected instrumental value outweighs the acquisition cost and (ii) misreport private information when the private benefit is greater than the expected penalty. As such, a body of literature investigates how principals can induce agents to both acquire and report information in a truthful manner by the use of formal contracts, incentive schemes, monitoring, hurdles, or audits (e.g., Antle & Eppen, 1985; Balakrishnan, 1991; Lambert, 2007; Shin, 2008). The general finding from this literature is that writing contracts that effectively induce agents to both acquire and report truthfully is particularly difficult (Balakrishnan, 1991; Shin, 2008) and not especially widespread in project-selection settings (Brüggen & Luft, 2016; Haka, 2007).

2.2. Hypothesis Development

While traditional agency theory assumes narrow self-interest, behavioral research suggests that managers are sensitive to moral issues in agency relationships (Evans et al., 2001; Hobson, Mellon, & Stevens, 2011). One common view is that moral sensitivity can be incorporated into the agency framework by including preferences for morality in managers' utility function (e.g., Stevens & Thevaranjan, 2010). Another view suggests that people's moral dispositions come from a set of

[5] An important part of this paper is concerned with how improving information technology might affect project managers' opportunistic reporting behavior. I argue that making it easier for project managers to acquire information induces more honest reporting for managers with expertise in acquiring information. For non-experts, improvements in information technology would likely result in a loss of private information because the superiors' cost of acquiring the information is reduced.

internalized constraints on their real goal of pursuing self-interest (Rabin, 1995). The distinction in views is important because people tend to seek preferences and circumvent constraints. Rabin (1995) suggests that, when morality is treated as a constraint rather than a preference, people will actively seek to circumvent internal moral constraints by selectively and self-servingly avoid information. Thus, if managers consider honesty as a moral constraint on their reporting decisions, they might selectively avoid information that might morally compel them to report against their self-interest.

Research on information avoidance finds that individuals tend to use ignorance as an excuse to pursue their self-interest when these choices could potentially have negative consequences on others (e.g., Grossman, 2014). By remaining ignorant of the potential negative consequences of the self-interested choice, people can maintain the belief that they would have acted differently if they were certain about potential negative consequences. Therefore, people can use self-inflicted ignorance as an excuse because that allows for attributing selfish behavior to ignorance rather than a breach of moral integrity (Grossman & van der Weele, 2017).

The experiment of Dana et al. (2007) demonstrates the effect of willful ignorance on decision-making in a social dilemma. Similar to a dictator game, subjects are randomly matched together, and Player A (dictator) can choose between two options that directly affect the payment of Player B. Although one option clearly maximizes Player A's payment, the alternative option leads to a fairer outcome and maximizes their total welfare. In this setting, Player A is either endowed with the information about how the different options affect Player B, or Player A has to click a button to obtain this information. Results show that, even though the resulting outcomes—and Player A's ability to implement those outcomes—are identical, providing Player A with the opportunity to ignore this information significantly reduced the frequency in which they choose the option that maximized the total welfare.

Information avoidance, however, is not limited to avoiding collecting a piece of costless information, i.e., physical avoidance (Golman et al., 2017). Another way people can avoid information is to avoid drawing conclusions they dislike when analyzing data. Thus, this type of information avoidance can occur even when people have collected and attended to the relevant data. Yet, to avoid information while processing data requires that people can reasonably support drawing alternative conclusions from the data (Kunda, 1990; Peysakhovich & Karmarkar, 2016). Because people tend not to hold unreasonable

beliefs, alternative conclusions must be somewhat plausible. If the informational content is immediately obvious and clear when attending to data, people are somewhat unable to cognitively maneuver away from that information. In that case, people would have to physically avoid collecting the data to remain ignorant of its content.

Whereas physical information avoidance is a salient act of opportunism in the managerial reporting setting (i.e., choosing not to collect relevant data), choosing to avoid drawing the most logical conclusions is a less salient act. On the one hand, drawing an alternative self-serving conclusion could be the result of an unconscious bias in the processing of data (Hales, 2007; Kunda, 1990), making the act an "honest mistake".[6] On the other hand, even if managers are more intentional in avoiding unfavorable conclusions, the fact that they collected and attended to the data enables them to better maintain an honest self-appearance (Bodner & Prelec, 2003; Mazar, Amir, & Ariely, 2008). Furthermore, drawing alternative conclusions can also provide a justification for reporting selfishly even though managers might not fully convince themselves as long as they can argue that reaching a self-serving conclusion "could have been an honest mistake" (Shalvi, Dana, Handgraaf, & De Dreu, 2011; Shalvi et al., 2015).[7]

While physical information avoidance can serve as an excuse for selfish behavior in dictator games (Dana et al., 2007), the effectiveness of such ignorance is significantly reduced in settings rich with moral cues. Van der Weele et al. (2014) provide experimental evidence that avoiding information to excuse self-interested behavior is rare in a setting built on trust (only 2 out of 256 participants choose to remain ignorant) and therefore find no treatment effect on selfish behavior. Many accounting researchers argue that the managerial reporting context is built on trust (Church et al., 2014; Douthit & Majerczyk, 2019; Evans et al., 2001). In particular, reporting managers are often entrusted with the reporting task where the firm trusts the manager to report in good faith instead of relying on formal controls to induce truthful reporting (e.g., Church et al., 2019). Unlike dictators' decisions to allocate resources, managers' reporting decisions often contain factual assertions that could be congruent or incongruent with private

[6] See Sections 4.3.1 and 4.3.3 for further discussion of "honest mistakes"

[7] Shalvi et al. (2011, 2015) argue that reporting something that "could have been true" is considered less of a moral violation compared to reporting something that is clearly not true.

information (Rankin et al., 2008). These factual assertions add another moral dimension to the decision, where managers must choose between reporting truthfully or not (Douthit & Stevens, 2015; Rankin et al., 2008).

Considering the managerial reporting context, I posit that physical avoidance of relevant project data is rare and does not morally exonerate managers to report self-servingly. This is because physical avoidance is a salient act of opportunism. However, I conjecture that managers are less hesitant to draw self-serving conclusions to provide themselves with plausible excuses for reporting self-servingly. Because of the reluctance to physically avoid information, I argue that internal accounting systems play an important role in mitigating self-serving reporting from managers responsible for acquiring information. That is, when accounting systems are well-structured and user-friendly, managers can more easily infer informational content from the data they collect, thereby reducing their ability to self-justify drawing alternative self-serving information from the data. By contrast, when accounting systems are disintegrated and difficult to use, managers have to process the data to infer its informational content, which provides wiggle room for drawing self-serving conclusions from the data—even though the data is obtained and attended to. This discussion leads to the following proposition and hypotheses:[8]

***Proposition*:** Managers with discretion in acquiring information rarely choose to physically avoid collecting relevant project data before reporting

H1: Managers with discretion in acquiring information report as self-servingly as managers without discretion when acquiring information is easy (highly accessible information).

H2: Managers with discretion in acquiring information report more self-servingly when acquiring information requires processing data to infer its informational content (low information accessibility) compared to when acquiring information is easy (high information accessibility).

3. EXPERIMENTAL DESIGN

3.1. Experimental Task

The experimental task is a contextualized version of the "moral wiggle room" game used in previous research (Dana et al., 2007; van der Weele, 2013). The experiment is programmed using the oTree-

[8] Classical agency theory has clear predictions in my setting. These are outlined in Section 2.1.

software (Chen, Schonger, & Wickens, 2016). Participants are randomly allocated to the role of either a project manager or a superior. The project managers' task is to assess a potential project's profitability and report to the superior whether implementing the project is the best option for the firm. Project managers choose between two pre-filled reports: 'Report A' (implement) recommends implementing the proposed project and states that it is the best option for the firm. 'Report B' (reject) recommends rejecting the proposed project and states that it is not the best option for the firm.

Superiors, however, are passive receivers of the reports, and their payment, therefore, is directly affected by the project managers' reporting decisions. The superiors cannot know whether a project manager has acquired information, or whether the project manager has misreported.[9] Unbeknownst to the superior, implementing a project always yields the highest payment for project managers. Project managers know that their project can either be optimal or sub-optimal to implement for the firm.[10]

Project managers learn whether their project is optimal or sub-optimal by looking at a number displayed on their screens. If the number = 1, implementing the project is optimal and in the interest of both the superior and the project manager. If the number = 0, implementing the project is sub-optimal for the firm but still in the project manager's interest. When interests are misaligned, project managers have an incentive to falsely report that the project is optimal to implement, i.e., *false-positive report*. However, the project managers can also mistakenly recommend rejecting an optimal project, i.e., *false-negative report*. Although both false-positive and false-negative reports misrepresent information, project managers only have an incentive to submit false-positive reports (i.e., implementing a sub-optimal project). Figure 1 shows the incentive structure of the experimental task:

—INSERT FIGURE 1 ABOUT HERE—

[9] Superiors cannot reject reports submitted. Aghion and Tirole (1997) state that, in similar situations, the best choice of the superior is to "rubber-stamp" the projects proposed by better informed subordinates (p. 2). Furthermore, taking away the possibility to reject proposals allows for a clean investigation of honesty concerns without strategic considerations (e.g., Douthit & Stevens, 2015).

[10] Project managers only know that their project could be either optimal or sub-optimal. However, the actual probability of an optimal project is 20 percent.

3.2. Experimental Manipulations

I manipulate whether project managers have discretion in information acquisition. Nested in the discretion conditions, I manipulate whether obtaining the information is easy (highly accessible information) or requires project managers to process a dataset (low information accessibility).

In the *no-discretion condition*, the number that reveals whether the project is optimal ("1") or sub-optimal ("0") is openly displayed on the screens of project managers. Because the number is highly visible, project managers are unable to avoid this information before reporting.

In the *high-accessibility* condition, the number is 'hidden' in a 1×1 matrix. If project managers want to obtain the information, they must click and hold a button to reveal the hidden number. By clicking the button, project managers immediately know whether implementing the project would be optimal or sub-optimal for the firm.

In the *low-accessibility* condition, the number is 'hidden' in a 4×5 matrix. If project managers want to obtain the information, they must click and hold a button to reveal 20 integers that add up to either zero or one. The sum of the integers reveals whether the project is optimal or sub-optimal to implement. To minimize the risk of calculation errors, the matrix only contains integers ranging from -2 to +2.[11] Thus, all project managers—regardless of their calculations skills—would be able to arrive at the correct sum if they spend enough time checking their calculations (i.e., counting carefully).

In both discretion conditions, project managers privately choose whether to look at their matrix or not. If they choose to look, they are free to determine how many seconds they want to keep the matrix open. There is no time limit, and managers can close and reopen the matrix as many times as they would like.[12] Figure 2 is a visual representation of the experimental conditions.

—INSERT FIGURE 2 ABOUT HERE—

[11] See Section 4.3.1 for an analysis of calculation errors

[12] A counter records how many milliseconds managers actively keep the matrix open. Project managers must both click the "push to reveal number(s)" button and have the mouse hovering over the button to see the content of the matrix. This ensures that project managers were actively looking while the counter recorded the seconds.

3.3. Design Choices

There are three important aspects of the design to discuss. First, the payoff matrix is such that the instrumental value of additional information is zero for project managers with narrow self-interest. Regardless of the number being "1" or "0", choosing 'Report A' always maximizes the project manager's payment. Hence, project managers who choose to acquire this information privately cannot be motivated by financial self-interest.

Second, the optimal behavior from the superiors' point of view is their project managers both acquire and report information in a truthful manner. Specifically, the total welfare is maximized when reports are congruent with private information: If number = 0, 'Report A' yields a total of 150 (150 + 0), which is less than 'Report B' (180 = 90 + 90). If number = 1, 'Report A' yields a total of 240 (150 + 90) which is more than 'Report B' (100 = 90 + 10). This payoff structure makes it clear that project managers are expected to both acquire and report in good faith as this maximizes the firm's profit.

Third, project managers report to participant-superiors instead of hypothetical superiors. This design choice reflects the project-selection setting where both superiors and project managers are affected by implementing projects. The division of participants into managers and superiors entails an introduction of a hierarchy, which is an important contextual feature of the managerial reporting context (Douthit & Majerczyk, 2019). Although this design choice introduces concerns about equity and fairness in participants' reporting decisions (Rankin et al., 2008), it enables a comparison between behavior in the managerial reporting context and other non-contextualized studies that examine the effect of information avoidance (e.g., Dana et al., 2007; van der Weele, 2013).

3.4. Participants and Procedure

One hundred and seventy-five business students from a European business school were recruited to participate in the experiment.[13] This allows for a comparable number of subjects in each condition (about 35) as in other studies on information avoidance (e.g., Dana et al., 2007; Grossman, 2014).[14] The

[13] I obtained approval from the Institutional Review Board to run the experiment on human subjects.

[14] Note that there are twice as many project managers as supervisors, and that 4/5 of those project managers have conflict of interest. Project managers with conflict of interest are the subjects of interests (Grossman & van der Weele, 2017).

experiment was conducted in a laboratory where each participant was surrounded by solid partitions that prevented them from seeing each other's screens.

Each experimental session consists of three stages. In the first stage, all participants practiced solving matrices with hidden integers by clicking a button to 'open' them and report the correct sum.[15] In the second stage, participants were randomly allocated to either the role of superior or project manager. Before the reporting task, project managers read instructions and finished a comprehension test before reporting.[16] Meanwhile, superiors worked on an unrelated task (see Section 4.3.1). In the third stage, project managers filled out the Moral Identity Scale (MIS) developed in Aquino & Reed (2002). In this questionnaire, the participants were prompted to consider the attributes of being fair, generous, and kind and then asked to indicate agreement or disagreement with statements about the importance of those attributes to their sense of self on a six-point Likert scale.[17] Before exiting the experiment, project managers had the option to learn whether their reporting choices during the experiment led to a sub-optimal or optimal outcome for the firm by clicking a button. Superiors had no such option to ex-post infer the truthfulness of the project managers' reports.[18] Overall, the experiment lasted about 45 minutes, and the total average payout was 246 NOK (about $30) for superiors and 177 NOK (about $22) for project managers.[19]

4. RESULTS

4.1. Descriptive Statistics

The main dependent variable is *false_positive*, which is a dummy variable for whether a project manager reports to implement a sub-optimal project. The *false_positive* dummy takes the value of zero when a

[15] All participants practiced with the same three matrices, i.e., 2×2, 5×5, and 1×1. All matrices contained integers ranging from -2 to +2. To optimize learning, participants receive immediate feedback after submitting their answers. The software recorded both milliseconds participants spent looking at the matrix and the number of mistakes they made while practicing.

[16] The comprehension test consisted of four questions with multiple answer-options. Participants received immediate feedback when they submitted their answers. A counter kept record of how many mistakes participants made on the comprehension test. This enabled me to test whether participants' comprehension level explains behavior in the experiment (see Section 4.3.1).

[17] This study follows Aquino and Reed (2002) in excluding one problematic item from the scale: "I often buy products that communicate the fact that I have these characteristics".

[18] Superiors only know the aggregate profit they earn from all projects and can therefore not infer whether a report is untruthful.

[19] Project managers only know how their reporting choices affect the payoff for themselves and the superior. They do not know the total payment the superior receives from participating in the experiment.

project manager reports to reject a sub-optimal project or to implement an optimal project. In contrast, the dummy variable *false_negative* indicates whether the project manager mistakenly reports to reject an optimal project. Other important measures are: *ex-ante ignore*, which is a dummy variable that indicates whether a project manager opened a matrix with hidden integers before reporting, and *ex-post ignore*, which is a dummy variable that indicates whether a project manager opted to learn whether his/her report led to an optimal or sub-optimal outcome for their firm after the experiment was done.

Table A provides the descriptive statistics for key variables across experimental conditions for all project managers. The table shows that experimental groups are well-balanced, and idiosyncratic differences are evenly distributed across conditions (for all measures, $p > 0.4$). Despite random allocation, there are relatively more males in the low-accessibility condition (one-sided t-test, $p = 0.067$). Prior studies suggest that females are less likely to behave dishonestly (e.g., Ezquerra, Kolev, & Rodriguez-Lara, 2018). I therefore control for gender effects in further analyses. There are no significant differences in MIS scores with respect to internalization and symbolization scores (Kruskal-Wallis test: $p = 0.47$ and $p = 0.14$, respectively).[20]

—INSERT TABLE A ABOUT HERE—

4.2. Hypotheses Tests

The proposition provided in Section 2.2 states that managers rarely choose to physically avoid collecting relevant data before reporting. The frequency in which project managers choose not to collect information before reporting supports this conjecture. Only 4.3% in the high accessibility condition and 2% in the low accessibility condition choose to physically avoid information before reporting. Compared to non-contextualized studies with similar trade-offs, Dana et al. (2007) find that 50% of subjects avoid collecting costless information. Grossman & van der Weele (2013) report that 60% of subjects avoid information, and Grossman (2014) finds that 45% avoid information.[21] The findings in this study are more comparable to the results reported in van der Weele et al. (2014), where 2% of subjects avoided

[20] All firms consist of one superior and three project managers reporting on different projects, except one that only had two project managers. Though the firm size is larger than one project manager and superior, project managers are not aware of each other, do not interact, and cannot influence each other's payment. The focus on project managers' behavior necessitated that I prioritized observations of project managers.

[21] These are the results for replications of the hidden-information condition in Dana et al. (2007).

information. Unlike the other studies, the experiment in van der Weele et al. (2014) is set in a reciprocal context based on the trust game (Berg, Dickhaut, & McCabe, 1995). Thus, my findings support the proposition that physical information avoidance is rare in the managerial reporting context.

To test my hypotheses, I conduct logistic regressions with *false_negative* as the dependent variable indicating whether project managers report to implement sub-optimal projects. None of the project managers reported to reject an optimal project (false-negative report). Table B shows the results of three regression analyses. Model 1 includes all managers, while Model 2 focuses on project managers with misaligned interests where their projects are sub-optimal to implement for the firm. Model 3 extends Model 2 by including additional control variables.

—INSERT TABLE B ABOUT HERE—

Consistent with H1, the analyses reveal no difference in opportunistic reporting (i.e., *false_positive*) between project managers with discretion and project managers without discretion when obtaining information is easy (high accessibility). Considering that few physically avoided information before reporting (ex-ante ignore), this supports my conjecture that physical avoidance does not morally exonerate managers to report self-servingly in the managerial reporting context. Thus, I find support for H1.

Consistent with H2, project managers with discretion over less accessible information (i.e., 4×5 matrix) are significantly more likely to report to implement sub-optimal projects (false positive) compared to managers without discretion and managers with discretion over highly accessible information (i.e., 1×1 matrix). Indeed, the most comprehensive model (Model 3) shows that project managers with discretion over less accessible information are about 30 percentage points more likely to implement sub-optimal projects than those with no discretion (dy/dx = 0.332, p = 0.01). Thus, I find support for H2.

Although discretion to avoid information before reporting does not affect reporting opportunism, Model 3 shows that those who submit false-positive reports also tend to avoid information ex-post (see Section 4.3.3 for further analysis of this finding).

4.3. Supplementary Analyses

There are several possible channels through which lower information accessibility could increase opportunistic reporting (false positive report). For instance, the increase could result from project managers making more mistakes when summing up the 4×5 matrix, or, the project managers might have only briefly looked at the matrix and decided to report without bothering to analyze the data adequately. Moreover, project managers could be subject to an unconscious self-serving bias when analyzing the 4×5 matrix. In the following, I separately examine these alternative explanations before investigating the role of project managers' moral identity in explaining the results.

4.3.1 Calculation Errors

One potential confound is that project managers in the low-accessibility condition misreport more because of calculation errors. In the process of summing up the twenty integers in the 4×5 matrix, project managers can make calculation errors that lead to them reaching incorrect conclusions about their project.

To investigate the role of calculation errors, I benchmark project managers in this condition to participants who performed the same task but were paid according to their report's accuracy. To obtain a baseline of unbiased reports, I provided all superiors with the opportunity to earn an additional NOK 50 (about $ 6) while waiting for their project managers' reports. The superiors' task was to correctly solve the identical matrix as the project managers in the low-accessibility condition. However, the superiors do not know that their project managers are working with an identical matrix. The behavior of these superiors, therefore, serves as a benchmark of unbiased information processing.[22]

Results show that only one out of 44 benchmark-superiors submitted an incorrect answer in the task. By contrast, 28 out of 41 project managers reported to implement sub-optimal projects (false positive) in the low-accessibility condition. None reported to reject an optimal project (false negative). Coupled with the lack of calculation errors made by the benchmark-superiors, the strong self-serving bias in project managers' reports suggests that mere calculation errors cannot account for the observed increase in opportunistic reporting.

[22] At the time of solving the task, the supervisors have the same level of experience with the matrix tasks and the same payment level (fixed wage of NOK 50).

Furthermore, the number of mistakes project managers made while working on the 5×5 practice-matrix is uncorrelated with reporting decisions in the low-accessibility condition (i.e., 4×5 matrix), $r(47) = -0.06$, $p = 0.66$. These variables are also uncorrelated when only considering project managers misaligned interests (i.e., sub-optimal projects), $r(39) = 0.21$, $p = 0.18$. Overall, the total number of mistakes on the comprehension test is also uncorrelated with the decision to report to implement sub-optimal projects (*false_report*), $r(129)=0.13$, $p = 0.15$.[23] Thus, differences in analytical abilities and level of comprehension seem not to explain the observed result.[24]

4.3.2 Lack of Effort (Time)

Another possible explanation is that project managers spend insufficient effort on analyzing the 4×5 matrices. To investigate this possibility, I use the benchmark-superiors' time data as a baseline of how much time project managers should spend on analyzing the matrix. While working on the tasks, a software recorded the milliseconds in which the matrices have been actively opened. The timer was programmed so that subjects could only see the hidden content of the matrix while pressing down a button and having the cursor hover over the button. If the button was released, the content disappeared, and the counter stopped until the button was pressed again. This software feature allowed for a precise measure of the time project managers spent looking at the matrix.

In contrast to classical information economics' prediction, I find no difference in data processing between project managers and superiors. Results show that benchmark-superiors—who were incentivized to report correctly—opened the 4×5 matrices on average 27.7 seconds (19.07) before reporting. In comparison, project managers kept them open for 28.86 seconds (18.61). The difference is

[23] The comprehension test consisted of four multiple choice questions. Participants who gave incorrect answers received immediate feedback and had to answer correctly before proceeding. Participants could make up to 9 mistakes on the comprehension test. Questions 1, 2, and 3 of the comprehension test concerned their understanding of the payoff structure. Question 4 concerned the factual assertion in their reports.

[24] In the post-questionnaire, project managers were asked "*how certain are you that your recommendation to your superior was accurate?"* Only the managers with sub-optimal projects report that they are more uncertain in the low-accessibility condition, $t(85)=1.98$, $p = 0.05$. They were also asked, "*how comfortable would feel reporting information that might be different from true/actual information, if you did not know the true information for certain*". Only managers with sub-optimal projects report that they would feel more uncomfortable reporting uncertain information ($t(107)=1.75$, $p = 0.08$). However, these measures are not predictive of misreporting within the low-accessibility conditions ($N = 34$ both $p > 0.20$). Unfortunately, due to a technical issue, these measures were not recorded for those in the first session.

non-significant ($p = 0.75$).[25] Though project managers knew from practice that the size of the matrices (i.e., 1×1 and 4 × 5) indicates how much effort is needed to obtain the answer, I find that project managers' decision not to open the matrix is insensitive to the size of the matrix.

Thus, I do not find support for project managers spending insufficient effort analyzing the dataset in the low-accessibility condition. Instead, the analysis suggests that they work for a significant amount of time analyzing the data—despite having no financial incentive (only a social incentive). Figure 3 shows the distribution in time data for both benchmark-superiors (pay for accuracy) and project managers (pay for report) for both the practice matrix and the incentivized matrix task.

—INSERT FIGURE 3 ABOUT HERE—

4.3.3 Awareness of Misreporting

One explanation for why project managers in the low-accessibility condition have a strong self-serving bias in their reports could be because they are unaware that they are making self-serving inferences (e.g., Kunda, 1990). Similar to Hales (2007), the finding in this paper could be explained by project managers' unintentional bias in processing data. In that case, the increase in false-positive reports could be explained by a cognitive information-processing bias instead of an attempt to self-justify misreporting.

To assess project managers' awareness in the low-accessibility condition, I analyze systematic differences in the frequency in which they ignore information ex-post. Before exiting the experiment, all project managers could choose to learn whether their report led to an optimal or suboptimal outcome for the firm (ex-post ignore). Assuming that managers would want to avoid information that would confront their moral self-image (Bodner & Prelec, 2003; Grossman & van der Weele, 2017), ex-post information avoidance could indicate whether managers suspected that they misreported.[26]

Consistent with this notion, I find that 58 percent of all project managers who report to implement sub-optimal projects (false positive) ignore information ex-post. In comparison, only 34 percent ignored

[25] Standard deviations in parentheses. The result is robust to excluding project managers with optimal projects ($p = 0.52$).

[26] Alternatively, managers who ex post avoid information could also generally be more careless. However, I find no statistical association between the time managers spend solving the 4 × 5 matrix and their tendency to ex post ignore information. This suggests that it is not carelessness that drives the observed differences in ex-post ignore.

information ex-post among those who report truthfully (two-sided test, $p = 0.01$). For project managers in the low-accessibility condition, 61 percent of those who report to implement a sub-optimal project (i.e., false positive) also ignore information ex-post. In comparison, only 31 percent of those who reported truthfully ignored information ex-post (two-tailed test, $p = 0.078$).[27] Coupled with the finding that project managers in the low-accessibility condition spend about 29 seconds on average looking at the matrix, one would expect that these project managers would be keener to learn this information ex-post for free. However, I find that ex-post ignorance is, in absolute numbers, more frequent in the low-accessibility condition (53% compared to 45% and 44%), although not significantly different (two-tailed, $p = 0.24$). This link between ex-post ignorance and misreporting in the low-accessibility condition suggests that project managers were relatively aware—at least suspect—that they misreported.[28] Figure 4 provides a graphical illustration of these findings.

—INSERT FIGURE 4 ABOUT HERE—

4.3.4 Moral Identity

The theory underlying my predictions suggests that project managers abstain from misreporting partly because they feel constrained by a set of internalized moral constraints (Rabin, 1995). If honesty is treated as a constraint, this theory suggests that project managers will attempt to circumvent these constraints. To investigate the role of moral concerns in project managers' decision-making, I use the Moral Identify Scale (MIS) (Aquino & Reed, 2002) to measure whether participants who score high on the internalization of moral values are more likely to report truthfully. This scale has been used to assess the importance of self-image in previous experiments on information avoidance (Grossman & van

[27] $N = 41$, $p < 0.05$ with one-tailed test.

[28] Recent studies in accounting document an "effort effect", which posits that being required to exert effort to obtain information leads to a feeling of deservedness, resulting in more misreporting (Brown, Chan, Choi, Evans, & Moser, 2015). Haesebrouck (2017) finds that exerting effort leads to more honesty when reports contain factual assertions. I investigate whether this 'effort effect' could explain this study's result by proxying effort as number of seconds managers open the 4 × 5 matrices. I find no difference in time spent on opening the matrices between managers who misreport (false positive) and managers who report truthfully ($p = 0.521$). Among project managers with misaligned incentives, I find no association between time and misreporting even when using their practice time as controlling for innate abilities. I only find that project managers in the low-accessibility condition who misreport have a higher variance in time data compared to those who report truthfully (F-stat = 0.345, $p = 0.07$).

der Weele, 2017). The scale has repeatedly been able to predict moral conduct across many decision contexts (Hertz & Krettenauer, 2016).

The MIS is a quantitative measure of how central (or peripheral) moral values are to an individual's sense of self along two dimensions. Project managers were prompted to consider a person who has the following characteristics: caring, compassionate, fair, friendly, generous, hardworking, helpful, honest, and kind. Project managers were then asked to indicate agreement or disagreement with twelve statements about the importance of those attributes to their sense of self-identity (see Aquino and Reed (2002) for the complete scale). There are two dimensions to this scale. First, the *internalization* dimension measures how central moral values are to one's sense of self-identity. Second, the *symbolization* dimension measures how important it is to an individual's sense of self to be perceived by others as moral.

Because project managers filled out the MIS after making their reporting decisions, an important first step is to assess the possibility that project managers' altered their responses to the MIS depending on their decision to submit a false positive report (misreport). Although unable to entirely rule out this possibility, I use the exogenous variation in *false_postive* (i.e., low-accessibility condition) to investigate whether participants in the conditions with more frequent misreporting provide significantly different answers. Using the mean MIS scores as the dependent variables in regression analyses reveals no difference in mean scores across treatment conditions (for internalization and symbolization, both $p > 0.2$). Considering the significant difference in opportunistic reporting in the low-accessibility condition (i.e., about a 30% increase), this suggests that the decision to misreport does not contaminate the MIS scores in a statistically significant manner.

For project managers with sub-optimal projects, internalization scores are negatively correlated with reporting false positives ($r(107) = -0.19$, $p = 0.047$), and symbolization scores are uncorrelated ($r(107) = 0.04$, $p = 0.65$).[29] The negative association between internalization scores and opportunistic reporting suggests that participants consider the reporting decision a moral decision. According to moral constraint

[29] The symbolization score is presumably uncorrelated with reporting false positives because superiors cannot infer the truthfulness of reports ex post. Thus, this dimension is –by design– not particularly relevant in this setting.

theory, project managers with high internalization scores might feel more constrained in this situation and thus be keener to relax these constraints than those with low internalization scores.

To test whether there are asymmetric treatment effects with respect to the internalization of moral values, I split project managers into two groups according to their mean internalization scores, i.e., the upper and lower half of the internalization-score distribution. Then, I test for heterogeneous treatment effects by running the treatment analysis of Table B on the two groups separately. Table C shows the results of the subgroup treatment-analysis. Table C shows that project managers in the upper half of the internalization-distribution are more sensitive to low-information-accessibility treatment. In contrast, project managers in the lower half of the internalization-distribution are less affected by the treatment.

—INSERT TABLE C ABOUT HERE—

Figure 5 provides a graphical illustration of the asymmetric treatment effect.[30] Only 32 percent of project managers with high internalization of moral values submit false positive reports when information is easy to acquire (high information accessibility). In comparison, 57 percent of project managers with low internalization of moral values misreport when information is easy to acquire (high information accessibility) (diff = 0.25, $p = 0.044$).[31] The difference in misreporting demonstrates that, when acquiring information is easy, internalization scores are predictive of misreporting.

—INSERT FIGURE 5 ABOUT HERE—

When acquiring information requires project managers to sum up the integers in the 4×5 matrices (low information accessibility), I find that 65 percent of project managers with high internalization scores choose to misreport. That is a 103-percent increase in misreporting compared to project managers with high internalization in the high-accessibility conditions (diff = 0.33, two-tailed test: $p = 0.02$). The increase in misreporting among project managers with low internalization is non-significant between the accessibility conditions (diff = 0.14, two-tailed test: $p = 0.28$). Because of the asymmetric treatment

[30] I only include observations from project managers whose projects were sub-optimal to implement to the firm. This is because managers whose projects were optimal did not experience a moral conflict between reporting honestly and self-servingly. However, project managers in the low-accessibility condition only knew this after analyzing data. To compare behavior between treatment conditions, I focus on project managers with conflict of interest.

[31] Because only two project managers decided to not open the matrix in the high-accessibility condition and their reporting choices are statistically similar, I combine these observations with observations of project managers without discretion.

effect, project managers with high internalization misreport to the same extent as project managers with low when acquiring information requires processing data (low information accessibility) (diff = 0.06, two-tailed test: $p = 0.67$).

5. CONCLUDING DISCUSSION

In this study, I report the results from an experiment designed to investigate managers' tendency to avoid relevant information in a project selection-setting. By avoiding information, managers can justify recommending to implement a sub-optimal project by convincing themselves that they would have reported otherwise if fully informed. Previous research suggests that information avoidance can occur in two ways. Managers might either physically avoid acquiring relevant data or avoid drawing conclusions they dislike even though they attended to the data (Golman et al., 2017). I hypothesize that managers have moral reservations about avoiding information physically because that type of avoidance is a salient act of opportunism in the reporting setting. However, managers are less hesitant to avoid drawing conclusions they dislike. Because accounting systems largely determine how readily available information is to its users, I hypothesize that accounting systems play an important role in reducing misreporting from managers with discretion over information acquisition.

I find that managers with discretion over acquiring information rarely physically avoid collecting relevant data—even when obtaining the information requires an effortful analysis of data. Therefore, when information is easily accessible, managers with discretion over collecting information misreport similarly to those without this discretion. However, when obtaining information requires effortful analysis, project managers with discretion are significantly more likely to report to implement sub-optimal projects (false positive) compared to managers without discretion and managers with discretion over highly accessible information.

Supplementary analyses provide evidence consistent with the notion that project managers treat honesty as a moral constraint on their reporting decisions (Rabin, 1995). Project managers tend to refrain from misreporting when they cannot obtain a plausible excuse for doing so (i.e., relax the moral constraint). Being able to physically avoid collecting information is not a plausible excuse in the managerial reporting setting. However, project managers are more prone to opportunistic reporting when

obtaining information requires them to process data, as this provides them with an opportunity to construct a plausible excuse for reporting self-servingly (e.g., "it could be an honest mistake"). The supplementary analysis shows evidence consistent with this notion. It reveals that analytical abilities, level of comprehension, effort exerted, and unconscious processing bias cannot account for the observed increase in opportunistic reporting. Instead, project managers' internalization of moral values seems to sufficiently explain the dramatic increase in opportunistic reporting in the low-accessibility condition.

5.1. Academic Contribution

This study makes four contributions to accounting research. First, the study fills an important gap in the experimental management accounting research (Luft, 2016) by investigating how diverging interests affect private data collection and data processing. While prior research has only studied how conflict of interest can lead employees to not collect data for their reports (Church et al., 2014), this current study is the first to study how misalignment of interests can affect both the collection and processing of data. Studying managers' data processing is important because accounting systems can affect how easy it is to derive information from available data (e.g., integrating data sources) but cannot force managers to collect all relevant data, especially when information asymmetry stems from differences in expertise in acquiring information and not just proximity to operations (Bloom et al., 2014). Thus, this study answers Luft's (2016) call for more experimental research on how the private acquisition of information affects important management accounting constructs.

Second, this study contributes to the research concerned with understanding the determinants of honest reporting in accounting. While previous research in accounting attributes honest reporting behavior to preferences for honesty (Douthit & Majerczyk, 2019; Evans et al., 2001; Rankin et al., 2008), my results are consistent with the notion that people tend to treat morality as constraints to be circumvented (Rabin, 1995). This suggests that reporting managers might use their discretion in acquiring data to actively gather, avoid, and interpret data to exonerate self-serving behavior. Thus, the design of the accounting system that managers use to acquire information for their reports can affect reporting honesty.

Third, this study, to the best of my knowledge, is the first to experimentally investigate how information accessibility affects reporting honesty in an agency setting. Recently, Deimen and Szalay (2019) developed a model to investigate whether and under what conditions transferring formal authority to managers with expertise in obtaining information (e.g., to implement a project) is better than relying on them to acquire and communicate information (e.g., recommend projects). This current study provides experimental evidence that the agency cost associated with communication with agents with moral concerns can depend on the sophistication of a firm's accounting system. While traditional agency theory assumes narrow self-interest, this study demonstrates the importance of managers' extended motivation in reporting situations.[32] Hence, this study identifies a previously hidden cost related to under-investment in internal accounting systems.

Lastly, the findings of this study relate to the research on dual roles and using employee-selection as a control against opportunistic behavior (Campbell, 2012; Maas & Van Rinsum, 2013; Pierce & O'Dea, 2003; Sathe, 1983). Dual roles have been advocated as a means to achieve the best of high involvement and high independence. While dual roles have many benefits, research points out that dual roles can also create role conflict. Some have argued that selecting employees with key personal characteristics can eliminate the tensions arising from conflicting interests between roles, particularly in more complex situations (Pierce & O'Dea, 2003, p. 260). However, I present experimental evidence that personal characteristics (i.e., moral type) matter less when complexity increases because people can better justify their behavior to themselves. Because people may place more value on appearing moral rather than behaving morally, my findings raise a note of caution about relying too heavily on personal characteristics when complexity increases (e.g., Campbell, 2012). Put differently, the frailty of moral behavior in situations involving conflict of interest suggests that firms should focus on reducing role conflicts rather than relying on personal characteristics to overcome temptations to act opportunistically.

[32] There are currently working papers investigating how expending effort to acquire private information affects reporting honesty (Brown et al., 2015; Haesebrouck, 2017). Although expanding effort relates to information accessibility, these studies do not provide subjects with discretion over the decision to acquire information or discretion over what conclusions to draw from more complex datasets. As such, the focus deviates from this current study.

5.2. Practical Implications

The main implication of this study is that improving internal accounting systems may serve as a control by increasing the moral saliency of misreporting. Despite that information accessibility varies in practice, this study suggests that investments in accounting systems that improve information accessibility can—to some extent—increase the level of honesty in firms. While improving and tailoring such systems has previously been costly, this cost is falling with the influx of systems that take advantage of scalable software technology (e.g., Bygstad, 2015; Liu, 2018).

Moreover, this study relates to the practice of risk-based auditing in which auditors assess the risks of misstatements. An important determinant in risk assessments is whether potential misstatements constitute fraud risk (intentional misstatement) or are merely unintentional errors (PCAOB, 2010). Although fraud risk is a significant risk by its very nature, assessing the intentionality of misstatements is difficult. This study suggests that auditors should consider the sophistication and user-friendliness of firms' accounting systems as a part of their risk-assessment of controls designed to prevent fraud.

5.3. Limitations and Future Research

My experimental findings are subject to limitations, which provide a basis for future research. The experiment is a one-shot reporting game where subjects can choose to remain ignorant while reporting with (relatively) high financial consequences. As a first step, this is an important design choice because it allows for comparisons to related studies investigating the effect of willful ignorance on ethical decision-making. In practice, however, managers report frequently and may occasionally face opportunities where they prefer ignorance over information. Whereas I find minimal information avoidance in this one-shot study, a natural next step would be to examine whether managers would change their behavior over time and repetition.

Furthermore, there is no detection risk, audit probability, or any other risk of being caught misreporting in the experiment. Although this provides a clean investigation of the effect of discretion on honest reporting, a promising avenue for further research is to examine the effect of having audit risk in this setting. On the one hand, the risk of being caught could exacerbate the tendencies to engage in effortful information acquisition to make misreporting appear unintentional. On the other hand, knowing

that an internal auditor might overview the work could produce a desire to be perceived as competent reporting managers. Therefore, it would be interesting to investigate how internal audits affect managers' acquisition and reporting behavior in settings similar to the one used in this present study.

This study provides evidence that relying on managers' inner moral compass in situations with diverging interests may be ineffective in settings marked by complexity and ambiguity. Thus, in situations where accounting systems cannot sufficiently reduce the inherent complexity in the available data, further research could investigate what can reduce managers' tendency to seek justifications for misreporting. For example, firms can provide clear instructions for what constitutes acceptable behavior in specific situations by clearly communicating norms against rationalizing opportunistic reporting (e.g., Church, Hannan, & Kuang, 2012; Murphy, 2012).

This study investigates how internal accounting systems may induce reporting honesty in managers with discretion in information acquisition. While information accessibility is an essential aspect of accounting or information systems, it is not the only one. Innovation in information technology is rapid and changes many of the traditional aspects of accounting systems, e.g., direct mobile access, robotic process automation with system-generated reports, chat-bots, and new visualization tools (Deloitte, 2018b; Fractal, 2018; MicroStrategy, 2019). As such, a promising avenue for further research is to investigate how such innovations affect reporting decisions and other important management accounting variables.

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	PROJECT MANAGER	SUPERIOR	
		Number = 0	Number = 1
REPORT A	150	0	90
REPORT B	90	90	10

FIGURE 1.—Payoff Scheme in NOK.

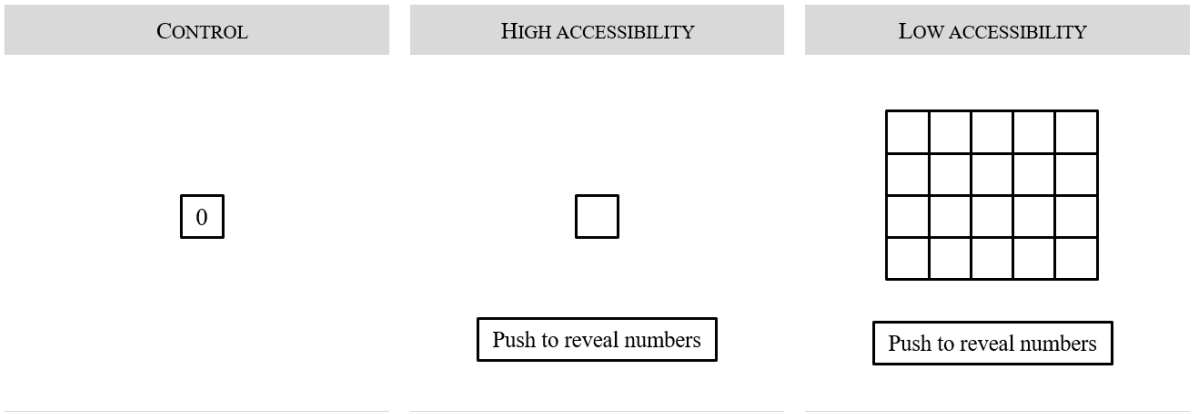


FIGURE 2.—Treatment manipulations in the experiment. To the left: the number (either "1" or "0" is clearly visible in an 'open' 1 × 1 matrix. In the center: the number is 'hidden' in a 1 × 1 matrix. To the right, the number is the sum of the integers hidden in the 4 × 5 matrix (integers ranging from -2 to + 2).

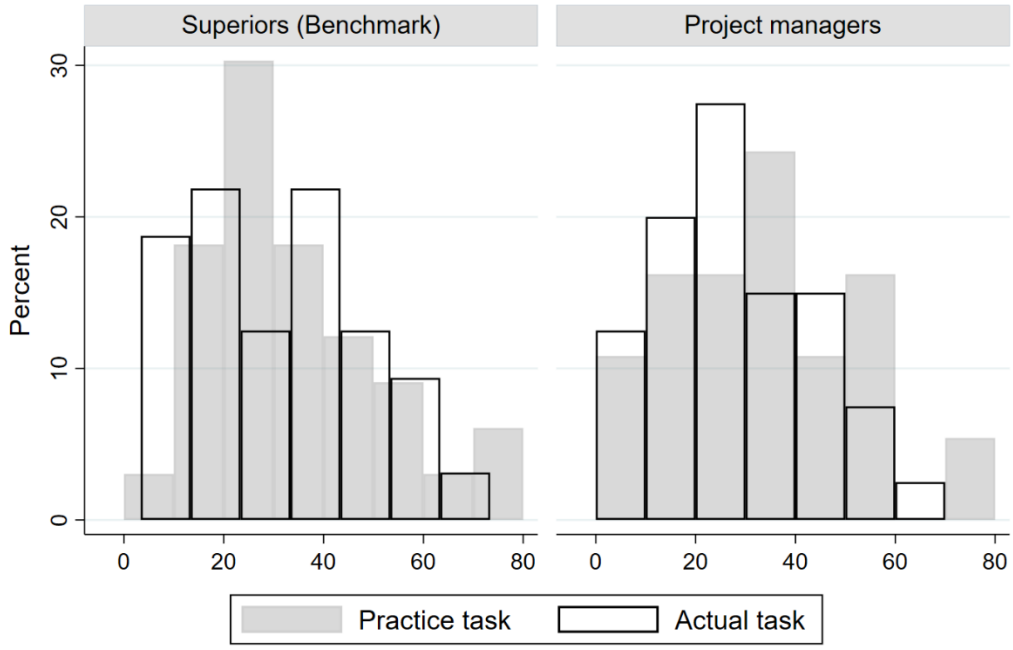


FIGURE 3.—Distribution of seconds spent looking at matrices. Both benchmark-superiors and project managers solved identical practice (5 × 5) and actual matrices (4 × 5). The gray bars in the figure show the distribution of time participants actively opened the practice matrices, while the outlined bars show the same distribution of time but for the actual task. While superiors are incentivized to report correctly, project managers have an incentive to misreport. There is no difference in practice time between superiors and project managers (t-test, $p > 0.1$).

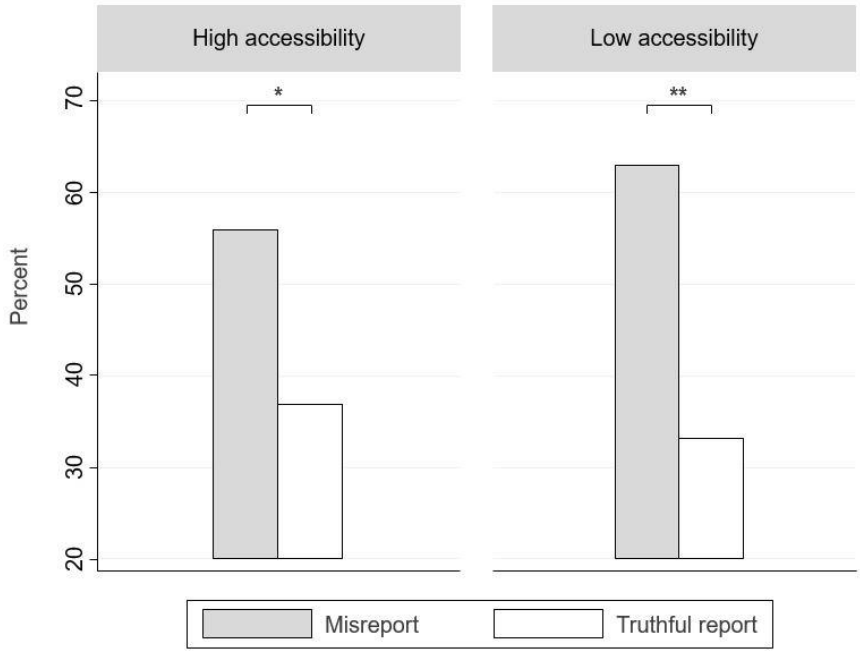


FIGURE 4.—Ratio of ex-post ignorance by treatment conditions. The figure depicts the ratio of project managers with misaligned interest who opted to remain ignorant after they had made their reporting decisions (The no-discretion and high accessibility conditions are collapsed). Stars indicate p-levels for one-sided t-tests ($p = 0.05$ and $p = 0.038$, respectively). Combined, the difference in ex-post ignorance is significant when pooling all experimental conditions together (two-sided, $p = 0.0135$).

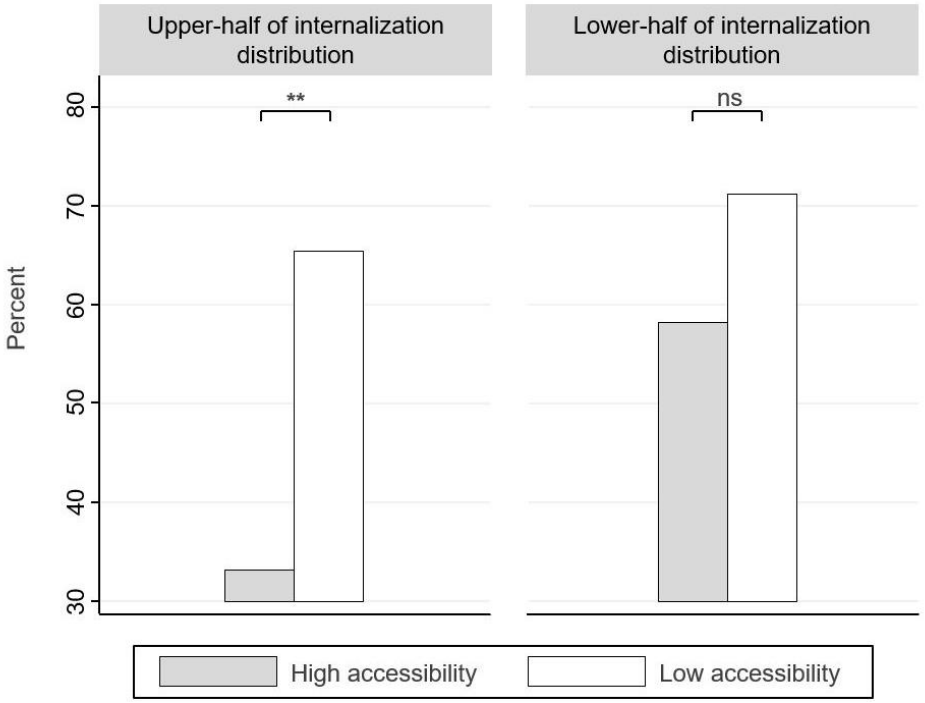


FIGURE 5.—Misreporting false positives by information accessibility and internalization of moral values. The bars in the high-accessibility category also include the project managers in the control (no discretion) condition. Stars indicate p-values for two-sided t-tests. Results not present in the figure: Given high accessibility, there is a significant difference between project managers in the upper and lower half of the internalization distribution ($p = 0.04$). Given low accessibility, there is no difference between project managers in the upper and lower halves of the internalization distribution ($p = 0.67$).

TABLE A
Descriptive Statistics for All Project Managers by Treatment Condition

	No discretion	Discretion	
	Endowed information (n = 35)	High information accessibility (n = 47)	Low information accessibility (n = 49)
False positive report[a]	34.3%	40.3%	57,1%
False negative report	0.0%	0.0%	0.0%
Ex-ante ignorance	-	4.3%	2%
Ex-post ignorance	45.7%	44.7%	51.1%
Moral identity scale[b]			
Internalization	*17.91 (4.0)*	*18.40 (4.13)*	*19.04 (3.25)*
Symbolization	*13.54 (4.89)*	*14.23 (4.29)*	*15.33 (3.59)*
Female (= 1)	31.4%	25.5%	40.8%
Age	22.77 (2.99)	24.36 (5.45)	23.02 (2.34)
Accounting courses	3.91 (2.83)	3.40 (2.59)	3.81 (3.42)

NOTE.—All the experimental firms consist of one superior and three project managers (except one firm that only had two project managers). Though the firm size is larger than one project manager and superior, the project managers are not aware of each other, do not interact, and do not influence each other's payments. The focus on project managers' behavior necessitated that I prioritized observations of project managers. [a] Excluding subjects with aligned interests increases the relative size of false-positive reports to 41.3%, 48.7%, and 68.2%. [b] Displays mean values with standard deviations in parentheses.

TABLE B
Logistic Regression with Marginal Effects on Decisions to Report False-Positives

	(1) All project managers	(2) Project managers with misaligned incentives	(3) Project managers with misaligned incentives
Discretion: High accessibility †	0.0628	0.0488	0.062
	(0.53)	(0.38)	(0.44)
Discretion: Low accessibility †	0.263**	0.307***	0.332***
	(2.35)	(2.68)	(2.69)
Female†	-0.0819	-0.1917*	-0.202*
	(0.84)	(1.79)	(1.75)
Age			0.020
			(0.94)
Accounting courses			0.018
			(0.94)
Relevant experience†			-0.105
			(0.80)
Ex-ante ignore			-0.015
			(0.01)
Ex-post ignore			0.341***
			(3.02)
Diff treatment effect (odds ratio)	2.280*	3.027**	3.126**
	(1.90)	(2.26)	(2.26)
Robust errors	YES	YES	YES
Session controls	YES	YES	YES
N	131	109	109

NOTE.—Results are robust to excluding the gender control and different estimation methods (linear probability model and probit models). *t* statistics in parentheses; † for discrete change of dummy variable from 0 to 1; The table displays marginal effects, except the differences between the discretion conditions (high and low accessibility), reported in odds ratios. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

TABLE C
Heterogeneous Treatment Effects

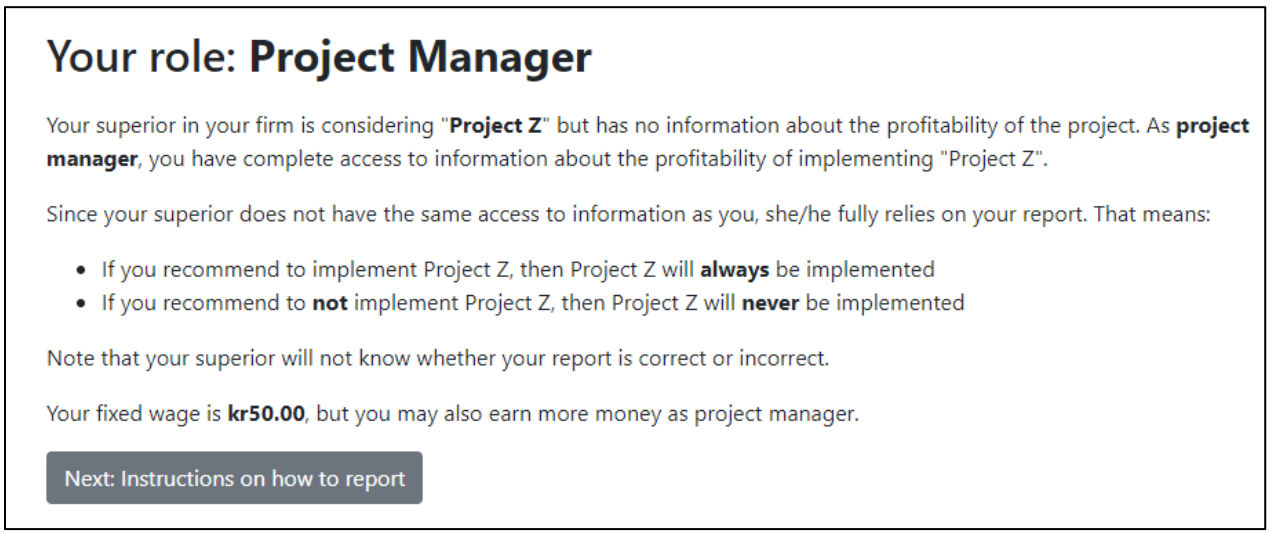
	(1) Project managers in the upper half of internalization scores	(2) Project managers in the lower half of internalization scores
High accessibility (1×1) [†]	.073 (0.33)	.007 (0.43)
Low accessibility (4×5) [†]	.398** (2.12)	.180 (1.20)
Female[†]	.265* (1.82)	.002 (0.01)
Diff treatment effect (odds ratio)	4.924** (2.13)	2.305 (1.07)
Session controls	NO	NO
Robust errors	YES	YES
N	51	58
Pseudo R2	0.126	0.019

NOTE.—The table shows the marginal effects of logistic regression with *false_positive* as the dependent variable. Standard deviations are in parentheses. The analysis includes project managers with misaligned incentives only. Results are robust to excluding the gender control variable; [a] *discrete* change of dummy variable from 0 to 1; z statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$.

7. APPENDIX

The following is a selection of screenshots from the laboratory experiment in Chapter I.

i. Instructions (Project Managers)



ii. Comprehension Quiz (Project Managers)

Question to test understanding 3/4:

Your report choices	Your payoff	Superior payoff	
		Failing (S=0)	Successful (S=1)
Implement	kr 30	kr 0	kr 30
Not implement	kr 20	kr 25	kr 10

The table above is another example of project information. The table shows how implementing a project affects the firm (*you and your superior*). Notice that the project can either be succeeding (if "S=1") or failing (if "S=0"). Which one of the following statements is true?

- If S = 0, then implementing the project maximizes the payoff of the firm

Incorrect! When S = 0, the firm could have received a total of 45kr if you reported to not implement the project. The total payoff is only 30kr if the project is implemented

- My own payoff from implementing the project is higher when S=1 compared to when S=0

Incorrect! Only your superior's payoff is affected by the success or failure of the project. Your payoff is not affected

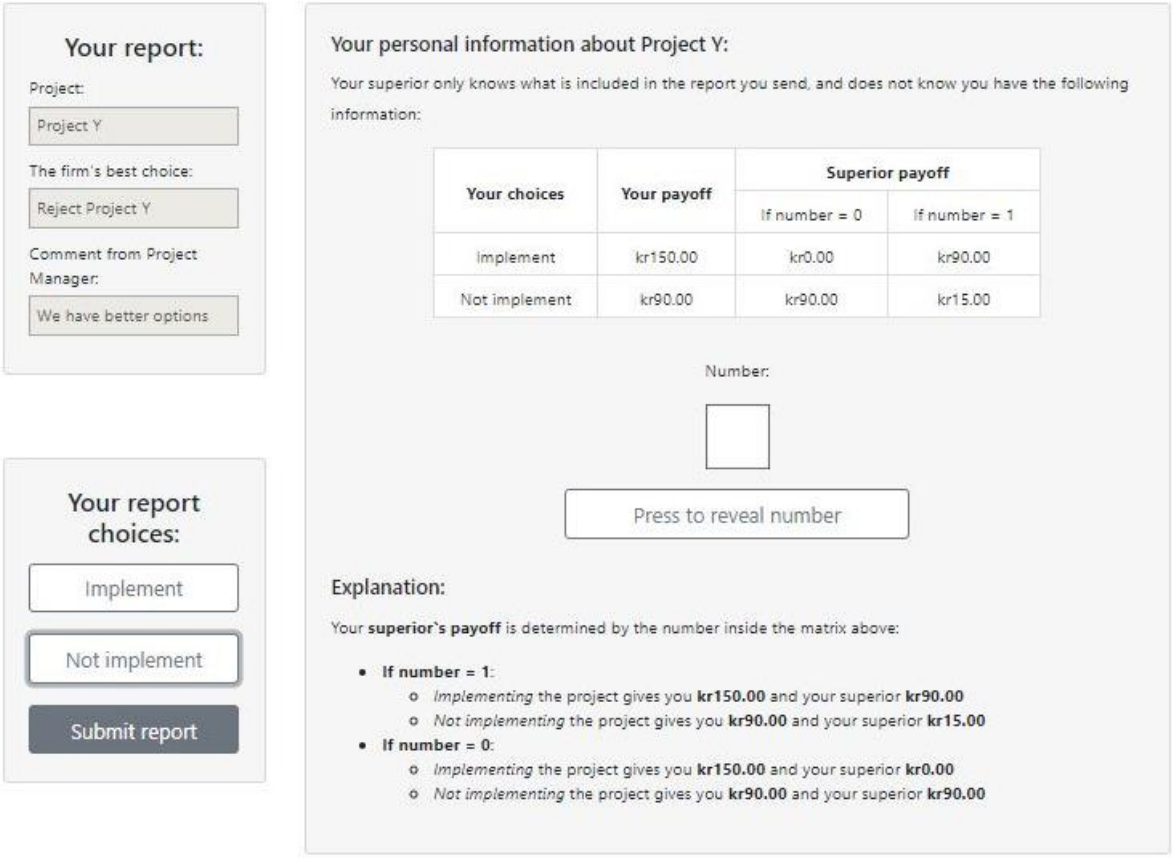
- (•) My own payoff is always highest when the project is implemented.

Correct! Your payoff is highest when the project is implemented. However, your superior's payoff is dependent on the success of the project.

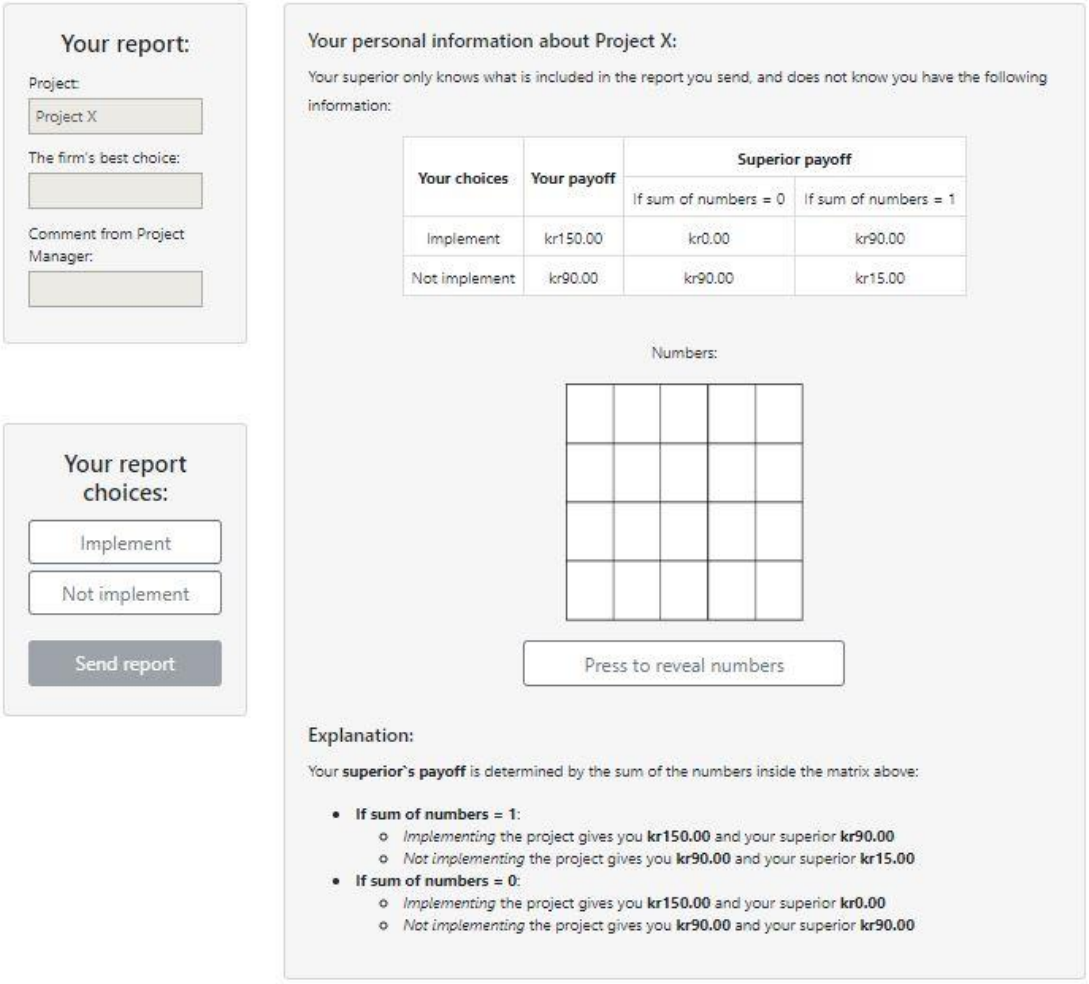
Check answers

Next: Understanding question 4/4

iii. Reporting Page (T1: High Information Accessibility)



iv. Reporting Page (T2: Low Information Accessibility)



CHAPTER II

Strategic Curiosity:

An Experimental Study of Curiosity and Dishonesty*

F. Ceren Ay† Joel W. Berge‡ Katrine B. Nødtvedt§

Abstract

In this study, we provide experimental evidence on a novel phenomenon concerning information preferences: people strategically collect additional non-instrumental information to justify morally questionable decisions. We conduct a virtual dice-rolling experiment where participants roll a dice and self-report the outcome of the first roll for monetary rewards. In this setting, we vary the extent to which participants can continue rolling the dice before reporting as well as the displayed content of those additional roll-outcomes. We document that people systematically roll the dice more—*are more curious*—when tempted to misreport. We find that curiosity is positively correlated with the size of the lie. However, contrary to previous studies, we observe no variation in dishonesty across treatments regardless of the possibility to collect additional non-instrumental information. This study provides new insights into how individuals actively shape their information environment in pursuit of self-interest.

Keywords: Information seeking; curiosity; dishonesty; lying cost

JEL-Classifications: C91, D82, D83, D91

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1 Introduction

Classical theories of information economics define information as a tool that individuals use to reach superior decisions (Stigler, 1961). Under this theory, information is valuable only from an ex-ante perspective and if it can be used to make better decisions. However, evidence from behavioral research shows that people can avoid relevant information to create a *moral wiggle room* in which morally questionable decisions can be excused (Dana et al., 2007; Golman et al., 2017). Avoidance may not be the only tool to achieve moral wiggle room. Collecting additional information can be used strategically to interpret facts toward one's own preferences. Even though theoretical and experimental research shows that people tend to strategically avoid information to excuse self-interested choices (Dana et al., 2007; Golman et al., 2017; Grossman and Van der Weele, 2017), little research has examined to what extent individuals *collect* additional information to excuse the pursuit of self-interest.[1] We fill this gap in the literature by providing an experimental analysis of the tendency to collect more information when confronted with the temptation to misreport. We conducted a one-shot dice-rolling game (Fischbacher and Föllmi-Heusi, 2013; Shalvi et al., 2011) in which participants roll a fair virtual dice and report the outcome of the first roll for monetary rewards, with higher reported numbers resulting in higher payments. We vary whether people can collect non-instrumental information and the content of the additional information. We implement these treatment variations by restricting how many times people can roll the dice before reporting, and whether the dice displays numbers or random figures after the first roll.

Similar to avoiding information that makes it difficult to excuse selfish decisions (Grossman, 2014), we find evidence that curiosity is driven by a desire to justify selfish behavior. Our main finding is that non-instrumental information is collected strategically, implying that people are *strategically curious*.[2] Contrary to the previous literature, we find no variation in dishonesty across treatments despite the possibility to collect additional information and the content of this information. With our explicit focus on deliberate decisions to acquire additional non-instrumental

[1] We use the term "additional information" to refer to information that, strictly speaking, is superfluous to the reporting decision but that can be useful to individuals when trying to justify dishonest behavior. We use 'additional' instead of 'superfluous' because we introduce a new goal for the information collection: justifying dishonesty. Hence, the information can be useful in justifying dishonesty even though the information is not instrumental according to classical theories.

[2] We call the behavioral phenomenon that people collect related and unrelated additional information to relax moral constraints that are at odds with their self-interests *strategic curiosity*.

information when tempted to misreport, we contribute to the research on information and moral decisions by showing that curiosity can also be driven by a desire to justify selfish behavior.

In a pre-registered experiment, we recruited 1580 US participants on Amazon Mechanical Turk (mTurk). In the base treatment *(Single Roll)*, participants roll the dice once and then report the outcome. In this condition, people can continue to roll the dice after reporting while knowing that they cannot change their report. To study how people search for additional information when tempted to misreport, we introduce three variations to identify causal effects of different information environments. In the *Three Rolls* treatment, the number of rolls is limited to three, and people do not have a chance to roll less or more than three times before reporting the outcome of the first roll. In the other two treatments, participants can roll as many times as they want to before reporting. In the *Multiple Numbers* treatment, the dice's sides always display numbers, whereas in the *Multiple Figures* treatment, the dice displays random figures after the first roll. Since only the outcome of the first roll should be reported, additional rolls have no instrumental value in the case of honest reporting.

Our results provide evidence that people are systematically more curious when collecting additional information can help justify dishonesty. As this is an observed game, we can disentangle whether collecting additional information that is related or unrelated to the outcome leads to higher misreporting. We find that people who observe lower outcomes in the first roll are more likely to roll more times before reporting in the *Multiple Numbers* and the *Multiple Figures* treatments. People in the *Multiple Numbers* treatment observe numeric outcomes whereas those in the *Multiple Figures* see only non-order symbols in the additional rolls. The average number of rolls is not significantly different in these two treatments. In the *Multiple Numbers* treatment participants roll 4.8 times on average, whereas in the *Multiple Figures* treatment, they roll 4.9 times on average. This result indicates that people acquire additional information—not only to search for justifications—but also to distract themselves from moral conflict.

We find that dishonesty does not respond to the availability of additional information. The average *size of the lie*—the distance between the reported number and the actual outcome—is 0.50 units for all participants and does not significantly vary across treatments. However, we document a positive relationship between information collection and dishonesty. Rolling the dice additional times is correlated with higher size of the lie and this relationship is particularly strong among dishonest participants.

Our supplementary results show that even after the report is submitted, people continue collecting information ex-post in the *Single Roll* treatment. We find a significant difference in rolling behavior between ex-ante and ex-post rolling when the outcome of the first roll is low—but no difference when the outcome of the first roll is high. This suggests that people are more curious when the additional information can be used to justify reporting dishonestly. Further evidence shows that people use curiosity to justify morally questionable decisions even after the decision has already been made. In this ex-post rolling, we observe that participants who misreported roll significantly more times than those who reported honestly. Dishonest reporters roll the dice 5.5 additional times after the first roll, whereas honest reporters roll it only 3.1 more times. Although not pre-registered, these findings support our main hypotheses and findings on the strategic use of curiosity to justify dishonesty.

This study contributes to research on preferences toward information in moral dilemmas, which can arise both before and after a decision has been made, and both when the decision-maker possesses incomplete and full information. Various motivations that shape information preferences have been documented previously, and curiosity is one of the prominent drivers of information acquisition. Loewenstein (1994) provides a review on curiosity and posits that demand for information is intrinsic; it is "appetite for knowledge". This kind of curiosity directed toward all kinds of information is defined as *epistemic curiosity* (Litman et al., 2005). We find that curiosity need not only arise from an intrinsic desire for information; it might also be driven by a strategic desire to justify selfish behavior or distract oneself from moral conflict. More recently, Golman and Loewenstein (2015) introduced the concept of "information gaps", which refers to people's desire to collect information to close the gaps between what is already known and what information is available. Eliaz and Schotter (2010) provide experimental evidence that individuals are willing to pay to receive information regarding the results of an intelligence test even when this information has no value in terms of achieving higher outcomes. We find that people acquire unnecessary information particularly when tempted to make morally questionable decisions. This extends the literature on curiosity by showing that curiosity may be motivated by strategic reasons rather than only an innocuous desire to collect information.

Information can play an important role in people's self-image management when it has *diagnostic utility*, revealing people's own moral type or disposition (Bodner and Prelec, 2003; Rabin, 1995). In this case, both avoiding and collecting information can help preserve a desired

self-image, helping people to feel good about their abilities and traits (Golman et al., 2019). Our study expands this literature by showing that information acquisition can serve a similar function as information avoidance. When the temptation to misreport is present, people tend to acquire non-instrumental information. In support of this, we find that people tend to acquire non-instrumental information that is also unrelated to the moral decision. This shows that the curiosity might not only stem from the search for justifications, but also from the search for distractions from the moral conflict. Prior research documents that rational inattention can cause various behavioral biases like present bias and correlation neglect (Gabaix, 2019; Sims, 2006). We extend this research by showing that, even when information is not related to the decision or the outcome, it can serve as a tool for self-distraction and inattention, which can be used strategically to stick with certain decisions.

The rest of the paper proceeds as follows. Section 2 presents the details of the experimental design. Section 3 explains the procedure and the details about the sample. Section 4 presents the results from our experiment. Section 5 concludes the paper.

2 Experimental Design

To investigate the relation between curiosity and dishonesty, we use a modified dice-rolling game (Fischbacher and Föllmi-Heusi, 2013; Shalvi et al., 2011). The dice-rolling game has been widely used to study dishonesty in the previous literature (Abeler et al., 2019). The standard structure of the game is that participants roll a fair six-sided dice and report the outcome of the first roll for monetary rewards. In the instructions, participants are informed that higher reported numbers result in higher payments. Because participants roll the dice privately, the experimenter cannot infer whether an individual misreports the roll outcome but can only infer dishonesty on the aggregate level. Together with the payment structure, the privacy of the game provides those who roll low numbers with a monetary incentive to misreport by reporting a higher number than the one they rolled. In the case of honest reporting, the expected average reported number is 3.5, and outcomes are uniformly distributed on the integers 1 to 6. Using this game has several advantages for investigating dishonesty since the game is of a simple nature that is easy to understand for participants. Since the theoretical distribution is known, experimenters can detect overall dishonesty.

Because our research question required us to observe both the number of times partici-

pants roll the dice and the outcomes of the dice rolls, we used an online dice-rolling game. In our experiment, participants roll a virtual dice on a computer screen while a software records how many times a participant rolls the dice and the outcomes of each dice-roll. Participants are informed about this procedure in advance and are told that their payoff will only be dependent on the reported number and not the factual outcome. Participants then report the outcome of their first throw and receive payment according to their report (reporting 1 yields a payment of USD 0.5 and reporting higher numbers increase the payment with increments of USD 0.5).

Though observed games are becoming more common in the dishonesty literature (Abeler et al., 2019; Gneezy et al., 2018), the observability of the reporting situation could potentially create an experimenter demand effect and affect participants' perceptions of the game. This could lower participants' level of dishonesty. However, the focus of our paper is to detect information preferences and strategic use of information collection. Using an online experiment requires using a virtual dice in the browser, because with a private dice we cannot collect information on how many time times the dice has been rolled and the outcome of the first roll. Aware of the potential concerns about observability, participants are ensured that their choices remain anonymous. Before knowing about the dice-rolling game, participants are informed that they would not be rejected based on the submission of an incorrect answer. Before reading further instructions, all the participants had to answer correctly on questions related to the study's terms and conditions. In the following instructions, participants read about the dice-rolling game and the rules of their treatment condition. Another concern when using a virtual dice is that participants might suspect that the dice is not fair. To combat this concern, we allowed participants to freely roll the dice before knowing about the reporting task. We explicitly informed all participants that the dice was programmed to be fair. To avoid priming participants on numeric values while practicing, the sides of the dice displayed non-ordered and random symbols.

Using an observed version of the basic dice-rolling game enables us to investigate whether the outcome of the first roll affects the likelihood that participants roll more than once, and whether the distance between the observed first-roll outcome predicts information acquisition. This enables us to measure the exact size of the lie and what drives information acquisition, which is crucial for our research questions. By reaching a sample of 1,580 participants, we aimed to provide valid findings for strategic curiosity. In addition, the virtual set-up enables us to scale up the experiment and post the experiment on online platforms where participants can choose

when and where to complete the experiment. The sample size enables us to run a well-powered study after making the estimations for at least 80% power (see Ay et al. (2019)).[3]

2.1 Treatments

To study the relation between curiosity and dishonesty, we manipulate whether participants are able to choose how many times they can roll the virtual dice. Restricting participants' ability to collect additional information provides exogenous variation in the decision to collect additional information, which facilitates causal analyses between treatment groups. In total, we introduce four treatment variations to our dice-rolling setting.

2.1.1 Baseline

To establish a baseline, we implemented a *Single Roll* treatment where the participants only roll the virtual dice once before they submit their report. In the *Single Roll* treatment, the availability of additional information is (exogenously) restricted along with their ability to justify misreporting using additional outcome-related information. To obtain a proxy measure for pure (epistemic) curiosity in our setting, we allowed participants in the *Single Roll* treatment to continue to roll the dice as many times as they would like after they reported. Because participants could not change their report after submission, collecting additional information has no instrumental use for the decision.

Including our baseline, we provide a design in which we manipulate exogenous and endogenous information availability.

2.1.2 Exogenous availability of information

To investigate whether the amount of counterfactual information—without self-selecting to collect it—affects dishonesty, we limit the number of rolls prior to reporting in two of our treatments. In addition to the *Single Roll* baseline, we implemented a *Three Rolls* treatment where participants are forced to roll the dice three times before they submit their report. In this treatment, additional

[3] Sample size is estimated with the mean values for reported die outcome from Shalvi et al. (2011). In the control group, participants are allowed to roll the die only once, whereas in treatment participants roll multiple times. We used the reported numbers (so the earnings) in the control and treatment groups for our estimations. $\mu_{control}$ shows the average reported outcome in the control group whereas μ_{treat} shows in the treatment group. In condition *Single Roll* (control group) where only one roll is possible $\mu_{control} = 3.97$ and $\sigma_{control} = 1.56$. In the treatment where multiple rolls are allowed $\mu_{treat} = 4.45$ with $\sigma_{treat.} = 1.59$.

outcome-related information is exogenously given to participants as they cannot proceed to the reporting page before the dice has been rolled exactly three times. This enables us to investigate whether observing additional outcomes-related information in itself increases misreporting and whether this effect is driven by the counterfactual outcomes they observe.

In *Single Roll* and *Three Rolls* treatments, the number of rolls is exogenously limited prior to reporting. This restriction helps us study how participants respond to this limitation and whether it affects dishonesty.

2.1.3 Endogenous availability of information

To study whether participants are strategically curious, we implemented two treatments that allow for endogenous information collection. In these two treatments, participants can roll the dice as many times as they want to, however the content of the dice is different after the first roll.

2.1.3.1 Multiple Numbers

In the *Multiple Numbers* treatment, participants choose how many times to roll the dice before reporting the first outcome. To investigate whether the content of the subsequent roll-outcomes matters for the decision to collect additional information, we add a description underneath the "roll" button that indicates the content of the next dice-roll. In the *Multiple Numbers* treatment, the description stated, *"Potential outcomes: Numbers from 1 to 6*". Because participants must actively choose to roll the dice additional times to obtain additional outcome-related information, we can compare whether having access to this information affects misreporting differently by being endowed with such information. This allows us to also investigate whether those who have access to outcome-related (counterfactual) information systematically roll more when they observe low roll-outcomes in their first (actual) roll.

2.1.3.2 Multiple Figures

In the *Multiple Figures* treatment, participants choose how many times they roll the dice before reporting but, after the first roll, subsequent roll-outcomes display non-ordered symbols instead of numbers. Changing the displayed content of the sides of the dice restricts participants' access to additional outcome-related information that can (directly) help justify misreporting by report-

ing the best throw. Rolling the figures-dice only generates unrelated information. Yet, acquiring unrelated information can serve as a distraction from their moral standard to report honestly and therefore make misreporting less threatening to their moral self-view (Mazar et al., 2008). To be rationally inattentive as Gabaix (2019) proposes, participants can search for distraction by collecting unrelated information. The description underneath the "roll" button states *"Potential outcomes: Random symbols only*" to remind participants.[4] In contrast to the *Multiple Numbers* treatment where participants know that additional roll-outcomes display (counterfactual) numeric information, participants in the *Multiple Figures* treatment know that rolling the dice additional times only generates unrelated symbolic information. This allows us to examine whether participants are more curious about the additional information when the information has more potential to justify misreporting and whether observing related information is more effective in justifying misreporting than observing unrelated information.

To eliminate the effects of self-selection to rolling multiple times, our design enables us to compare exogenous (*Three Rolls*) and endogenous choice of multiple rolls (*Multiple Numbers*). See Figure 1 for an overview of the design.

—INSERT FIGURE 1 ABOUT HERE—

3 Sample and Procedure

The experiment was posted as a Human Intelligence Task (HIT) on the Amazon Mechanical Turk (mTurk) crowdsourcing platform in June-July 2019. The interface of the experiment was programmed using oTree (Chen et al., 2016). Before data was collected for this experiment, our design was approved by Institutional Review Board at the NHH Norwegian School of Economics.[5] Our hypotheses are pre-registered with AEA-RCT Registry (Ay et al., 2019).[6] Each of the 1,580 participants participated in only one treatment and was not aware of the other experimental treatments.

[4]The symbols displayed on the sides of the dice are identical to the ones on the practice dice.
[5]IRB Application number: NHH-IRB 07/19.
[6]Before running the main experiment, we conducted a pre-test on the same platform with 125 participants.

—INSERT FIGURE 2 ABOUT HERE—

All participants received the same instructions about the task, the payoff structure, and the overall procedure of the game. Participants were informed that their answers are recorded but would be kept anonymous and that the researchers cannot trace their choices back to their personal identities or their MTurk profiles. The instructions inform participants that all submitted work would be accepted regardless of accuracy and that payments would be transferred without any further questions shortly after the completion of the task. We reassured participants about their anonymity and the exclusion rules because participants could refrain from acting dishonestly due to reputation concerns on the online crowd-sourcing platform.[7] To avoid potential experimenter-demand effects, we provided this information to participants before the instructions about the dice-rolling task.[8]

Initially, participants started by practicing with a trial dice for as long as they wanted before reading about the main experiment. The sides of the trial dice displayed only non-ordered and random symbols and all participants had to roll the practice dice at least once before proceeding. This method was chosen to reassure participants about the fairness of the dice without priming them with numeric outcomes. After practicing with the trial dice, participants read the instructions for the dice-rolling task along with the payment structure. After reporting their roll-outcomes, participants answered questions related to the experiment (e.g., perceived descriptive norms of similar dice-rolling games, self-reported feelings of being observed, and perceived legitimacy of rolling more than once), along with demographic questions. Overall, the experiment took participants approximately 7 minutes to complete, and the average payment was USD 2.5, which included a participation fee of USD 0.5.

Table 1 contains descriptive statistics across the different treatment treatments. In *Panel A* we report the demographic measures, and in *Panel B* we report some of the self-reported beliefs that were collected the post-experiment questionnaire. Assignment to treatments is balanced in

[7] Comments that participants give during the experiment also suggest that many were experiencing a moral dilemma in the reporting situation. For example, one participant wrote, "I did report the correct first roll of '2'. (I was curious and did roll the dice other times, but my report was truthful and accurate.)". Another wrote, "I wanted to report a higher dice roll for more money. I did not."

[8] Payments to participants is automated in the experiment, which allowed us to pay bonuses without storing worker IDs. We did not store worker IDs and IP-addresses to ensure anonymity. We deliberately abstained from using contentious words such as dishonesty, lying, or misreporting to avoid experimenter-demand effects. Participants were given a participation code once they accepted the HIT, which prevented them from retaking the HIT. No duplication of participation code was found.

terms of observable characteristics and beliefs. The average age of participants is 38, and 46% of our sample is female. The majority of participants have at least a high school degree. *Panel B* in Table 1 provides an overview of covariates included in our analyses and estimations. *Norm* shows the beliefs on the levels of dishonesty in general, whereas *Feeling Observed* refers to how observed they felt during the experiment on a scale of 0 to 10. Political Views are elicited on a scale from 0 (Very Liberal) to 10 (Very Conservative). Our results show that participants are more liberal overall. We observe that participants' reported beliefs about the prevailing dishonesty norm or feelings of being observed do not differ significantly across treatments (Kruskal Wallis test results for norms $\chi^2 = 2.87$, $p = 0.41$ and for feeling observed $\chi^2 = 2.77$ and $p = 0.43$).

—INSERT TABLE 1 ABOUT HERE—

4 Results

In this section, we report the findings of our experiment. Reported results include both pre-registered and supplementary analyses to clarify our findings. Our results based on two sources of randomization: treatment variations and the outcome of the dice in the first roll. The first result we provide on dishonesty stems from the first source of randomization, whereas the results on curiosity are based on the second source of randomization. All the hypotheses and analyses are pre-registered except for the analyses on the number of rolls in the *Single Roll* treatment in Result 2b and Result 3b.

In the first subsection, we provide findings on dishonesty across treatments. Although our design has the similar features to Shalvi et al.'s (2011), the main goal of our paper is to investigate curiosity in a moral context. For this reason, in the following sections we document our findings on information collection and whether it could be strategically chosen. Using an observed game enables us to provide analyses on information collection based on the outcome of the first roll whereas in studies using unobserved games, it is not possible to investigate such behavior and motivations for it (Fischbacher and Föllmi-Heusi, 2013; Shalvi et al., 2011). Finally, we document the correlation between curiosity and dishonesty.

4.1 Dishonesty

Our design provides two channels to investigate the impact of additional information on dishonesty: exogenous (*Single Roll* and *Three Rolls*) and endogenous variation of availability (*Multiple Numbers* and *Multiple Figures*). Collecting additional information on the outcome by rolling the dice multiple times enables participants to observe outcome-related (numeric) or unrelated (symbolic) information before reporting. In the case of honest reporting, the average expected reported number from the dice-rolling is 3.5.

Looking at the average reported numbers, we observe deviation from the theoretical expectation under honesty ($p < 0.001$). In our baseline *Single Roll*, average reported number is 3.94 (sd. = 1.79). We find no statistically significant difference on dishonesty across treatments (*Three Rolls*, 3.92 (sd. = 1.76) in *Multiple Numbers*, 4.12 (sd. = 1.66) in *Multiple Figures*, $p = 0.125$). Figure 3 shows the distribution of reported numbers in each treatment, which reveal that distributions of reported numbers are similar across treatments. The dashed line across Figure 3 indicates each number's theoretical frequency, i.e., 1/6. It can be seen in the figure that the share of reports below "4" are lower than the theoretical fraction, whereas reports of "6" are higher and also the highest of all reports. This figure shows that participants tend to report higher numbers than "3" and mostly "6" if they decide to misreport.

—INSERT FIGURE 3 ABOUT HERE—

In the experiment, we could observe both the actual and the reported number for each participant and are therefore able to develop a precise measure of dishonesty. These precise measures reveal that 19.9% of the participants in the *Single Roll* treatment, 24.6% in the *Three Rolls* treatment, 20.4% in the *Multiple Numbers* treatment, and 20.5% in *Multiple Figures* treatment misreported the outcome of the first roll. The share of dishonest reports is in line with the values shown in Abeler et al.'s (2019) meta-study on dishonesty experiments. Findings from the previous literature suggest that observing higher numeric outcomes than the actual outcome makes lying easier by enabling participants to report the best outcome that they observe instead of making a fictitious report (Shalvi et al., 2011, 2015).

Our result shows that participants in all treatments are dishonest, and the level of dishonesty is not significantly different across treatments. This result contrasts with previous experimental findings in unobserved settings and our hypothesis on dishonesty in the pre-analysis plan. For

example, Shalvi et al.'s (2011) study shows an increase in dishonesty when the participants are instructed to roll multiple times compared to only rolling once. In our experiment, the *Three Rolls* treatment is similar to the "Multiple Rolls" treatment in (Shalvi et al., 2011) regarding how many times participants are instructed to roll. In the *Three Rolls* treatment in which participants are instructed to roll three times and were not given a chance to change it, we do not find any significant difference in the level of misreporting (reported number (4.15) and distance (0.64)). The *Three Rolls* treatment provides both a comparison to Shalvi et al. (2011) and serves to control for self-selection in our experiment. However, we do not observe an increase in misreporting in the *Multiple Numbers* treatment compared to *Three Rolls*.

Our results show that there is no difference in dishonesty between the settings where access to additional information is exogenously limited and those where it is endogenously decided. Although the level differences are not significant between treatments, mean reported values are higher than 3.5 in all treatments. This shows dishonesty in all treatments, no matter the availability and the content of the information.

Since we observe the actual outcome of the first roll, we can analyze the "size of the lie" or the distance between the reported and actual outcome. The "distance" shows the deviation from the actual outcome.[9] We find no significant variation in distance between treatments ($p = 0.383$). In our pre-analysis plan, our hypothesis was that availability of additional information increases dishonesty. Our findings instead suggest that the availability of additional information does not affect misreporting.

> *Result 1: Availability of additional information - either exogenously or endogenously given - does not increase misreporting compared to having no additional information available before reporting.*

4.2 Curiosity

In this section, we provide our findings on curiosity by first analyzing participants' rolling behavior before reporting (ex-ante) and then the same behavior after the report is submitted (ex-post). For ex-ante information collection, our two treatments enable us to investigate curiosity based on the content of information: outcome-related information in *Multiple Numbers* and unrelated

[9] Distance is 0.58 (sd. = 1.39) in *Single Roll*, 0.64 (sd. = 1.49) in *Three Rolls*, 0.47 (sd. = 1.40) in *Multiple Numbers* and 0.53 (sd. = 1.30) *Multiple Figures*.

information in *Multiple Figures*. When additional roll-outcomes display numbers (*Multiple Numbers*), rolling more times generates counterfactual information, which has been previously shown to make misreporting more frequent (Shalvi et al., 2011). Observing desired counterfactuals helps to decrease the psychological distance between the actual outcome and the desired one.[10] By contrast, when the additional roll-outcomes display random symbols (*Multiple Figures*), participants cannot use the additional information to reduce the psychological distance between the actual roll outcome and the desired one. In *Multiple Numbers* treatment, the information is always outcome related since the outcomes of the dice are always numeric, whereas in the *Multiple Figures* treatment, outcomes are unrelated since the dice shows random figures after the first roll.

In the pre-analysis plan, we hypothesized a higher number of rolls in the *Multiple Numbers* treatment compared to the *Multiple Figures* treatment. We find however, no difference in rolling behavior between observing outcome-related information (numeric) and information that is random and unrelated (symbols). Participants who can roll freely before they report throw the dice 4.98 (15.5) times after the first roll when the additional rolls have numeric outcomes, whereas this number is 4.82 (17.6) when the rolls have symbolic outcomes ($p = 0.96$). Figure 4 shows the average number of rolls prior to reporting in the *Multiple Numbers* and *Multiple Figures* treatments. As shown in the figure, when faced with a lower outcome in the first roll, the number of rolls is significantly higher in both treatments. This result is in line with our pre-registered hypothesis.

—INSERT FIGURE 4 ABOUT HERE—

Result 2a: People are curious and collect additional information even when the additional information is irrelevant to the task. Curiosity is higher when the outcome of the first roll is low.

Although not pre-specified, we want to further investigate whether people who rolled more when they observed a low outcome do so out of "pure curiosity" or whether they are searching to justify misreporting. This former type of curiosity is defined as "epistemic curiosity", which is a desire to collect information even when it is not targeted to a specific end (Litman et al., 2005; Loewenstein, 1994). To assess this, we let those in the *Single Roll* treatment have the opportunity to keep rolling the dice after they submit the report. These participants are explicitly told that they

[10] By desired counterfactuals, we refer to the higher numbers than the outcome of the first roll.

would not be able to change their report but could keep on rolling if they wanted to do so. We use their ex-post rolling (after reporting) behavior in *Single Roll* treatment as a benchmark for seeking non-instrumental information out of pure curiosity.[11]

—INSERT FIGURE 5 ABOUT HERE—

Figure 5 shows number of rolls in both *Single Roll* and *Multiple Numbers* treatments based on the outcome of the first roll (greater than 3 and lower or equal than 3). In both treatments, participants who roll lower outcomes in the first roll rolled significantly more times than those with a high outcome in the first roll ($p < 0.01$ for both treatments).

—INSERT FIGURE 6 ABOUT HERE—

Distribution of the number of rolls can be seen in Figure 6. Number of ex-post rolls is significantly lower than number of ex-ante rolls (4.98 in *Multiple Numbers*, 2.75 in *Single Roll*, $p = 0.005$).

Result 2b: Curiosity is observed even after the decision has been made—when additional information has no instrumental value. A low outcome of the first roll increases the number of ex-post rolls.

Our design enables us to provide findings on the rolling behavior based on the outcome of the dice. Conditioning on the outcome of the first roll has not been possible in previous research that has relied on hidden rolls. Our results show that the level of information collection is not significantly affected by the content of information. Our results document that participants continue rolling the dice even after reporting. Although additional information has no use, this behavior could be motivated by a desire to justify dishonesty. In the next section, we continue documenting our results on motivations for curiosity.

4.3 Motivations for Curiosity

A tension between reporting honestly and reporting self-servingly arises when there is a large distance between the desired outcome (rolling a high number) and the actual outcome. We conjecture that this tension gives rise to a demand for information that reduces the gap between the

[11] We use instrumentality in terms of affecting the final result. Even though it cannot change the reported value, ex-post information may help people validate their dishonest reports. We provide further analysis of this behavior in the next section.

desired and the actual outcome. Demand for information is driven by the need to find justifications that can reduce the perceived distance or gap (Fischbacher and Föllmi-Heusi, 2013; Shalvi et al., 2011). The demand will be greater the larger the distance is between the actual outcome (e.g., rolling a 'one') and the number that one would prefer to report (e.g., 'six'). We pre-specified in the pre-analysis plan that people are more likely to acquire information that could reduce the perceived distance between the factual outcome and the wealth-maximizing outcome when this distance is large (e.g., rolling a one) compared to the when there is less or no distance (e.g., rolling a five). That is, when honesty concerns are in conflict with self-interest, individuals actively try to reduce the intrinsic cost of lying by acquiring information that may reduce the perceived size of the potential lie.[12] To investigate whether curiosity is used to reach higher monetary outcomes, we document estimations for the information collection in relation to the outcome of the first roll and other behavioral parameters in this section.

Our analysis on motivations to collect additional information prior to reporting focuses on how many times participants choose to roll the dice in the *Multiple Numbers* and *Multiple Figures* treatments. In these treatments, participants have the opportunity to roll as many times as they would like to before they report the outcome of the first roll. We hypothesized that observing a low outcome on the first roll produces a demand for justification to misreport.

—INSERT TABLE 2 ABOUT HERE—

Among participants who could freely roll the dice with numbers, we find that the lower their first roll, the more likely they are to roll again. Table 2 shows that for both treatments, higher outcome of the first roll significantly decreases the likelihood that the subject would roll more than once ($p < 0.01$).

> *Result 3a: Outcome of the first roll affects the likelihood of rolling more than once, even when the additional outcome is not related. The lower the outcome of the first roll, the higher the likelihood of continued rolling ex-ante.*

This result supports our hypothesis on curiosity; people can be strategically curious to justify morally questionable decisions when the actual outcome is low. For lower outcomes of

[12] Our estimation is based on Gneezy et al. (2018), however, the method we use deviates to correctly specify impacts of our observed design.

the first roll (≤ 3), the number of rolls is significantly higher before reporting (ex-ante) in the *Multiple Numbers* treatment than after reporting (ex-ante) in the *Single Roll* (4.61 in Multiple Rolls, 3.23 in *Single Roll*, p = 0.03). We do not observe a significant difference between ex-ante and ex-post number of rolls for participants who see higher outcomes in the first roll (2.88 in *Multiple Numbers*, 2.16 in *Single Roll*, p = 0.49).

This finding is in line with Gneezy et al.'s (2018) finding which states that the distance between reported and actual outcomes drives the intrinsic lying costs. We find that when the distance between the desired and actual outcomes increases, participants seem to desire information that could reduce this psychological distance. This finding suggests that people actively attempt to shape their information-set according to what serves their self-interest. Participants search for more information when they face lower outcomes in the first roll, and they search for such information significantly more when it can be acquired before rather than after the reporting decision.

Figure 7 shows number of rolls after reporting by honest versus dishonest participants (2.56 for honest reporting, 4.35 for misreporting, p = 0.043). As shown in the figure, participants who reported honestly roll significantly fewer times than participants who reported dishonestly. Showing that participants roll more after they misreport compared to if they reported honestly is important as it provides additional evidence that participants seem to use additional information as a way to assess the credibility of both potential and past lies—even when there is no monetary gain from rolling more and continued rolling has an opportunity cost.

—INSERT FIGURE 7 ABOUT HERE—

Participants are more likely to roll the dice to a greater extent when the outcome of the first roll is low. However, in the ex-ante treatment, participants acquire more information than the ex-post situation, supporting our hypothesis on "strategic" curiosity. By design, the additional rolls before the reporting can be considered when reporting, but additional rolls after the reporting cannot affect the submitted report.

Result 3b: Participants who reported dishonestly are more likely to collect additional information after reporting.

4.4 Information, Curiosity and Dishonesty

Our results show a clear behavioral pattern on low values of the first roll and curiosity. When we define strategic curiosity, we posit that it is a tool to make self-serving decisions easier. To investigate whether participants use the additional information for this goal, we provide evidence for the relationship between the distance of the lie and the number of rolls.

We observe no significant difference in the level of misreporting between *Multiple Numbers* and *Multiple Figures* treatments. Although we do not observe treatment differences in reported numbers, Table 3 shows that distance (size of the lie) is significantly higher among those who chose to roll the dice more, regardless of the content of the dice—numbers or figures. As mentioned earlier, *Multiple Numbers* and *Multiple Figures* treatments are the ones in which participants "endogenously" decide how many times to roll the dice. In the *Single Roll* and *Three Rolls* treatments, the number of rolls is exogenously decided.

—INSERT TABLE 3 ABOUT HERE—

In terms of relevancy of the content, *Multiple Numbers* and *Multiple Figures* treatments provide variation of the content of the endogenously collected information.[13] We find a very similar effect of number of rolls on distance in both treatments; it is positively and significantly associated with the distance of the lie. This shows that even though the effect size is different, curiosity toward both related and unrelated information is positively related, with greater distance between the actual outcome and the reported number.

These results can provide insights on motivations of dishonesty for two different types of information: with related information, dishonesty is driven by the fact that there is a potential higher outcome, and with unrelated information, the mechanism might be similar to distraction. Since it was not one of the main concerns of our research, the latter mechanism is not documented in detail. Effects of inattention and distraction have been previously documented in different behavioral concepts than dishonesty (Falk and Zimmermann, 2016; Gabaix, 2019). We show the same dishonesty level in these treatments and the same effect of rolling more on this level, suggesting that different mechanisms cause similar effects on dishonesty.

[13] Relevancy is used in terms of additional information being relevant to the first roll and the reporting decision.

Result 4: Curiosity is associated with misreporting regardless of the content of additional information.

Table 3 also shows that, in the *Single Roll* treatment in which participants could roll the dice only once prior to reporting the outcome, the time participants spent on the rolling page (Time Rolling) is positively associated with misreporting.[14] This result suggests that, even without rolling the dice more times, people who report dishonestly spend more time on the page before doing so. This finding supports the argument that morality is the intuitive choice in social decisions. For example, Cappelen et al. (2016) show a strong association between short response time and fair behavior, which means fairness is the intuitive choice in social decisions. In a meta study on dishonesty experiments, Köbis et al. (2019) show that in situations where dishonesty affects others, honesty is the intuitive choice.

In none of the treatments is the feeling of being observed related to individual misreporting. This shows that feeling observed during the game did not contribute to the treatment effects that are documented in this paper. In all treatments, beliefs on norms about dishonesty are associated with larger lies (i.e., larger distance from the first outcome). Beliefs on norms are elicited by asking participants how likely others are to report dishonestly in similar experimental settings. This is a self-reported measure on participants' beliefs about others' dishonest behavior in similar settings. Our findings show that beliefs about others' dishonesty is correlated with larger-distance lies. Although these mentioned effects are low, they support related research suggesting that beliefs about the prevailing descriptive norms (i.e., others' dishonesty in similar games) influence people's tendency to be dishonest (Bicchieri et al., 2019).

5 Concluding Remarks

Morality is often considered to restrict people from making self-serving decisions that are morally questionable. As opposed to treating morality as a goal in itself, it is sometimes treated as a set of internalized constraints on people's real goal of pursuing self-interest. In that case, people strategically acquire information to create moral wiggle room that makes otherwise morally unacceptable

[14]Note that in the rolling page of *Single Roll* treatment, participants are not allowed to roll after the first one, but they can deliberately stay on the page until they click the "Next" button. This variable is not added for the analysis in other treatments because people stay on the page while rolling the dice. In the Single Roll treatment, they cannot do anything on this page.

decisions appear morally acceptable. As people increasingly have access to an abundance of information, understanding how people use their discretion over various kinds of information in moral dilemmas is increasingly important.

In this study, we investigate how people strategically collect additional non-instrumental information to justify morally questionable decisions. We use a modified dice-rolling experiment where the availability and the content of additional information vary between subjects. This design enables us to disentangle what motivates collecting additional information, and to investigate how this affects dishonest reporting. We provide novel evidence that curiosity about related and unrelated information is heightened when being curious can help circumvent the moral obligation to report honestly. Even though people's curiosity is associated with more dishonest behavior, we find no treatment effect on dishonest reporting, suggesting a more complex underlying mechanism.

We obtain evidence that people acquire additional information—not only to search for justifications—but also to distract themselves from the moral conflict. Even after the reporting decision has been made in the *Single Roll* treatment, we find that people who misreport are more likely to acquire additional information to evaluate the credibility of their past lies. Further analyses provide additional evidence that people tend to use additional information to assess the credibility of potential lies rather than merely searching for justifications for selfish behavior.

Our study fills an important gap in the behavioral research literature by showing that information acquisition can be a strategic behavior. Previous research on information preferences in moral contexts has devoted considerable attention on information avoidance (Dana et al., 2007; Golman et al., 2017; Grossman and Van der Weele, 2017). We provide experimental evidence that people actively collect non-instrumental information when tempted by the benefits of being dishonest. Our findings support the notion that people attempt to circumvent moral constraints rather than having a preference for morality (Rabin, 1995). As people often have discretion over how much information to collect and consider before making moral decisions, understanding endogenous information collection and processing choices is essential to improve our understanding of behavior and to design better policies.

We provide evidence that information collection is linked with higher levels of dishonesty even when the information is not related to the task. Although our design limits us to providing a more detailed investigation of the motivations, previous literature suggests that people might

rationally seek inattention to distract themselves when making decisions (Gabaix, 2019; Sims, 2003, 2006). In the domain of moral cognition, becoming inattentive to moral standards can make it easier for people to excuse diverging from their standards (Mazar et al., 2008). Our findings on the systematic collection of unrelated information provide another interesting trait: people seem to collect information to distract themselves from moral dilemmas.

Even though our experimental investigation is concerned with endogenous information collection, we also contribute to research on how counterfactual information affects moral cognition (Bassarak et al., 2017; Effron, 2018; Shalvi et al., 2011). Previous literature finds that people tend to process new pieces of information to confirm their own beliefs. Though we find evidence of this, we find that people seem to not change their decisions based on the content of the additional information. Instead, our results suggest that dishonest people tend to acquire additional information to justify their dishonest decisions.

Our results provide insights that increase our understanding of the link between information and moral decisions by suggesting that people could use unnecessary information to justify morally questionable decisions. This insight is important as people have access to extensive information about many different topics in their daily life. Thus, we believe our results can increase our comprehension of social and economic decisions as our research serves as a step towards understanding the psychological mechanisms that drive the strategic use of curiosity.

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	Single Roll	Three Rolls	Multiple Numbers	Multiple Figures
1st				
2nd	-			
3rd	-			
4th	-	-		

Figure 1: Potential Outcome of the Dice by Treatments

Note: This figure shows the potential outcomes of the dice in each treatment. Just to represent potential outcomes and the limitations of the treatments, we visualize four random outcomes. In *Single Roll* and *Three Rolls* treatments number of rolls is limited by design whereas in the *Multiple Numbers* and *Multiple Figures* treatments participants can roll the dice as many times as they want (unlimited). In the *Multiple Figures* treatment participants only see figures instead of numbers.

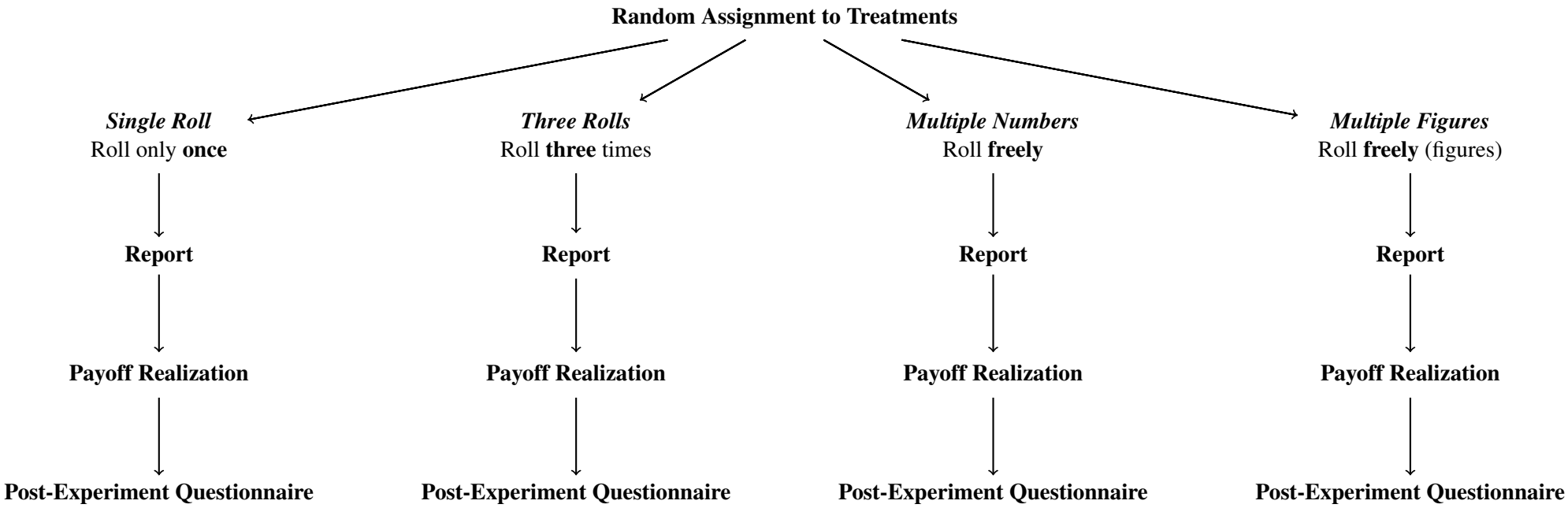


Figure 2: Experiment Procedure

Note: Treatments are built on the variation of rolling rules. After participants are randomly assigned to one of the treatments, they roll the dice as many times as allowed (or they chose in the *Multiple Rolls* and *Multiple Figures*. After rolling they are asked to report the outcome of the first roll with being informed that the final payoff is calculated over the reported number.

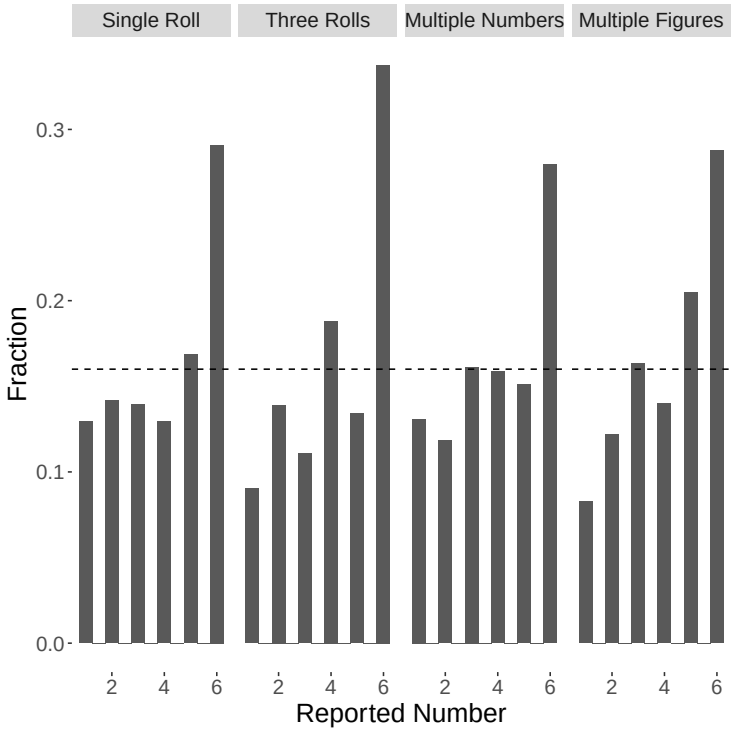


Figure 3: Distribution of Reported Numbers

Note: This figure shows the distribution of reported numbers for each treatment separately. The dashed line represents theoretical expectation on the share of each outcome from rolling a dice which is equal to 0.16. As can be seen fraction of 5 and 6 is higher than the theoretical expectation whereas fraction of reporting lower numbers fell below the theoretical expectation.

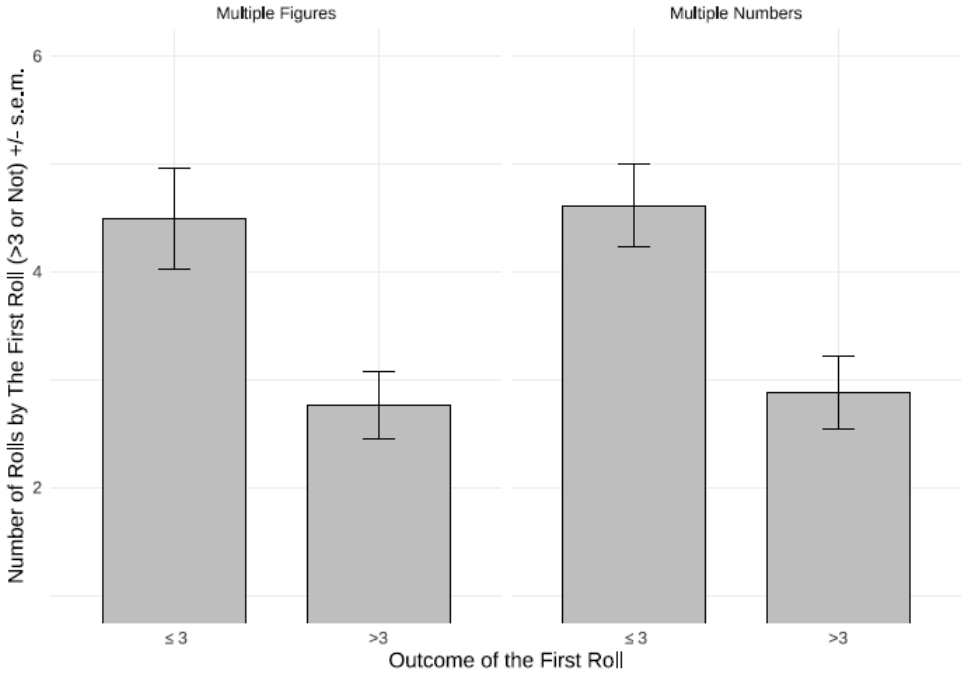


Figure 4: Number of Rolls Before Reporting

Note: *Bars are ses.* This figure shows average number of rolls for each treatment in which participants can roll the dice as many times as they want. For each treatment, the number of rolls is shown by the outcome of the first roll as below or equal 3(< = 3) and above 3(>3). As can be seen in the figure, participants who saw lower first outcome roll significantly more times than those who saw higher numbers. This holds for both Multiple-rolls treatments (numbers and figures) in which participants can roll as many times as they want before reporting. ($p < 0,001$)

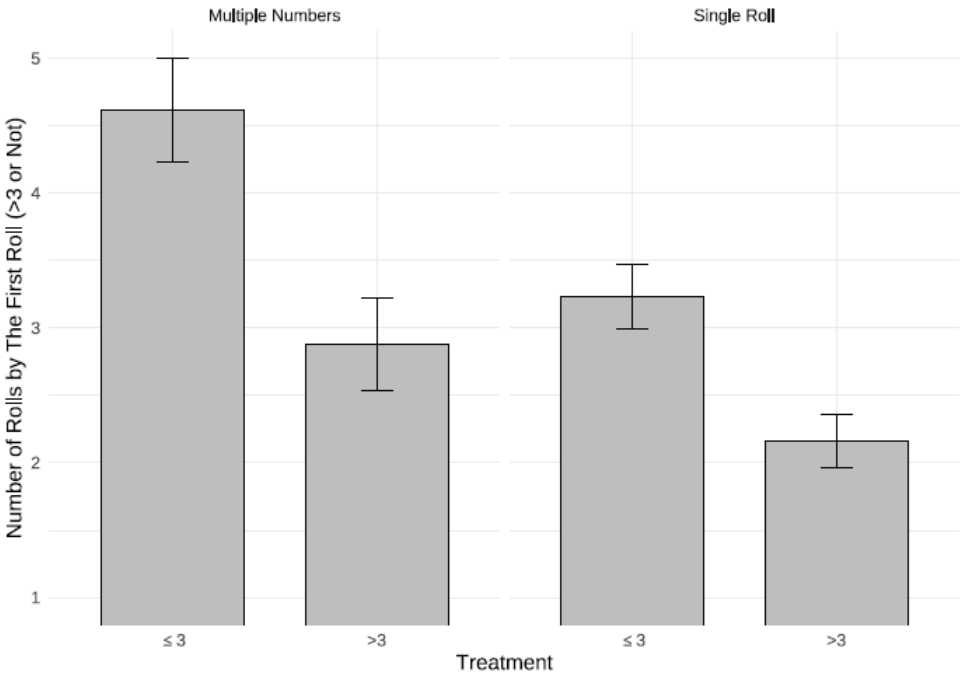


Figure 5: Ex-Ante and Ex-Post Number of Rolls

Note: This figure shows average number of rolls for each treatment in which participants can roll the dice as many times as they want and the outcomes of rolls are numbers. The only difference is that in the *Multiple Numbers* treatment they can roll the dice before reporting (ex-ante) whereas in the *Single Roll* treatment they can only roll additional rolls after reporting (ex-post). Number of rolls is shown by the outcome of the first roll as below or equal 3(< = 3) and above 3(>3). As can be seen in the figure, participants who saw lower first roll-outcomes roll significantly more times than those who saw higher numbers. This holds for both *Multiple Numbers* and *Single Roll* treatments in which participants can roll as many times as they want before reporting. Although this result is not pre-registered we find it valuable to show the information seeking even when there is no instrumental value that can affect the final reporting behavior and the outcome.

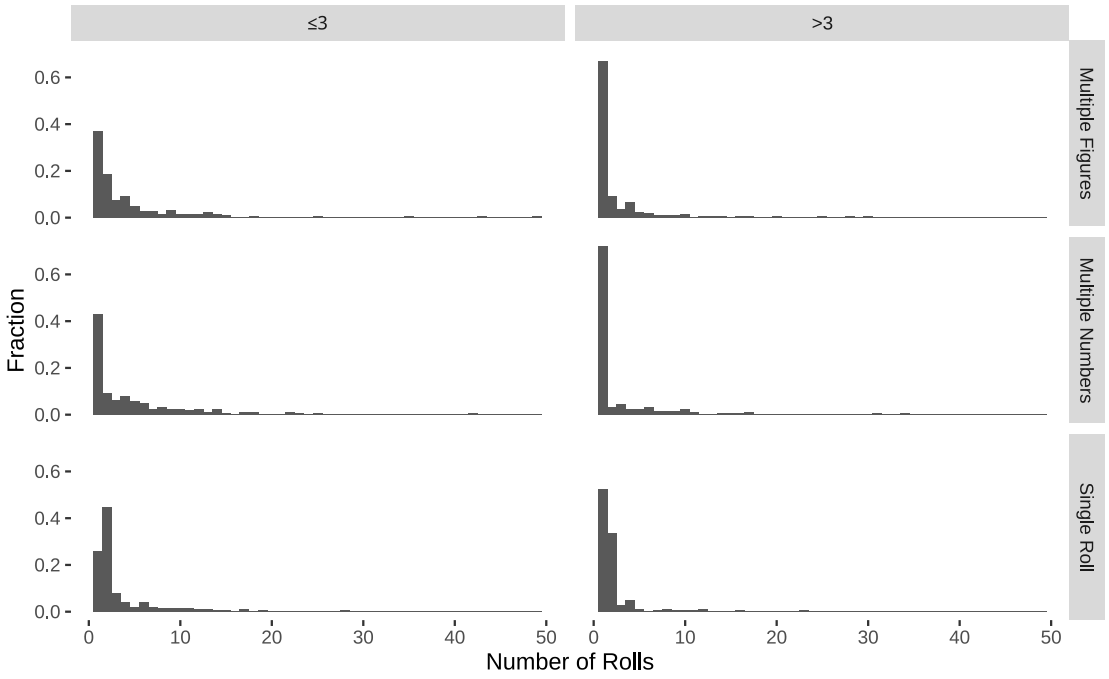


Figure 6: Distribution of Number of Rolls

Note: this figure shows the distribution of how many times participants chose to roll by treatments in the rows and the outcome of the first roll on the columns.

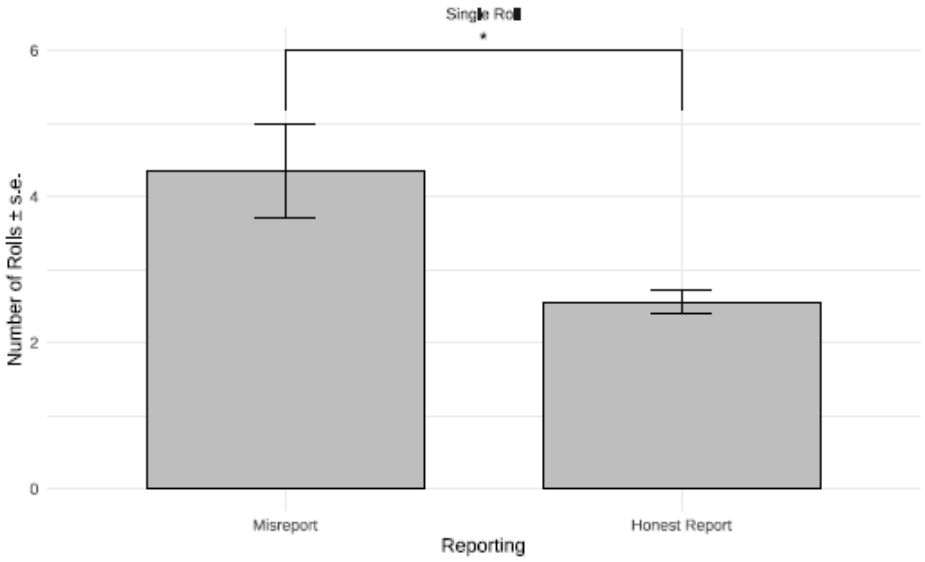


Figure 7: Number of Ex-Post Rolls and Dishonesty

Note: This figure shows the mean number of rolls for the Single Roll treatment by groups of dishonest (misreport) and honest reporting. After reporting, participants who misreported roll significantly more times than participants who reported honestly ($p = 0.042$).

Table 1: Summary Descriptives Table by Groups of Treatment

	Multiple Figures	*Multiple Numbers*	*Single Roll*	*Three Rolls*
	N = 386	N = 397	N = 409	N = 388
Panel A				
Age	37.8 (11.5)	38.7 (12.1)	39.0 (12.5)	38.3 (10.5)
Gender ($= F$)	0.47 (0.50)	0.48 (0.50)	0.45 (0.50)	0.44 (0.50)
Education:				
High School or Less	38 (11.5%)	52 (14.7%)	45 (12.5%)	41 (12.2%)
Higher Than High School	292 (88.5%)	301 (85.3%)	316 (87.5%)	295 (87.8%)
Panel B				
Norms	4.93 (2.80)	4.88 (2.60)	4.81 (2.78)	5.15 (2.76)
Feeling Observed	7.02 (3.25)	6.98 (3.21)	6.77 (3.13)	6.82 (3.36)
Political Views	3.39 (2.39)	3.48 (2.49)	3.18 (2.43)	3.45 (2.37)

Note: Values in the upper part of the table are self-reported demographics and beliefs elicited with a survey. It is clear from this table that sample was well balanced across treatments in terms of observable characteristics and beliefs. Political views are scaled from 0 (very liberal) to 8 (very conservative).

Table 2: Logistic Regression for Rolling More than Once

	Dependent variable:	
	Keep Rolling (= 1)	
	(*Multiple Numbers*)	(*Multiple Figures*)
First Roll	-0.349^{***}	-0.421^{***}
	(0.072)	(0.078)
Controls	Yes	Yes
Observations	397	386
dydx	-0.065^{***}	-0.081^{***}
	(0.021)	(0.024)
Log Likelihood	−225.443	−218.645

Note: Results show that, in both treatments higher observed numbers in the first roll decreases the likelihood of *"Keep Rolling"* significantly; *se*.s are in parentheses. *dydx* shows the marginal effect of "*First Roll*". Unlisted controls: Age, Gender, Norms, Feeling Observed, Political views, Income level, Education Level, Belief on Lying in the Experiment.*p<0.1; **p<0.05; ***p<0.01.

Table 3: Predictors of *"distance"* (Reported - Real Outcome) across Treatments

	Dependent variable: distance			
	(Single Roll)	*(Three Rolls)*	*(Multiple Numbers)*	*(Multiple Figures)*
# of Rolls			0.041^{***}	0.041^{***}
			(0.014)	(0.011)
Time Rolling	0.010^{**}			
	(0.005)			
Time Report	0.002	0.013	0.012	0.005
	(0.007)	(0.008)	(0.011)	(0.005)
Age	-0.011^{*}	-0.018^{**}	-0.027^{***}	-0.007
	(0.006)	(0.009)	(0.007)	(0.007)
Sex (F)	-0.400^{**}	-0.136	-0.270^{*}	-0.469^{***}
	(0.157)	(0.180)	(0.154)	(0.149)
Controls	Yes	Yes	Yes	Yes
Observations	347	317	324	331

Note: To explain distance of the lie, we use behavioral measures that are collected in the game and other covariates like self-reported unobservable characteristics; *se*.s are in parentheses. *Time Report* variables show the seconds participants spent on reporting and rolling the dice. A subset of data used to make this estimation to exclude participants with first outcome of 6 (since including these participants masks the effects of other covariates with 0 lying). Unlisted controls: Political view, Income level, Education Level, Belief on Lying in the Experiment. When we make the same estimation for only dishonest people, we observe that 1 additional roll increases the distance by 0.23 units, which means 4 additional rolls increases the lie by 1 unit for dishonest reporters. $^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$.

A Supplementary Analysis

A.1 Details of Dishonesty

Shalvi et al. (2011) argue that observing higher counterfactuals causes misreporting to reach higher potential payoff. On the other hand, Gneezy et al. (2018) predicts that participants would refrain from fully using the strategic advantages when lying as the size of the lie increases. In this section we report results about lying behavior that are not pre-registered. Figure A.1 shows the average reported number by the first roll. As can be seen, for every outcome we observe lying which is higher for values lower than 4 compare to higher outcomes. Our results show that participants who misreported mostly reported 6, while some share report lower numbers as can be seen in Figure A.2. Distribution of overall (pooled sample of honest and dishonest reporters) reports also show high share of 6 reports in Figure 3. The dashed line in Figure 3 shows the theoretical share of each number which is 1/6 (0.16).

A.2 Dishonesty and Ex-Post Information Collection

As shown in the main results, we observe that people who see a lower outcome in the first roll and who misreport are more likely to roll the dice ex-post, after the report has been submitted. To complete the analysis on that here, we provide an an extra analysis on the relation between dishonesty and ex-post rolls. As can be seen in the Table A.1, there is a positive relation between the distance (the size of the lie) and the ex-post number of rolls. As mentioned earlier, although this result is not pre-registered we find it crucial to understand the relation between moral decisions and curiosity. In a digital dice rolling game, people who misreport collect information by rolling the dice not only before reporting but also even after the report has been submitted.

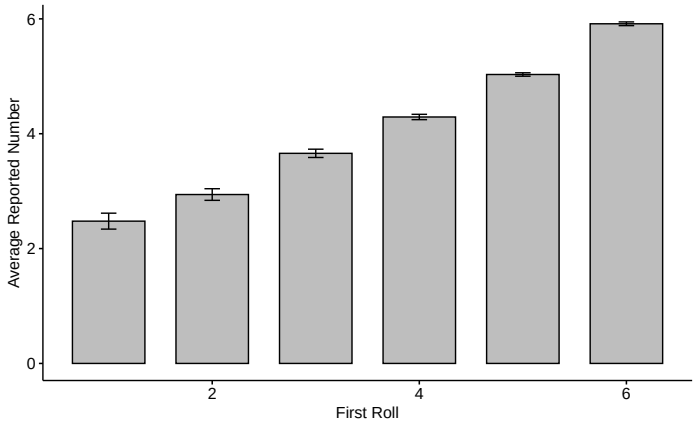


Figure A.1: Dishonesty and the Outcome of the First Roll

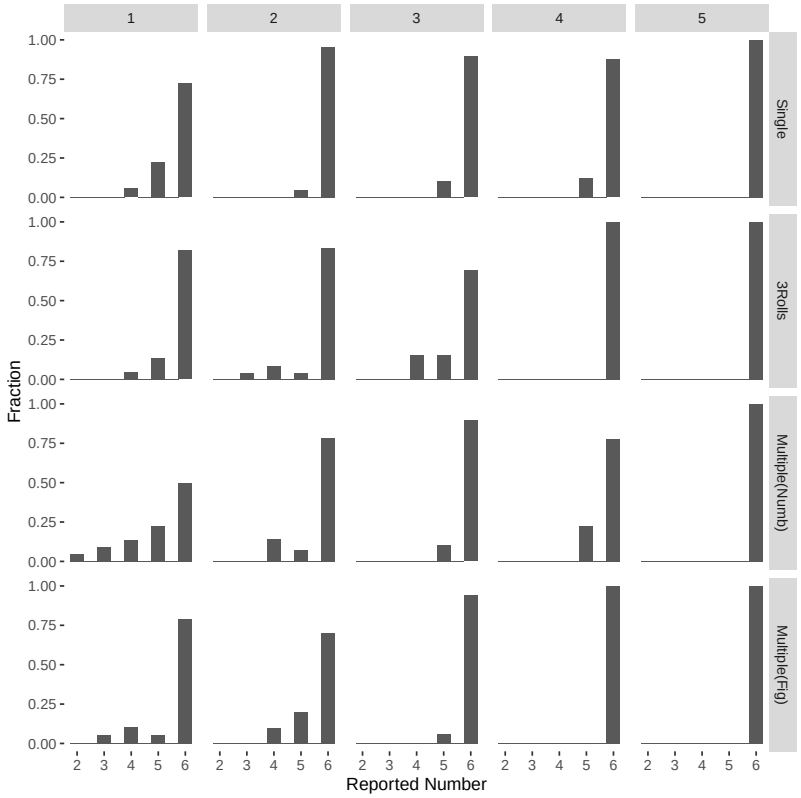


Figure A.2: Distribution of Dishonesty

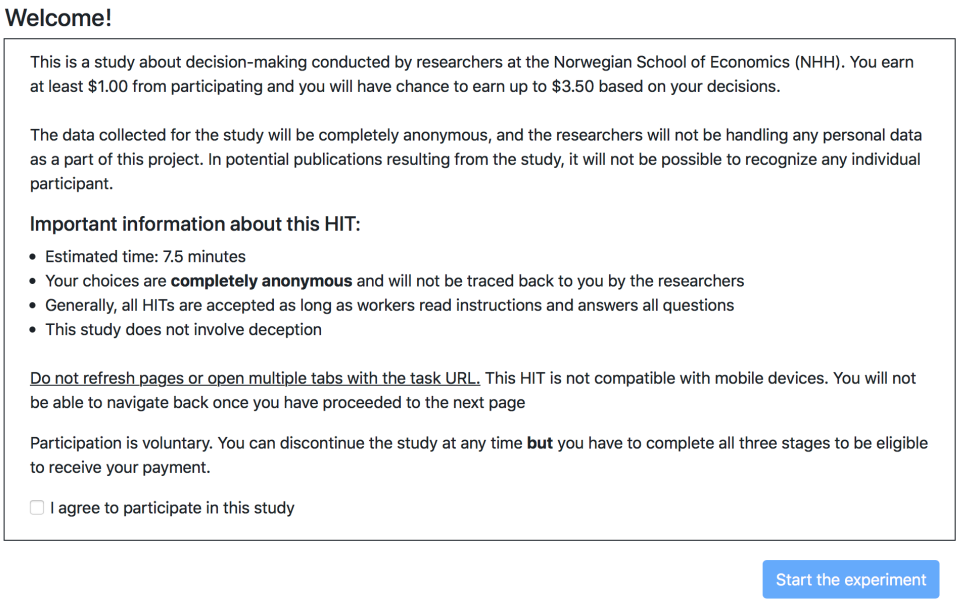
Note: This figure shows the distribution of reported numbers for the participants who reported dishonestly. The figure is separated by the potential outcomes of the first roll and each column corresponds to a level as indicated in the upper titles. Most of the participants reported 6 while for lower outcomes of the first roll slightly higher variation can be seen. We do not observe any "negative lying."

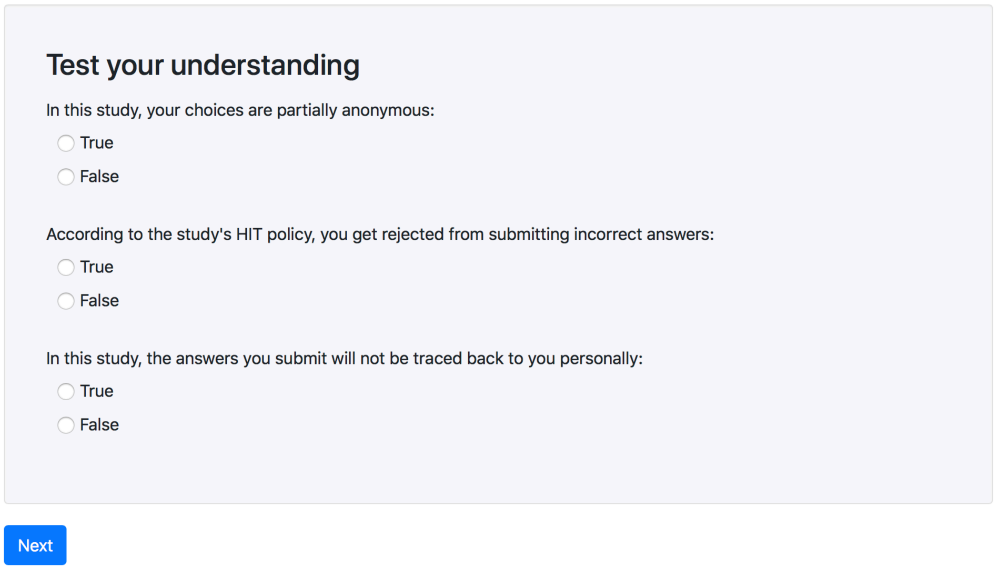
Table A.1: Dishonesty in the Single Roll Treatment and Number of Ex-post Rolls

	Dependent variable:
	distance
# of Ex-Post Rolls	0.058^{***}
	(0.022)
Time Rolling (Ex-Ante)	0.009^{*}
	(0.005)
Time Report	0.003
	(0.007)
Age	-0.010
	(0.006)
Sex (F)	-0.392^{**}
	(0.156)
Controls	Yes
Observations	347
Note:	*p<0.1; **p<0.05; ***p<0.01

Ex-post rolls and dishonesty: *se*.s are in parentheses. To explain the relation between ex-post rolls and dishonesty, we use behavioral measures that are collected in the game and other covariates such as self-reported unobservable characteristics. A subset of data was used to make this estimation to exclude participants with first outcome of 6 (since including these participants masks the effects of other covariates with 0 lying). Unlisted controls: Political view, Income level, Education Level, Belief on Lying in the Experiment.

B Instructions




Test your understanding
In this study, your choices are partially anonymous:
True
False
According to the study's HIT policy, you get rejected from submitting incorrect answers:
True
False
In this study, the answers you submit will not be traced back to you personally:
True
False
Next

Payment information

From now on, you will roll a regular six-sided digital die with numbers from 1 to 6.

Your task is to roll the die, and anonymously report the outcome. The number on the die (i.e. 1, 2, 3, 4, 5, 6) indicates the payment you receive from this part of the experiment. For example, if the number is "1" you earn $0.5, and if the number is "6" you earn $3.0.

Here is a full overview:

Number	Payment
1	$0.5
2	$1.0
3	$1.5
4	$2.0
5	$2.5
6	$3.0

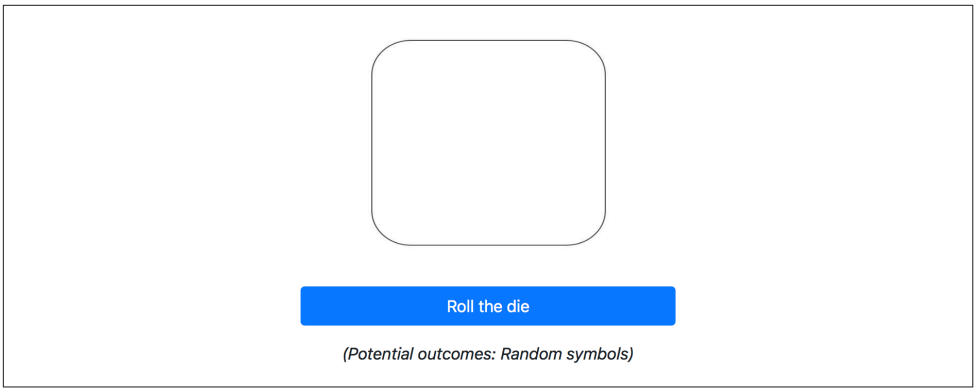
☐ I have read and understood the instructions

Next page

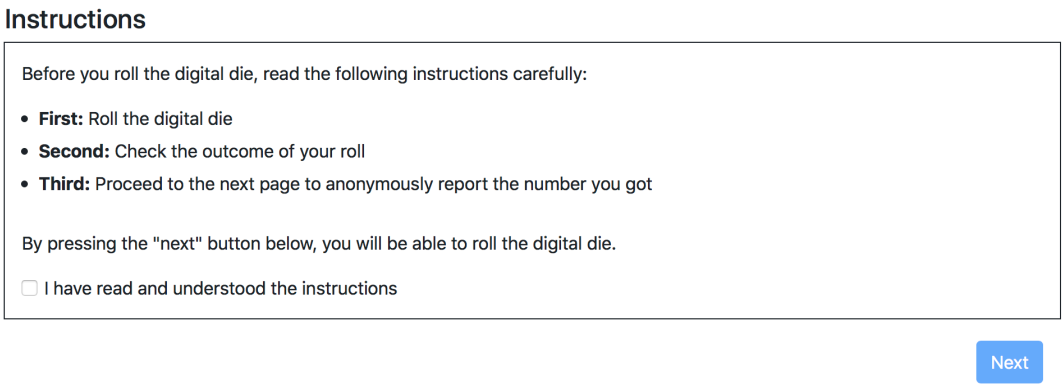
Practice rolling a digital die

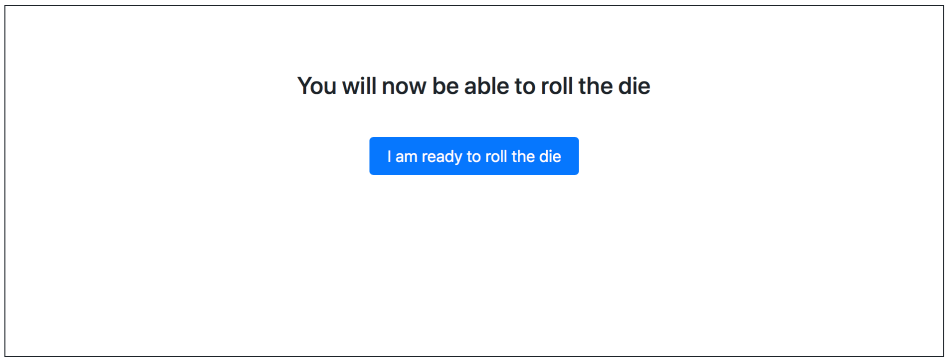
Below is a six-sided digital die. Each side of this die contain a random and non-ordered symbol instead of a number. When you press the 'roll-the-die' button, you roll the die and see the outcome of that throw. Every time you press the button, the die will roll again and show the outcome of the next throw.

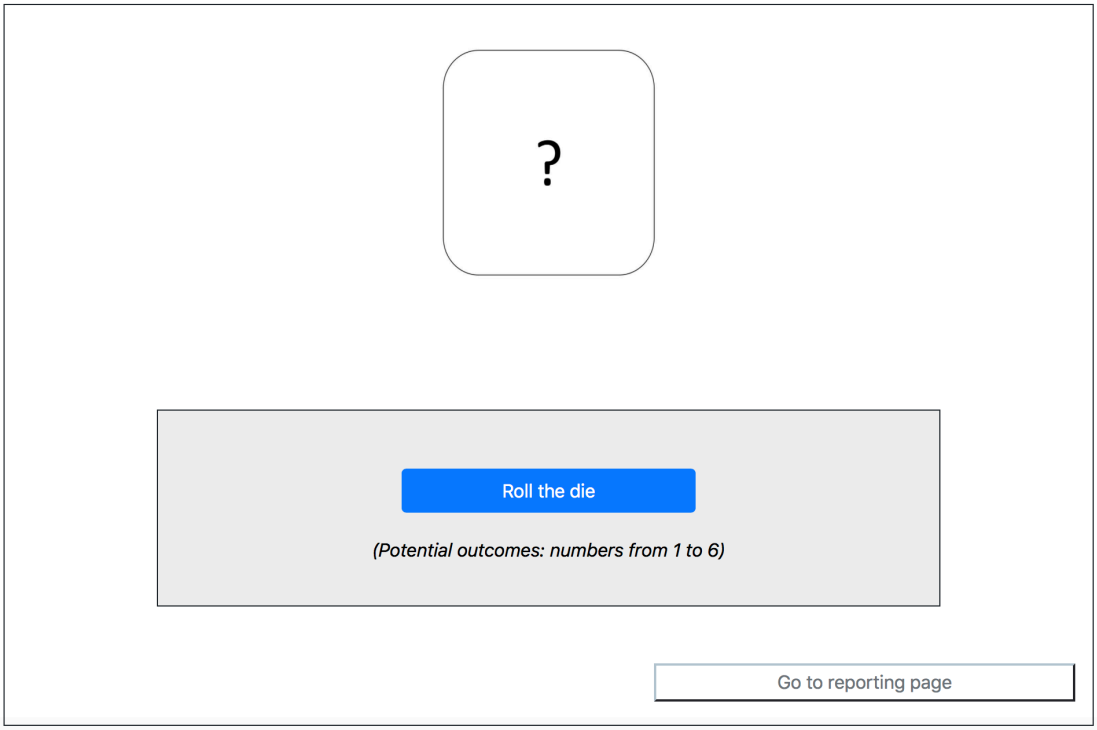
Try rolling the die and press the 'Next-page' button once you understand how the digital die works.

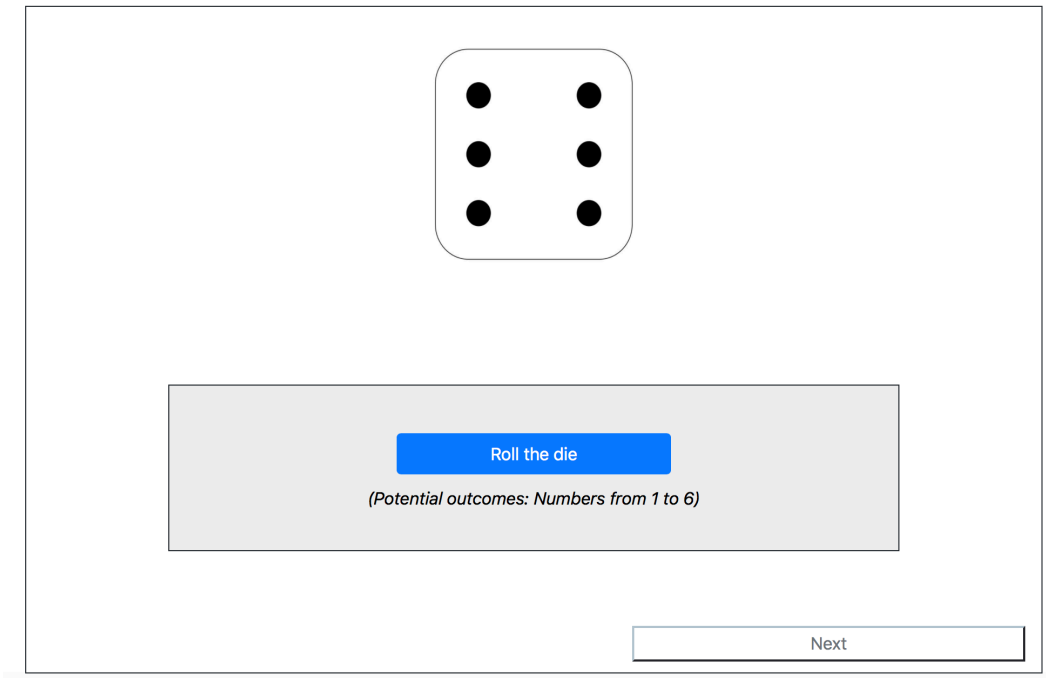


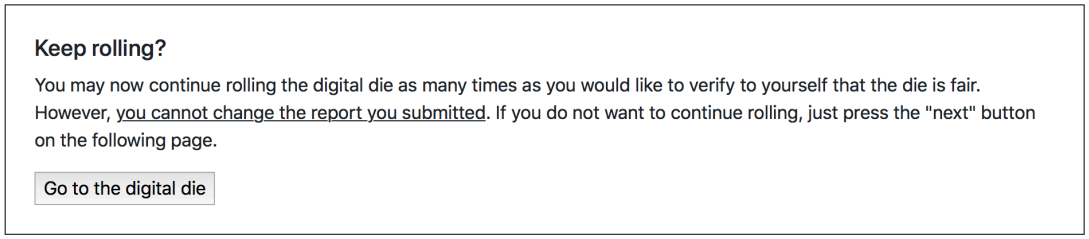
Next page

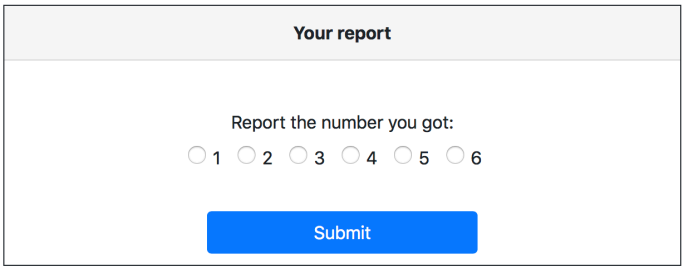

Instructions
Before you roll the digital die, read the following instructions carefully:
First: Roll the digital die
Second: Check the outcome of your roll
Third: Proceed to the next page to anonymously report the number you got
By pressing the "next" button below, you will be able to roll the digital die.
I have read and understood the instructions
Next


You will now be able to roll the die
I am ready to roll the die


?
Roll the die
(Potential outcomes: numbers from 1 to 6)
Go to reporting page

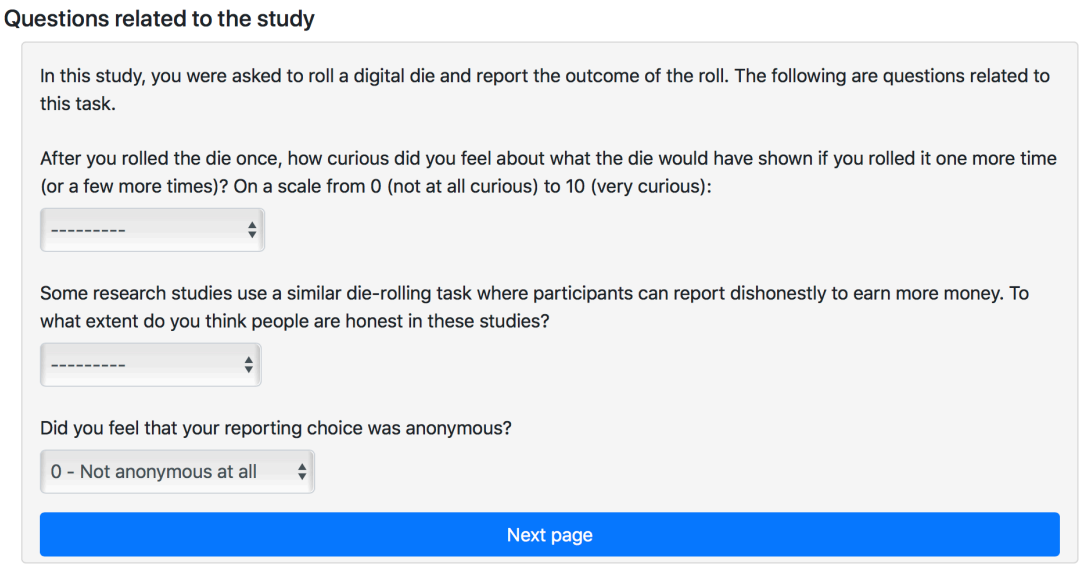

Roll the die
(Potential outcomes: Numbers from 1 to 6)
Next


Keep rolling?
You may now continue rolling the digital die as many times as you would like to verify to yourself that the die is fair. However, you cannot change the report you submitted. If you do not want to continue rolling, just press the "next" button on the following page.
Go to the digital die


Your report
Report the number you got:
1 2 3 4 5 6
Submit

In this last part of the study, you answer some questions related to the experiment and some about yourself. Once you are done with the survey, you will receive your MTurk code and be informed about your payment.

Next: Survey


Questions related to the study
In this study, you were asked to roll a digital die and report the outcome of the roll. The following are questions related to this task.
After you rolled the die once, how curious did you feel about what the die would have shown if you rolled it one more time (or a few more times)? On a scale from 0 (not at all curious) to 10 (very curious):

Some research studies use a similar die-rolling task where participants can report dishonestly to earn more money. To what extent do you think people are honest in these studies?

Did you feel that your reporting choice was anonymous?
0 - Not anonymous at all
Next page

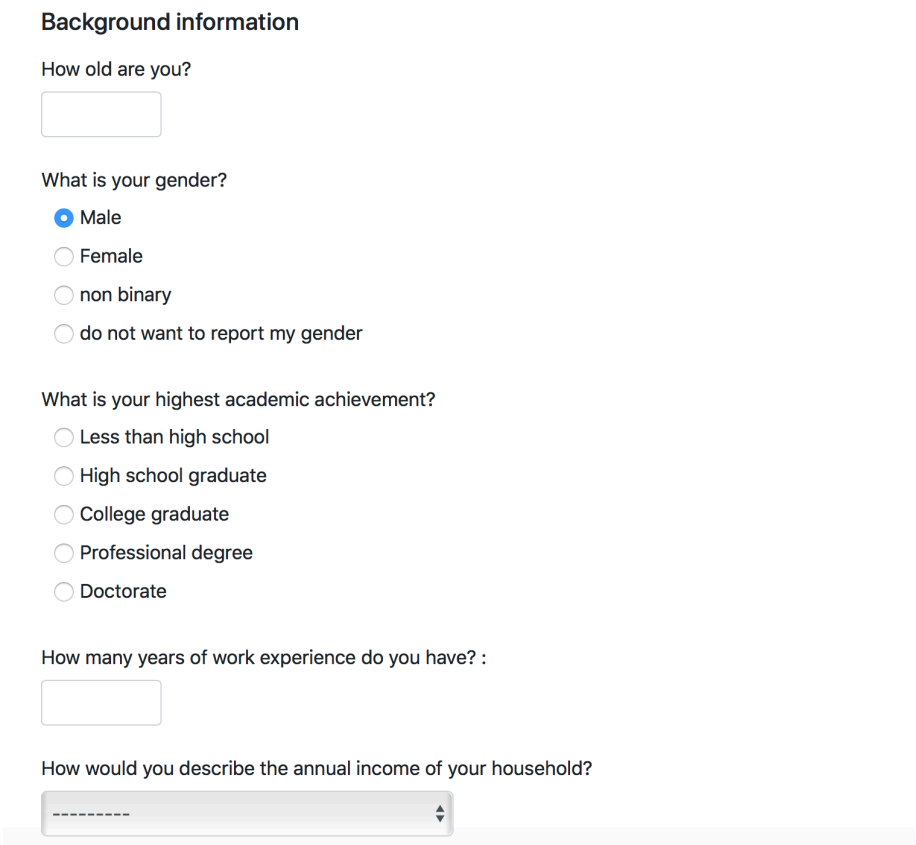
Questions related to the study

Rate your political views on a scale from 0 (Very liberal) to 10 (Very conservative):

○ 0 ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 ○ 8 ○ 9 ○ 10

Do you have any other comments regarding this experiment?

Next page


Background information
How old are you?
What is your gender?
Male
Female
non binary
do not want to report my gender
What is your highest academic achievement?
Less than high school
High school graduate
College graduate
Professional degree
Doctorate
How many years of work experience do you have? :
How would you describe the annual income of your household?

Thank you for participating in this experiment.

- Your bonus payment is **$2.50**, which corresponds to the outcome you reported (that is, 5).
- You have also earn an additional **$0.50** for participating.
- In total, your pay is: **$3.00**

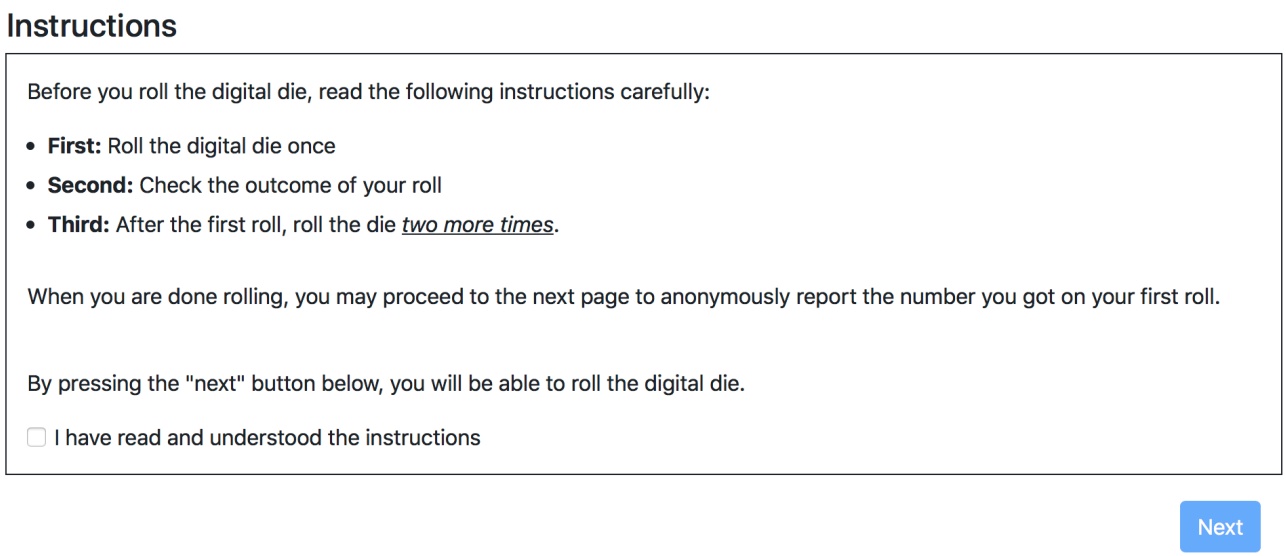


Figure B.1: Instructions for the Three Rolls Treatment

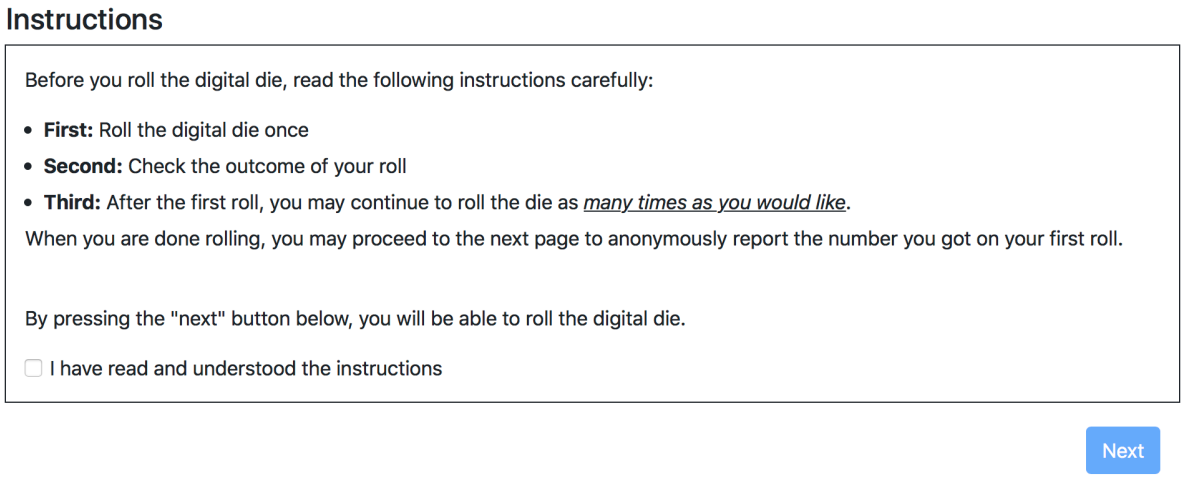


Figure B.2: Instructions for the Multiple Numbers Treatment

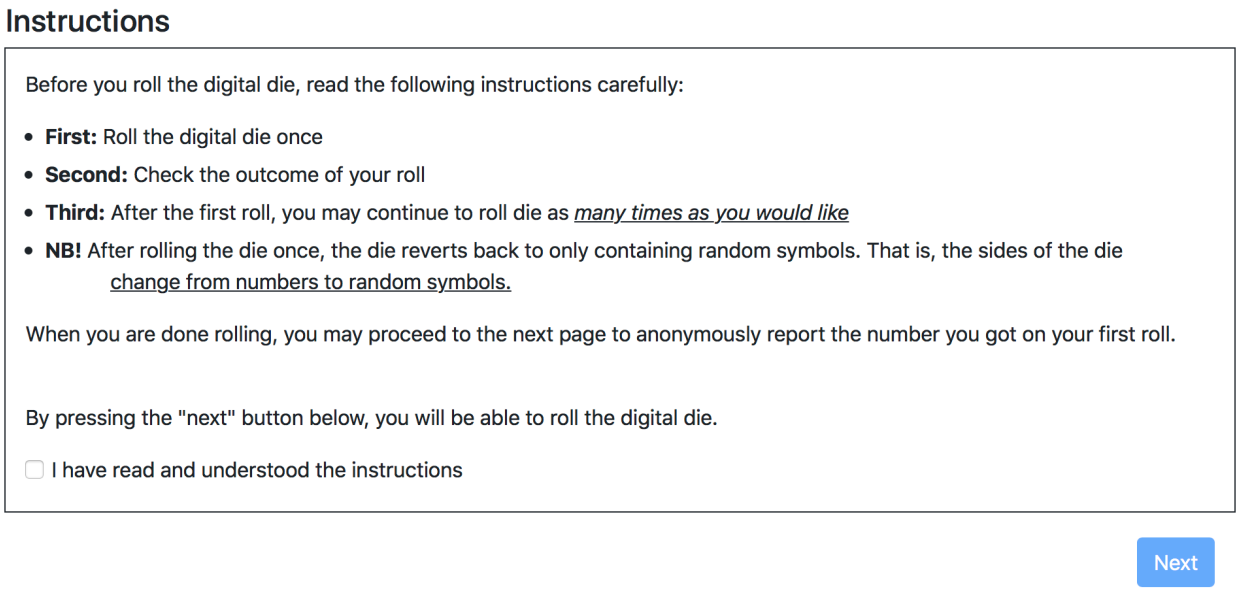


Figure B.3: Instructions for Multiple Figures Treatment

CHAPTER III

Doing Well While Doing Good:
Does the Presence of Profit Motives in CSR have Adverse Effects on Employee Opportunism?

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ABSTRACT

Many firms increasingly engage in a win-win approach to corporate social responsibility (CSR), whereby their charitable efforts also reap business profits. Even though many view capitalism as an unparalleled vehicle for meeting societal needs, research finds that people tend to perceive profit-seeking as immoral and in conflict with social good. This paper uses a pre-registered natural field-experiment to investigate whether the win-win approach to CSR has adverse effects on employee opportunism. Drawing on previous research, we examine whether the presence of a profit motive in win-win CSR enables employees to form self-serving beliefs about the employer that can justify acting opportunistically toward the employer. Through employing 1,500 online employees to work for our sole proprietorship, we find that engagements in either philanthropic or win-win CSR do not significantly impact employee opportunism. However, we find that the CSR initiatives affect the employees' perceptions of the employer and that engaging in win-win CSR adversely affects these perceptions compared to philanthropic CSR. Even though perceptions of the employer are separately correlated with employee opportunism, engaging in CSR seems to affect many perceptions that have offsetting effects on employee opportunism—likely resulting in insignificant treatment effects. Thus, this study suggests that, although engaging in win-win CSR undermines the positive perceptions of engaging in CSR, it does not significantly increase employee opportunism.

Keywords: Corporate Social Responsibility (CSR); Profit Motives; Employee Opportunism

JEL-Classifications: D01, C93, D82, M41, M59

1. INTRODUCTION

Despite Milton Friedman's famous argument that the "*firm's only social responsibility is to increase its profits*" (Friedman, 1970), corporate social responsibility (CSR) has become one of the most common modern business practices. A classical understanding of CSR is that firms have a social responsibility—beyond their legal and contractual obligations—to sacrifice some of their profits in the interest of society (Benabou & Tirole, 2010; Sprinkle & Maines, 2010). However, firms have started to rethink CSR from being about sacrificing profits to being endeavors that could benefit both society and the firm's bottom-line, i.e., win-win CSR. Firms such as Google, Nestlé, Pepsi, Unilever, and Walmart now approach CSR by finding ways in which their charitable efforts can also be beneficial to the firm, such that they can "do well while doing good" (Porter & Kramer, 2011).

Despite the popularity of the win-win approach to CSR, little empirical evidence exists on the consequences of mixing profit and charitable motives in CSR. A large body of research has examined how corporate philanthropy can have indirect benefits to firms, such as increasing consumers' willingness to pay for products (Besley & Ghatak, 2007; Lii & Lee, 2012), motivating employees to exert effort (Balakrishnan, Sprinkle, & Williamson, 2011), and attracting talent (Bode & Singh, 2017). However, a recent strand of research investigates under what conditions CSR may have adverse effects. In particular, List and Momeni (2020) provide field-based evidence that framing the firm's charitable efforts as made on behalf of workers can backfire as it triggers moral-licensing effects among workers. Cassar and Meier (2018a) show that using CSR to incentivize employees to exert more effort can backfire because employees perceive this instrumental usage of CSR as unkind. These findings suggest that the effect of CSR on employee behavior is not only dependent on the social cause underlying the CSR initiatives but also on how employees morally perceive these engagements. Though research suggests that people tend to perceive the mixing of profit and charitable motives negatively (Bhattacharjee, Baron, & Dana, 2017; Newman & Cain, 2014), scant empirical evidence exists on the consequences of engaging in win-win CSR on employee behavior.

In this paper, we investigate whether the win-win approach to CSR can affect firm profitability by influencing employees' tendency to behave opportunistically toward their employer. Employees often face situations where they can personally benefit from "betraying" their employer (Cialdini, Petrova, &

Goldstein, 2004; Tenbrunsel & Messick, 1999). Employee opportunism incurs a significant cost on firms (Association of Certified Fraud Examiners, 2018)[1] and comprises a variety of adverse behaviors such as misreporting (Antle & Eppen, 1985), shirking (Holmstrom, 1979), and theft (Cialdini et al., 2004). Because employees often feel morally obliged to be loyal to an employer they perceive to be kind (Burbano & Chiles, 2020), holding their employer in high opinion reduces employees' ability to self-justify taking advantage of opportunities to serve their self-interest. Tella et al. (2015) demonstrate that if people have incentives to behave selfishly (such as employees may have), they tend to develop more negative beliefs about those affected by their behavior (e.g., their employer or superior). Although perceiving the employer negatively can help justify opportunism, employees do not hold beliefs they cannot reasonably justify to themselves (Kunda, 1990; Tella et al., 2015).

We posit that the presence of profit motives in CSR (i.e., win-win CSR) might provide employees with sufficient ambiguity concerning the employer's underlying motivation for engaging in CSR such that it can be used to justify opportunistic behavior toward the employer. Even though many describe capitalism as an unparalleled vehicle for meeting societal needs (Porter & Kramer, 2011; Schultze, 1977), research in psychology finds that people tend to perceive profit-seeking as immoral and in conflict with social good (Bhattacharjee et al., 2017). Even when exchanges are mutually beneficial, people tend to perceive economic activities as zero-sum games in which someone has to lose for someone else to win (Baron, Bazerman, & Shonk, 2016). In some instances, mixing profit motives with charitable efforts can even lead people to evaluate efforts as worse than analogous efforts that produce no charitable benefits (Newman & Cain, 2014). Because employees can benefit themselves by betraying their employer, we posit that employees are likely to form self-serving beliefs about the employer (e.g., the employer only cares about the money) that help justify acting opportunistically toward the employer.

We conduct a natural field experiment (Harrison & List, 2004) to investigate the consequences of win-win CSR on employee opportunism. We hired 1,500 high-quality US workers on Amazon Mechanical Turk (MTurk) to work for our sole proprietorship. Those who accepted the job worked on a set of tasks specifically designed to non-obtrusively measure opportunistic employee behavior:

[1] Estimations of the size of the cost suggest that it amounts to about 5% of firm's annual revenue (Association of Certified Fraud Examiners, 2018).

shirking and *misreporting*. We randomized workers into one of three treatments to study how CSR approaches affect employee opportunism. Similar to List & Momeni (2020), workers received a message about one out of three initiatives recently undertaken by the employer. Specifically, in the baseline condition, workers read about a recent marketing campaign in a local newspaper (*NO_CSR*). This condition serves as a baseline as there is no mention of any CSR initiatives that benefit society. In the first treatment condition, workers read about a philanthropic donation the employer made to a local non-profit organization (*CSR*). In the second treatment condition, workers read about a win-win CSR initiative the firm had engaged in together with the local non-profit organization (*WIN_CSR*). All the descriptions portrayed actual initiatives of the sole proprietorship.[2]

Our results show employee opportunism across all conditions. Many employees shirked on tasks, and about 30 % choose to misreport to increase their payment. However, different from our pre-registered hypotheses, we find that employee opportunism is not affected by the employer's CSR choices. Specifically, employees shirk and misreport to the same extent regardless of the employer engaging in philanthropic CSR, win-win CSR, or marketing (i.e., *NO_CSR*). Neither do we find a significant difference in employee opportunism between our CSR treatments.

In developing our hypotheses, we conjectured that CSR affects employee opportunism by affecting the employees' perceptions of the employer. To investigate this mechanism, we prompted workers to provide anonymous feedback concerning their perceptions of the employer's moral integrity, opportunism, and profitability. Consistent with our conjectures, we find significant treatment effects on employees' perceptions of the employer. Specifically, employees in the win-win CSR treatment perceived the employer significantly less favorably than employees in the philanthropic CSR treatment—and similar to employees in the marketing condition (*NO_CSR*). Furthermore, we find that perceptions of the employer's moral integrity and opportunism are correlated with employee opportunism, suggesting that perceptions of the employer matter for employee opportunism. However, analysis of the employees' feedback provides a suggestive explanation for why we observe no treatment-

[2] We pre-registered our hypotheses with aspredicted.org (#37752).

effect: engaging in CSR affects multiple perceptions that seem to have offsetting effects on employee opportunism.

This paper makes an important contribution to research on the consequences of CSR on employee behaviors (Balakrishnan et al., 2011; Burbano & Chiles, 2020; Cassar & Meier, 2018a, 2018b; List & Momeni, 2020) by being the first to investigate whether win-win CSR can have adverse effects on employee opportunism. Previous studies investigating the link between CSR and employee behaviors have predominately studied the effect of CSR on employee behavior by using sacrificial corporate donations to charity (Balakrishnan et al., 2011; Burbano & Chiles, 2020; Church, Kuang, & Liu, 2019; List & Momeni, 2020). One exception is Cassar & Meier (2018a) who examine whether corporate donations could be used instrumentally to exert more effort from the workers. In their experimental setting, the corporate donation is contingent on employees' level of effort to incentivize prosocial employees to work harder. The focus of our study, however, is on how engaging in win-win CSR, which is independent of employees' effort and not linked to employees' compensation, affects employee behavior. To that end, we establish a field-setting where CSR initiatives can be mutually beneficial to the charity and the firm. This provides a novel setting to examine the consequences of various approaches to CSR on employee behavior.

Our results from our analysis of the underlying mechanisms may also shed light on why previous research seems to produce mixed results on the effect of philanthropic CSR on employee opportunism. While Burbano and Chiles (2020) find that employee misreporting decreases substantially when the employer engages in philanthropic CSR, List & Momeni (2020) find no effect on employee misconduct when workers are informed that the firm engages in a philanthropic CSR initiative.[3] Our findings show that engaging in CSR affects employer-perceptions quite broadly, resulting in changes in several employer-perceptions. Further correlational results suggest that the affected perceptions have offsetting effects on employee opportunism, suggesting that the effect of CSR on employee opportunism relies on the relative strength of affected employer-perceptions.

[3] List and Momeni (2020) manipulate the framing of the philanthropic CSR initiative. The null-result we refer to is their $T_{FirmMsg}$ treatment, which framed the CSR as a firm initiative.

The rest of the paper is structured as follows. In Section 2, we provide the background of our study and the rationale behind our hypotheses. In Section 3, we present the experimental design. Section 4 contains results and additional analyses. In Section 5, we discuss our findings along with caveats and suggestions for further research.

2. RELATED LITERATURE AND HYPOTHESIS DEVELOPMENT

A common understanding of CSR is that it involves voluntary firm endeavors that benefit society and go beyond a firm's legal and contractual obligations (Benabou & Tirole, 2010; Sprinkle & Maines, 2010). CSR is a multifaceted phenomenon in organizations, and companies approach CSR in many different ways (Huang & Watson, 2015). However, CSR initiatives are often an integral part of a firm's competitive strategy (Huang & Watson, 2015), the decisions often reside at higher levels of the organization (Panapanaan, Linnanen, Karvonen, & Phan, 2003; Vashchenko, 2015), and lower-level employees are typically merely informed about the CSR choices of the firm (Werre, 2003).

In contrast to the traditional CSR approach, whereby firms sacrifice profits in society's interest, some propose a win-win approach to CSR whereby firms can find ways to directly profit from producing social value (Porter & Kramer, 2011). Although the philanthropic approach to CSR rarely comes without any indirect benefits (e.g., improving customers' perception of the firm (Servaes & Tamayo, 2013) or attracting talent (Bode & Singh, 2017)), the win-win approach is distinctly different as it makes profit motives apparent. For instance, Nestlé used extensive resources to improve small farmers' working conditions in rural areas of Africa, not only to help farmers in impoverished areas (charitable motive) but also to improve the productivity of their farmers in their own supply chain (profit motive).

Though harnessing the selfish motive for profit to address social issues is argued to be more sustainable than relying on corporate philanthropy, research shows that people tend to perceive profit-seeking as immoral and in conflict with social good (Bhattacharjee et al., 2017). Even when exchanges with profit-seeking firms are mutually beneficial, people tend to perceive economic activities as zero-sum games in which someone has to lose for someone else to win (Baron et al., 2016). As a result, profit-seeking is often perceived to entail a certain degree of anti-social behavior incompatible with prosocial behavior. This suggests that people might react negatively to CSR initiatives that benefit the firm as is

the case with win-win CSR. In fact, Newman and Cain (2014) find a "tainted altruism" effect whereby efforts that realized both charitable and personal benefits were evaluated less favorably than efforts that realized no charitable benefits.

2.1. Link between Employee Opportunism and CSR

Employees often face situations where they can personally benefit from "betraying" their employer (Cialdini et al., 2004; Tenbrunsel & Messick, 1999). Employee opportunism encompasses a variety of adverse behaviors such as inducing budgetary slack (Antle & Eppen, 1985), exaggerate performance reports (Maas & Van Rinsum, 2013), shirking (Holmstrom, 1979), and theft (Cialdini et al., 2004). Common for all these behaviors is that employees can serve their self-interest with minimal risk of contractual penalties. Without proper controls to align employees' interests with the employer's interests, classical economic theory predicts that employees take full advantage of opportunities to serve their self-interest with little concern about how these choices affect the employer (Becker, 1968; Lambert, 2007). However, behavioral research finds that employees in an agency relationship might not take advantage of these opportunities to serve their self-interest because of moral considerations (Gneezy, Kajackaite, & Sobel, 2018; Stevens & Thevaranjan, 2010).

Prior research proposes several theoretical mechanisms in which CSR choices affect employee's decisions to behave opportunistically. One research strand argues that CSR increases employees' identification with their organization, evoking more organizational behavior (Brockner, Senior, & Welch, 2014; Burbano, 2019). Recently, List and Momeni (2020) posit that CSR can affect employee behavior through a gift-exchange effect, triggering reciprocity toward the employer—but framing the firm's charitable efforts as made on behalf of workers can backfire as it triggers moral licensing effects. Others suggest that CSR might affect employees' internal cost-benefit analysis for acting unethically where people trade off the material benefits of being dishonest with the cost of adversely updating their moral self-concept (Mazar, Amir, & Ariely, 2008). That is, employees might feel worse about acting opportunistically when they perceive their employer to be socially responsible (Burbano & Chiles, 2020; Hansen, Dunford, Boss, Boss, & Angermeier, 2011).

Since employees often have opportunities to behave opportunistically, holding the employer in high opinion constrains employees' ability to justify taking advantage of opportunities to serve their own self-interest. Alternatively, acting opportunistically toward an employer that is perceived as unkind and opportunistic is easier to justify to oneself and others, thereby reducing the intrinsic moral cost of acting selfishly (Shalvi, Gino, Barkan, & Ayal, 2015). Tella et al. (2015) demonstrate that if people have incentives to act selfishly, they tend to be "conveniently upset" with those affected by their decisions. That is, they develop more negative beliefs about those affected by their selfish actions because that could excuse their selfish actions. However, people are only able to distort their beliefs about others when they can construct seemingly reasonable justifications for their views (Haisley & Weber, 2010; Kunda, 1990; Tella et al., 2015).

We posit that employee opportunism is affected by the firm's CSR choices by affecting perceptions of morality and the opportunism of their employer. When the firm engages in philanthropic CSR (only charitable motive), we predict that employees perceive the absence of profit motives as an unambiguous signal that the employer is moral and benevolent, triggering a moral obligation to reciprocate the charitable efforts by reducing misbehavior on the job. However, when the firm engages in win-win CSR (mix of charitable and profit motives), we posit that the presence of a profit motive makes the signal ambiguous, enabling employees to form self-serving beliefs about the employer. Because the mixing of motives in win-win CSR produces some interpretative leeway about the employer's true intentions, employees can use that ambiguity to convince themselves that the employer is opportunistic and use that as an excuse to act opportunistically. Collectively, these arguments form the following hypotheses about the effect of the different approaches to CSR on employee opportunism:

H1: Employees are less likely to behave opportunistically if the firm engages in a CSR-initiative without apparent profit-motives compared to if it engages in a business initiative with an apparent profit motive.

H2: Employees are more likely to behave opportunistically if the firm engages in a CSR-initiative with apparent profit-motives compared to if it engages in a CSR-initiative without apparent profit-motives.

H3: Employees are more likely to behave opportunistically if the firm engages in a CSR-initiative with apparent profit-motives compared to if it engages in a business initiative with an apparent profit motive.

3. EXPERIMENTAL DESIGN

We conduct our empirical study as a natural field experiment (Harrison & List, 2004; List & Momeni, 2020), using workers from Amazon's Mechanical Turk (MTurk). MTurk is an online labor market where requesters can hire workers to perform tasks in exchange for payment. The tasks are designed to allow workers to shirk or misreport without risking their reputation on the platform. We hired online employees to perform a set of tasks for one of the authors' sole proprietorship. The sole proprietorship—Synosis—is officially registered in the Norwegian Company Register.[4]

3.1. Procedure

We posted a job description on MTurk that included a general description of the tasks, information about the job's estimated duration, the fixed-payment size, and an opportunity to earn a bonus payment. Notably, the job description informed potential workers that by accepting the job, they also accepted that anonymized data could be used for non-commercial research purposes (i.e., informed consent).

Those who accepted the job were redirected to a website managed by Synosis. On the first page, the employees read a description of the employer and read about one of three recent employer-initiatives (see Section 3.1.2). Before the workers started working on the tasks, they had to demonstrate that they were not a robot[5] by using their own words to describe why the employer made the initiative presented to them. Employees started working on the prediction and object identification tasks in random order. Once these tasks were completed, they were prompted to provide anonymous feedback to the employer. That is, they rated to what extent they agreed to the following statements (0 totally disagree to 11 totally agree): i) "*Synosis is a company with high moral integrity*," ii) "*Synosis would take advantage of others to benefit itself*," iii) "*Synosis is a profitable company*," and iv) "*Synosis cares only about its own*

[4] To ensure a high level of research ethics, we obtained approval from the Institutional Review Board at the Norwegian School of Economics. We also followed the recommendations of Libby and Salterio (2019) to obtain informed consent and provide debriefing opportunities to employees. Research funds were used to pay for donations and to pay online employees.

[5] There are increasing concerns about the increased presence of bots on the mTurk platform. For example, https://www.maxhuibai.com/blog/evidence-that-responses-from-repeating-gps-are-random#comments.

interests". Employees were then asked whether they wanted to do an unpaid transcribing task for the employer.

Before reaching the last page containing their submission code, all employees filled out demographic information. On the final page, workers were encouraged to visit the company website on April 20, 2020, to read more about the non-commercial research conducted with the generated data (i.e., debriefing).

3.1.1 Tasks

We developed a set of tasks from various traffic situations using the oTree software (Chen, Schonger, & Wickens, 2016). We used traffic context because this setting is familiar to many and computerized algorithms often rely on people's assistance and input to process visual images of traffic situations. The following tasks were specifically designed to measure various employee behaviors in a field-based setting:

First, the *prediction task*. This task measures employee dishonesty with no risk of detection. Employees are presented with images of four cars driving on a highway. A computer will pick out one of the cars for a random speed control. Because these drivers should not systematically predict what cars would be picked out, the employees are asked to predict which car would be chosen by the computer. To motivate their predictions, employees receive a bonus payment (+ 0.4 USD) if they can predict the computer's choice. Based on the "mind game" (Jiang, 2013; Kajackaite & Gneezy, 2017), we instructed employees to make a mental prediction, remember it, and report their prediction after observing what car was chosen. Since employees do not pre-register their predictions, they can claim to have correctly predicted the outcome regardless of their actual ex-ante predictions. Misreporting is, therefore, impossible to detect on an individual level but can be inferred on an aggregate level. Figure 1 is a screenshot of the prediction task.

—INSERT FIGURE 1 ABOUT HERE—

Second, the *object identification task*. This task measures employees' tendency to shirk on real effort tasks. Employees are presented with images of traffic situations from the Seattle Area (wsdot.com). The images contain many different objects that are important factors when evaluating a traffic situation. The

employees are instructed to investigate the images carefully and use sliders to indicate the number of vehicles, red lights, and pedestrians on each image. Because the images are blurry and difficult to inspect, employees have to exert effort to identify all relevant objects correctly.[6] Thus, we use the number of misidentified objects as a proxy for shirking (similar to List & Momeni, 2020). Figure 2 shows a screenshot of one of the traffic images.

—INSERT FIGURE 2 ABOUT HERE—

After employees finished working on tasks, they were asked whether they would be willing to work on additional unpaid transcribing tasks for the employer. Prior research suggests one mechanism through which CSR might affect employee behavior through an increased sense of moral obligation (Burbano & Chiles, 2020). We included the optional transcribing task to investigate whether workers tend to exhibit "gift-exchange" motives (e.g., Bradler, Dur, Neckermann, & Non, 2016; Kube, Maréchal, & Puppe, 2012; List & Momeni, 2020) by reciprocating the employer's CSR efforts by working for free. Because workers knew they could stop transcribing whenever they wanted to, we could precisely measure how much unpaid work the workers did across treatment conditions.[7] A screenshot of the transcribing task is provided in the Appendix.

3.1.2 Treatments Groups

We follow List and Momeni (2020) and randomize workers into one of the three treatment groups. To avoid self-selection effects (i.e., benevolent employees want to work for firms that do CSR), we did not provide information about the employer's CSR initiatives in the job description. Only workers who accepted the job contract were provided with information about one of three different initiatives recently undertaken by the employer—Synosis. Depending on their treatment allocations, the workers read about either (1) a marketing campaign in a local newspaper (*NO_CSR*), (2) a philanthropic donation to a non-profit organization, or (3) a win-win CSR initiative together with the same non-profit organization. Each description portrayed an actual initiative taken by Synosis.

[6] All the employees are provided with the same traffic images to facilitate comparisons between employees. Though employees vary in their ability to correctly specify objects from blurry images, random allocation allows us to investigate systematic differences in mistakes made by employees between treatments.

[7] To ensure that the initiatives were a salient factor in workers' decision-making (i.e., CSR or win-win CSR), we put a reminder on the same page employees decided to volunteer.

In the *NO_CSR* condition, employees read that the employer invested 12% of their budget in an advertising campaign published in one of the largest local newspapers. Furthermore, employees read that Synosis made this investment to boost its reputation and attract new clients (i.e., profit motive only). See the Appendix for a screenshot of this condition (section i).

In the *CSR* condition, employees read that the employer donated[8] 12% of their budget to a local non-profit organization (i.e., City Church Mission)[9] that provides free legal assistance to people in unfortunate situations. Moreover, employees read that Synosis did not want to use this donation for self-promotion and therefore decided to make the donation anonymous and not publicize the donation on company websites. Only employees (and part-time online workers) are informed about the donation (i.e., charitable motive only). See the Appendix for a screenshot of this treatment (section ii).

In the *WIN_CSR* condition, employees read that the employer donated 12% of their budget to the local non-profit organization and—in return—the non-profit organization promoted Synosis at one of their business-oriented events.[10] Also, employees read that Synosis donated—not only because Synosis believes in doing good and protecting human rights—but also because the good publicity could boost its reputation and attract new clients (i.e., a mix of profit and charitable motives). See the Appendix for a screenshot of this treatment (section iii).

3.1.3 Workers

We posted our job offer on the MTurk platform. Among the 1,855 employees who accepted the offer, a total of 1,500 finished and submitted their work.[11] We restricted our hiring to US workers with a minimum of 500 completed jobs on the platform with a 95 percent acceptance rate. Table A shows the descriptive statistics for all workers (i.e., employees) who submitted their work. Characteristics such as age, gender, education level, and income level are well-balanced across treatments. Because our data

[8] The monetary size of the marketing campaign served as our baseline for the size of the donations in the *CSR* and *WIN_CSR* conditions. Furthermore, we follow List and Momeni (2020) in only disclosing the relative size of the investment or donation in percentage of the firm's budgeted expenses.

[9] Because of its religious affiliations, we decided not to disclose the exact name in the experiment.

[10] The proprietor negotiated a deal with the City Church Mission that was mutually beneficial. The anonymous donation in the *CSR* condition was not mentioned during negotiations.

[11] We based our power calculation on 25% level of misreporting and a 10 % treatment effect. Power calculations show that we obtain 80 % power with 500 participants in each group (*p1* = 0.25, *p2* = 0.1775, *rrisk* = 0.7100, *N per group* = 501).

was collected during the COVID-19 outbreak, we included a measure of whether employees worried that the Coronavirus would negatively affect their personal well-being. We find no difference in their self-reported worries across conditions (Kruskal-Wallis test, p = 0.26).

—INSERT TABLE A ABOUT HERE—

3.2. Pre-Tests

3.2.1 Pre-Test of CSR Treatment Instruments

Before running the experiment, we wanted to pre-test our CSR instruments to investigate whether we could replicate Newman and Cain's (2014) findings on the MTurk platform, using our instruments. We recruited 287 subjects to participate in our survey experiment.[12] The survey contained a description of a hypothetical firm and information about one out of three initiatives taken by the firm: In the baseline condition (NO_CSR), participants read about a recent marketing campaign that was intended to increase profits boosting the reputation of the firm. In the first treatment condition (*CSR*), participants read about a recent anonymous donation made by the firm to a non-profit organization because it believes in contributing to society. In the second treatment condition (*WIN_CSR*), participants read about a recent public donation to a non-profit organization and that the donation was made—not only because the firm believes in contributing to society—but also because the donation could boost the reputation of the firm and attract new clients.[13]

In line with Newman and Cain (2014), we found that participants' perception of the firm is more favorable in the philanthropic CSR condition (*CSR*) compared to win-win CSR (opportunism and moral integrity, both $p = 0.000$) and the no-CSR condition (both, $p = 0.000$). However, we did not find support for the "tainted altruism" effect, where initiatives that realize both charitable and personal benefits are evaluated as worse than analogous behaviors that produced no charitable benefit. Instead, we find that participants perceive the firm as slightly *more* moral if it engages in win-win CSR compared to no CSR

[12] To combat challenges associated with using online platforms in research (Bentley, 2018), participants had to correctly answer two attention-check questions and had to provide free-text explanations for their answers to prove they were not robots. Out of the 300 who participated, 287 participants passed the attention check and were randomly allocated to one of the experimental conditions.

[13] The instrument we used in the experiment deviated from the one we used in the pre-test because our initial non-profit organization had to quit the cooperation because a lack of time. However, we were careful to design our new instruments with minimal differences from the pretest.

(Mann-Whitney, $p = 0.017$) but equally opportunistic (Mann-Whitney, $p = 0.475$).[14] See Section 4.4 for additional findings from the survey experiments.

3.2.2 Pre-Test of Tasks

We pre-tested our tasks before hiring workers. It was important for our research question that the tasks would be perceived similarly to other tasks that MTurkers would normally do on the platform. We recruited fifteen participants to perform the tasks and then evaluate them from 0 (completely disagree) to 100 (completely agree). Participants rated the *prediction task* as easy to understand (mean = 84.6, *std* = 19.5), a little different from other tasks (mean = 35.6, *std* = 30.89), and reported that a firm would be likely to post a similar task on MTurk (mean = 58.9, *std* = 34.53).[15] Participants also rated the *object identification task* as easy to understand (mean = 92.8, *std* = 11.1), somewhat different from other tasks (mean = 27.5, *std* = 33.4), and that a typical firm would likely post similar tasks (mean = 66.65, *std* = 29.87).

3.2.3 Payment Calibrations

Furthermore, we wanted our payment structure to be well-calibrated to establish neutral beliefs about the firm. Though MTurkers are typically paid poorly (Semuels, 2018), our IRB approval stated that employees had to be fairly compensated for their work. To balance these concerns, we recruited and paid ten participants to estimate how much time it took to complete tasks and adjusted our payment structure accordingly.[16] User-ratings obtained later suggest that payments were well-calibrated, and the level of payment offered by Synosis was considered average by the employees.[17]

4. RESULTS

4.1. Hypothesis Testing

In Section 2.1, we outline our hypotheses for how different approaches to CSR affect employee opportunism. Hypothesis 1 states that employees act less opportunistically when the employer engages

[14] Though we could not replicate the tainted-altruism effect with our participants, we assumed that employees would be more likely to form such beliefs because this could serve as a justification to act opportunistically.

[15] The prediction task did not include an incentive to report that they had correctly predicted the outcome. This aspect was introduced in the calibration test.

[16] We updated our payment structure such that the estimated average hourly payment was either $ 9.2 or $ 18.4 depending on their self-reported predictions on the prediction task (US minimum wage in 2019 = $7.25).

[17] User ratings for Synosis: https://turkerview.com/requesters/A2N5CFU1H4I2EI-synosis-org.

in philanthropic CSR compared to no CSR. However, Hypothesis 2 posits that the presence of a profit motive in the CSR initiative (i.e., win-win CSR) would increase employee opportunism compared to philanthropic CSR. Lastly, Hypothesis 3 posits that employee opportunism is higher when the employer engages in win-win CSR compared to not engaging in CSR at all (i.e., no CSR).

We use the share of employees who self-report that they correctly predicted which car would be selected for speed control to measure employee misreporting. Since the likelihood of making an accurate prediction is 25 percent, shares significantly above this threshold indicate misreporting. Figure 3 provides a visual illustration of the share of self-reported prediction-successes across our treatments. We find significant misreporting on the task as 54%, 56%, and 55% of the employees in the experimental conditions reported that they predicted which car would be selected for speed control (one-tailed binomial test, for all $p = 0.000$). Different from our hypotheses, pairwise comparisons show no difference in misreporting across conditions (*NO_CSR* versus *CSR* conditions, $p = 0.54$; *CSR* versus *WIN_CSR*, $p = 0.67$; *WIN_CSR* versus *CSR*, $p = 0.85$).[18]

—INSERT FIGURE 3 ABOUT HERE—

We use the number of misidentified objects employees made during the object identification task as our individual-level proxy for employee shirking. [19] The number of misidentified is the radical number of total mistakes squared such that over-identifying and under-identifying objects are treated equally. On average, employees made 4.45 (6.45) mistakes in the *NO_CSR* treatment, 4.13 (5.74) mistakes in *CSR*, and 4.58 (7.10) in the *WIN_CSR*. Although directionally consistent with our hypotheses, the differences are non-significant (Mann-Whitney tests, for all $p > 0.2$). The variance in the shirk measure is however significantly lower in the philanthropic CSR condition compared to *WIN_CSR* ($F = 0.73$, $p = 0.001$) and in *NO_CSR* ($F = 0.74$, $p = 0.013$). Figure 4 provides a density plot of the number of misidentified objects across conditions.

—INSERT FIGURE 4 ABOUT HERE—

[18] These are Mann-Whitney non-parametric tests. The null-result is robust to using other tests of statistical significance.

[19] We provide the same traffic images to all employees to minimize noise in the comparison between subjects.

To further investigate how our treatments affect employee behaviors, we conduct a more comprehensive regression analysis of employee behaviors that include demographic information about employees. Table B provides an overview of regression analyses on employee behaviors. Each column of Table B refers to distinct employee behaviors labeled on the top of that column.

—INSERT TABLE B ABOUT HERE—

In the first column, results confirm our previously reported finding that the CSR manipulations do not affect whether individuals report having made a correct prediction in the prediction task. However, we find that employees' age and income levels are negatively associated with self-reported prediction success. Since there is no reason why older and more affluent employees are systematically better at predicting a random outcome, this result suggests that these employer characteristics are associated with honesty. We also find that the time spent on the prediction task is negatively associated with self-reported prediction success, suggesting a positive association between time and honesty, a similar result to Shalvi et al. (2012).

The second column also shows results that confirm that the CSR manipulations do not affect the level of shirking among employees. Furthermore, we find very little evidence that shirking is significantly associated with any specific demographic variables. We only find a marginally significant negative relation between time spent on the task and the number of total mistakes.

The last two columns in Table B are concerned with employees' willingness to do unpaid volunteer work. Though a significant number of employees choose to do volunteer work (average 19.4 %), we observe no difference across conditions (see Appendix for more information on employee volunteering).[20]

None of the regressions finds that reported belief in corporate philanthropy to be predictive of any measured employee behaviors. That is, their response to the question posed in Church et al. (2019),

[20] Because we had a reminder before this decision, we investigate how results would change if we do not drop those who initially failed the attention check (i.e., not classified as a bot). By including them, two-tailed tests turn marginally significant (*CSR* vs *NO_CSR*, $t(202) = 1.65$, $p = 0.09$; *CSR* vs *WIN_CSR*, $t(200)=1.87$, $p = 0.06$).

"How strongly do you personally believe that companies should sacrifice profitability to promote social causes?" (1 = "not at all" and 11 = "very much").

4.2. Analyses of Mechanisms

We conjectured that employee opportunism is affected by the firm's CSR choices by affecting perceptions of morality and the opportunism of their employer. To investigate whether employees' perceptions of the employer mediate our CSR treatments' effect on the shirking measure, we conduct a path analysis with structural equation modeling. We use the shirk measure as the dependent variable instead of the misreporting measure (i.e., whether an employee claimed to have predicted accurately) because the misreport measure is measured on the treatment level and thus not appropriate for individual-level analyses. Thus, the shirk measure is more suitable to investigate the association between individual perceptions and behavior. Figure 5 provides a graphical illustration of the results from our path analysis.

—INSERT FIGURE 5 ABOUT HERE—

The results support our conjectures that the presence of a profit motive in CSR (i.e., *WIN_CSR* condition) affects employees' perceptions of the employer compared to having no (apparent) profit motive in philanthropic CSR (i.e., *CSR* condition). In particular, having a profit motive in CSR is negatively related to employees' perception of moral integrity (z = -13.3, two-tailed p = 0.000) and positively related to their perception of opportunism (z = 16.1, two-tailed p = 0.000). Though we find that employees' perception of opportunism is positively related to their level of shirking on tasks (z = 5.22, two-tailed p = 0.000), we also find that their perception of moral integrity is positively related to shirking (z = 4.96, two-tailed p = 0.000). This suggests, unlike our predictions, that employees shirk more—not less—when they perceive the employer to have high moral integrity and that employees use any excuse to self-justify their opportunism.

The indirect effect of *WIN_CSR* on shirk through employees' perceived moral integrity is negative and significant ($a*b$ = -1.23, p < 0.01). In contrast, the indirect effect of *WIN_CSR* on employees' tendency to shirk through employees' perceived opportunism is positive and significant ($c*d$ = 1.55, p < 0.01). Thus, despite our *WIN_CSR* treatment affecting the mediators, we find no overall significant

treatment effect of *WIN_CSR* on employees' tendency to shirk (b = 0.13, p = 0.786) because their indirect effects seem to offset each other.[21]

Collectively, our results suggest that our two mediators, employees' perceptions about the employer's moral integrity and opportunism, positively affect employee shirking. However, our treatment manipulations asymmetrically affect these mediators, producing offsetting indirect effects on shirking. In total, compared to philanthropic CSR, win-win CSR initiatives change employees' perceptions of the employer but do not seem to affect employees' tendency to act opportunistically.

4.3. Supplementary Analysis

4.3.1 Attention

To ensure that the employees did not merely skip through pages and read the instructions, we included an attention check that required employees to write a text that explained why Synosis made the presented initiative using their own words. Based on their answers and pre-registered omission criteria, we omitted 88 employees (34 because of nonsensical answers, 18 because they copied and pasted text from the instruction text, 16 because of high suspicion of being a bot, and 20 because they submitted twice)[22].

We selected 15 words associated with either profit or charitable motives for engaging in the initiatives. Table C shows the frequency in which the employees in the different conditions use each word in the list and the total share of profit-motive-related words.

—INSERT TABLE C ABOUT HERE—

We observe that the employees who read about the marketing campaign (*NO_CSR*) rarely used words associated with charitable motives (≈ 1%). In contrast, employees who read about the philanthropic donation to the non-profit organization (*CSR*) rarely used words related to profit-motives (≈ 13%). Employees who read about the "win-win donation," where the non-profit organization agreed to promote the firm in return for the donation (*WIN_CSR*), frequently used words related to profit and charitable

[21] We include employees' perception of firm profitability in our path model to investigate whether that yields similar results. In addition to our reported results that are consistent, we find a positive relation between *WIN_CSR* and perceived profitability (z = 3.49, p = 0.000), but no significant relation with shirking (z = - 1.19, p = 0.23).

[22] The share of dropped participants across conditions is: no_CSR (5.1%), CSR (5.5%), and win_CSR (3.1%). The share of dropped participants is marginally lower in the win_CSR condition (p = 0.073).

motives. Overall, the systematic differences in word frequencies suggest that employees paid attention to the instructions.

4.3.2 Treatment Effects on Employees' Perceptions of Employer

In Section 0, we proposed that employees would feel morally obliged to act benevolently towards their employer when they perceive their employer to have high moral integrity. Tempted to misreport to earn additional money, we conjectured that employees would attempt to justify their opportunism by convincing themselves that the employer is selfish and opportunistic rather than moral. However, as people rarely hold unreasonable beliefs, we posited that employees would use profit motive in win-win CSR initiatives to form negative perceptions about the employer that could help them self-justify opportunistic behavior.

The lack of treatment effects on employee opportunism could be because our manipulations did not change their employer-beliefs. To investigate this, we elicited their perceptions of the employer after they finished working on tasks. To avoid demand effects, we informed the employees that their responses were kept anonymous and that their answers would not affect their payment or risk of being rejected. Figure 6 is a graphical illustration of employees' perceptions about the employer across treatment conditions.

—INSERT FIGURE 6 ABOUT HERE—

Figure 6 shows that our manipulations significantly affected employees' perceptions of the employer's moral integrity, opportunism, selfishness, and profitability. Thus, we provide evidence that our CSR manipulations seem to affect many beliefs about the employer, reducing the concern that our treatments did not sufficiently manipulate perceptions. However, we note that we do not find support for a "tainted altruism" effect (Newman & Cain, 2014) among online employees, but instead find that employees in *WIN_CSR* condition perceive the employer to have slightly higher moral integrity (p = 0.07) but be equally opportunistic (p = 0.22) compared to the *NO_CSR* condition.[23]

[23] The employees also reported to what extent they approved of the employer's initiatives. We found the highest approval rate in the *CSR* condition (mean = 6.84), and this was significantly higher than the *win_CSR* condition (diff = -1.18, p = 0.000) and *no_CSR* condition (diff = -1.26, p = 0.000). Difference is insignificant between *win_CSR* and *no_CSR* (diff = -0.08, p = 0.72).

4.3.3 Task-Order Effects

There were two mandatory tasks that the online employees had to perform. We randomized the order in which employees worked on the *prediction task* and the *object identification task* to control for potential task-order effects in our setting. There are two types of task-order effects in our experimental set-up: First, employees' performance on the first task might affect how they perform on the next task (e.g., misreporting on the prediction task might affect their level of shirking on the object identification task). We conduct two separate regression analyses where we have either shirking or self-reported prediction success as our dependent variable. We find that shirking and self-reported prediction reports are significantly correlated ($p = 0.015$). Starting with the prediction task increases the level of shirking on the object identification task ($\beta = 0.753$, $p = 0.027$). We do not find that starting with the object identification task increases self-reported prediction success ($p = 0.46$). Thus, employees seem to be affected by whether the prediction task is the first task.

Second, the saliency of the treatment manipulations might be reduced after the first task. Thus, the treatment manipulations might have a more substantial effect on employee opportunism on their first task. However, we find no significant interaction between task-order and treatment conditions on both self-reported prediction success and shirking (both, $p > 0.1$). This suggests that the order of the tasks does not significantly interact with the treatments.

4.3.4 Online Employees (MTurkers)

Although online employees are becoming an increasingly important source of human capital in organizations (Schwartz, Bohdal-Spiegelhoff, Gretczko, & Sloan, 2016), these workers are often less connected to their employer and might therefore behave differently than more "traditional" employees. Previous experimental research frequently uses students to proxy for lower-level managers or employees (e.g., Cardinaels, 2016; Evans, Hannan, Krishnan, & Moser, 2001) and superiors (e.g., Rankin, Schwartz, & Young, 2008; Schatzberg & Stevens, 2008). Previous research finds that MTurk workers are similar to student participants with respect to shirking, misreporting, and reactions to contract differences (Farrell, Grenier, & Leiby, 2017). Furthermore, online workers are more demographically

representative of the population than students (Paolacci & Chandler, 2014). Thus, online workers are suitable proxies for investigating the behavior of non-experts (Farrell et al., 2017).

The demographic data of our online employees show that their average age (40 years) is closer to the average population age (Duffin, 2020) and higher than that of other studies using students (about 21 years). We find that employee misreporting is comparable to the general level of dishonesty found in previous literature, with approximately 30 percent of our participants decided to report dishonestly (see Abeler et al., 2019 for a comprehensive overview). We find that about 60 percent of all employees have less than three mistakes on the prediction tasks. Considering the task's difficulty, the low number of mistakes reveals that most workers deliver high-quality work. Furthermore, our data show that about 20 percent of employees choose to voluntarily work on unpaid tasks for the employer, which further suggests that employees are not carelessly going through tasks.

We also took preemptive measures to ensure that online employees were serious workers (Chandler, Mueller, & Paolacci, 2014). We required workers to have at least 500 completed tasks with a minimum 95 percent approval rate to accept the job offer. Because workers cannot manipulate these measures, these qualification requirements ensured that only candidates with a proven track record on the platform could accept the job offer.

4.3.5 Attrition

We also collected data on employees who accepted the job but did not complete the tasks. The overall attrition rate was 19 percent (355 out of 1855 employees started working on the tasks but did not finish). Even though employees quit for unbeknown reasons, all employees who accepted the job were immediately prompted to read about one of the firm's initiatives, which served as our primary treatment manipulation. This, therefore, allows us to investigate whether our treatments affected employee turnover. We find higher turnover rate in *WIN_CSR* (136/618 = 22%) compared to the *CSR* (104/613 = 17%, $p = 0.026$), while no significant difference in turnover rates compared to the *NO_CSR* condition (115/605 = 0.19, both $p < 0.20$).

Even though we limited the possibility that employees choose to work for a firm because of its CSR engagements (selection effects), we observe differences in attrition across our treatments. In one sense,

the increase in attrition could be viewed as a treatment effect as employees might be provoked or upset when they read about their new employer. Therefore, we may observe no significant treatment effects because those who would use the presence of a profit motive in CSR to justify taking advantage of the employer instead decided to quit. We believe that the increase in attrition in our win-win CSR treatment might reflect that more people take offense with the mixing of profit and charitable motives.

4.4. Outsiders' Perceptions of Employee Misbehavior

Although this study focuses on actual employee opportunism, it is important to understand how people outside the organization perceive internal employee opportunism depending on whether the firm engages in philanthropic CSR or win-win CSR. Understanding people's expectation of employee opportunism is important as it is directly related to the concept of interpersonal trust (Morgan & Hunt, 1994), which is an essential component in firms' everyday operations (Arrow, 1974).

There are potentially several mechanisms in which people's perception of the firm affects their beliefs about internal employee opportunism in the prospective firm. For instance, firms that are perceived as highly moral might attract employees with high moral integrity (Fehrler & Kosfeld, 2014), making immoral employee behavior less likely (Boegershausen, Aquino, & Reed, 2015). Because of this matching, observers might not associate opportunistic employee behavior with firms that they perceive as highly moral. Alternatively, the choice to engage in CSR may leak information about the firm's ethical culture (e.g., Cardinaels & Yin, 2015). Hence, CSR choices affect perceptions of employee opportunism to the extent that these choices seem indicative of the norms at play in the organization.

In the same survey experiment that we pre-tested our CSR instruments (N=287), we also investigated how our CSR treatments affected participants' evaluations of the likelihood of employee opportunism in that firm. To that end, we provided participants with the following case: "*Consider Employee A to be representative of a regular employee at [the firm]. Employee A recently went on a work trip to meet with prospective clients for [the firm]. During the trip, Employee A met up with old friends and treated them to dinner. Once Employee A returned from the trip, the company reimbursed Employee A for any*

work-related expenses he paid during the trip". [24] Participants then rated how likely on a scale from 0 (extremely unlikely) to 100 (extremely likely) they thought that the employee would claim reimbursement for the dinner with friends by falsely reporting it as a work-related expense.[25]

The results reveal that participants' perceive employee misreporting to be significantly less likely when the firm engages in philanthropic CSR (M = 43.3, SE = 2.9) compared to both win-win CSR (M = 56.2, SE = 2.8) and no CSR (M = 55.8, SE = 2.7) (for all, $p < 0.01$). However, participants do not differ in their perception of employee misreporting between the win-win CSR condition and the no-CSR condition (p = 0.92).[26] Coupled with our field-based findings on actual employee opportunism, this suggests that people tend to overestimate the extent to which firm-level CSR decisions are indicative of opportunistic behavior of its employees. Therefore, attempting to "do well while doing good" seems to undermine not only employees' perceptions of their employer but also undermines external stakeholders' perceived trust in the firm's employees.[27]

5. CONCLUDING REMARKS

Though CSR is traditionally viewed as firms voluntarily sacrificing profits to promote social causes, a recent trend among practitioners is to rethink CSR from being about sacrificing profits to being endeavors that benefit both society and the firm's bottom-line. Though previous research has documented many consequences of engaging in corporate philanthropy, no empirical evidence exists on the consequences of engaging in CSR with an apparent profit motive on employee behavior.

We contribute to the previous literature by examining the consequences of win-win CSR on actual employee opportunism. Based on extensive evidence that people tend to view profit-seeking as in conflict with prosocial behavior, we use a natural field experiment to investigate whether engaging in win-win CSR can have adverse effects on employee opportunism. Our results suggest that the presence

[24] We used a description of a general employee to elicit people's perceptions of how a typical employee would behave in the situation and to avoid priming our participants on gender differences.

[25] Note that in our manipulations, we stated that the firm *recently* made initiatives. Hence, when participants read about "a representative of a regular employee," they were not prompted to think of an employee who started working for the firm because of its CSR engagement. Furthermore, we choose the reimbursement case because it is explicit that misreporting would be at the firm's expense and unrelated to its CSR initiatives.

[26] *CSR* compared to *WIN_CSR* ($t(187) = -3.2$, $p = 0.002$) and *NO_CSR* ($t(193) = -3.1$, $p = 0.002$). NO_CSR compared to WIN_CSR ($t(188) = -0.11$, $p = 0.92$)

[27] See the Appendix for additional analysis on outsiders' perceptions of employee misbehavior

of a profit motive in win-win CSR seems to undermine employees' perceptions of the employers' CSR efforts but that the change in perceptions does not translate into a significant increase in employee opportunism. It is not that employer-perceptions are irrelevant for employee opportunism. Instead, engaging in CSR affects multiple perceptions that seem to have offsetting effects. Overall, our study provides field-evidence to test the hypothesis that win-win CSR increases employee opportunism.

Although we view our study as the first to investigate the consequences of win-win CSR on actual employee opportunism, another factor that distinguishes our study from previous research is our detailed analysis of the employer-perception mechanism proposed by previous studies (Burbano & Chiles, 2020; Cassar & Meier, 2018a; Tella et al., 2015). Our field-based findings on the mediating role of employer-perceptions on employee opportunism shed light on why previous research seems to produce somewhat mixed results on the effect of philanthropic CSR on employee opportunism. For instance, Burbano and Chiles (2020) report that by informing online workers about a philanthropic CSR initiative, employee misreporting decreased substantially with effects similar in magnitude to those who had to sign an honor code pledge before working. List and Momeni (2020), however, find no treatment effect on employee misconduct when workers are informed that the firm engages in a philanthropic CSR initiative. Our analysis of their feedback suggests engaging in philanthropic CSR affects more than just perceptions of moral integrity but also perceptions of selfishness, opportunism, and profitability, which seem to produce offsetting effects on employee opportunism. This result suggests that CSR affects employer-perceptions broadly and that the effect on employee opportunism relies on the relative strength of the affected employer-perceptions.

Our study also extends to research on how CSR can be used as a signaling device to attract talented and ethical employees (e.g., Bode & Singh, 2017; Fehrler & Kosfeld, 2014). Because the firm's ethical type is hard to observe from the outside, a firm may choose to sacrifice profits in society's interest to signal their type to a target audience (Zerbini, 2017). However, when the CSR initiative also has profit potential, the credibility of the signal diminishes because firms of low ethical type might also choose to engage in CSR as it is "good for business," thereby creating a 'lemon market' problem (Ackerloff, 1970). Our results are consistent with this notion, showing that people discount the signal and attribute the firm's motivation less to authentic altruism when CSR initiatives also improve the bottom line.

Although we show that a firm's engagements in either philanthropic or win-win CSR do not affect employee opportunism, our findings on how perceptions are affected may have implications for practitioners. This study provides evidence on an important trade-off that firms should consider when communicating their CSR efforts to different firm stakeholders (Du, Bhattacharya, & Sen, 2010). While investors push firms to frame their CSR efforts as a business case with apparent profit potential (Rangan, Chase, & Karim, 2015), our study shows that highlighting the profit potential of a firm's charitable efforts crowds out other stakeholders' (e.g., employees) positive perceptions from engaging in CSR. Our field-data show that communicating the profit potential of engaging in charitable efforts—even when the exchanges are mutually beneficial—may undermine evaluations of the firm's charitable efforts. Being aware of this trade-off can inform firms' communication choices when communicating their CSR efforts to different stakeholders.

Related to the trade-off in communication, we find that when we asked people—in our pre-test—about their expectations of employee opportunism, they report significantly lower expectations of employee opportunism only when the employer engages in philanthropic CSR. Our findings show that people expect employee opportunism to be more likely when the firm engages in win-win CSR compared to philanthropic CSR. Understanding people's expectations of employee opportunism is important because that can proxy for external stakeholders' trust in the organization (Morgan & Hunt, 1994), which is crucial for firms' future financial performance (Arrow, 1974; Lins, Servaes, & Tamayo, 2017). Thus, this study suggests that firms' attempt to "do well while doing good" may evaporate any "trust benefits" associated with engaging in CSR.

We recognize a number of limitations in this study that provide opportunities for further research. One potential limitation is that we only hired experienced employees with high approval ratings on MTurk to avoid hiring unserious employees, i.e., at least 500 completed tasks with a minimum of 95 percent approval. It is possible that, because of their extensive experience, our employees have worked on numerous tasks where they have been tempted to cheat for additional money. Over time, this might have desensitized them to moral dilemmas (Engelmann & Fehr, 2016) and made them automatize their responses to moral conflicts (Moore & Loewenstein, 2004). Potentially, this could explain why employee opportunism seems relatively insensitive to changes in the moral context. Further research

should investigate whether prolonged exposure to situations with moral conflict reduces people's sensitivity to contextual and situational factors in moral decision-making.

Another limitation is that we use online or gig-workers to study how an employer's CSR initiatives affect employee opportunism. Although gig-workers are becoming an increasingly important source of human capital in organizations (Schwartz et al., 2016), gig-workers are less connected to their employer and might respond differently than more "traditional" employees who work full-time for the firm. However, using online workers allows for a clean manipulation of employees' perceptions of the employer (since they do not have prior knowledge of the firm) and presents the opportunity to obtain sufficient statistical power to detect potential treatment effects. Further research could benefit from cooperating with organizations and conducting field experiments on traditional employees to investigate whether engaging in philanthropic or win-win CSR have different effects on employee perceptions and behavior than those observed in this present study.

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FIGURE 1.—Screenshot of the prediction task in the field experiment. Employees are instructed to make a mental prediction of which car will be randomly selected for a speed control by the computer. The computer selects one of the cars with equal probability. Employees self-report whether their mental prediction was correct after having observed which car the computer selected.

FIGURE 2.—Screenshot of the effort task in the field experiment. Employees inspect two images of traffic situations and are instructed to identify the number of vehicles, red traffic lights, and pedestrians they observe. Correct answers for the above image are: 8 vehicles, 3 red lights, and one pedestrian.

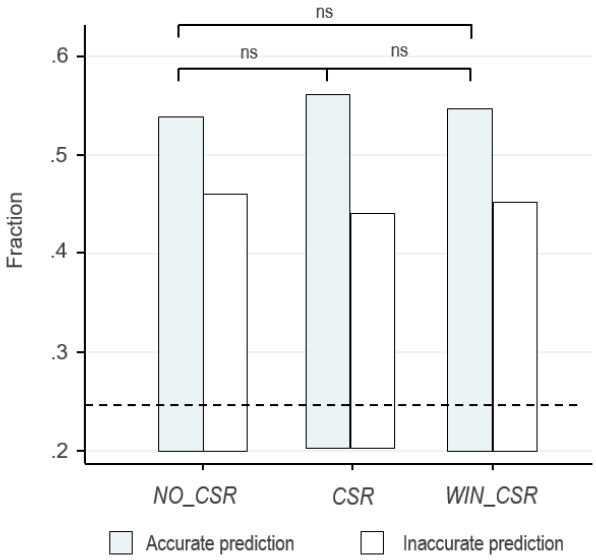


FIGURE 3.—The figure displays the mean scores of self-reported prediction outcomes across treatment conditions. The notation "ns" indicates p-values above conventional significance levels for pairwise Mann-Whitney U-test comparisons. The dotted line indicates the expected level of accurate predictions under full honesty, i.e., 25 %.

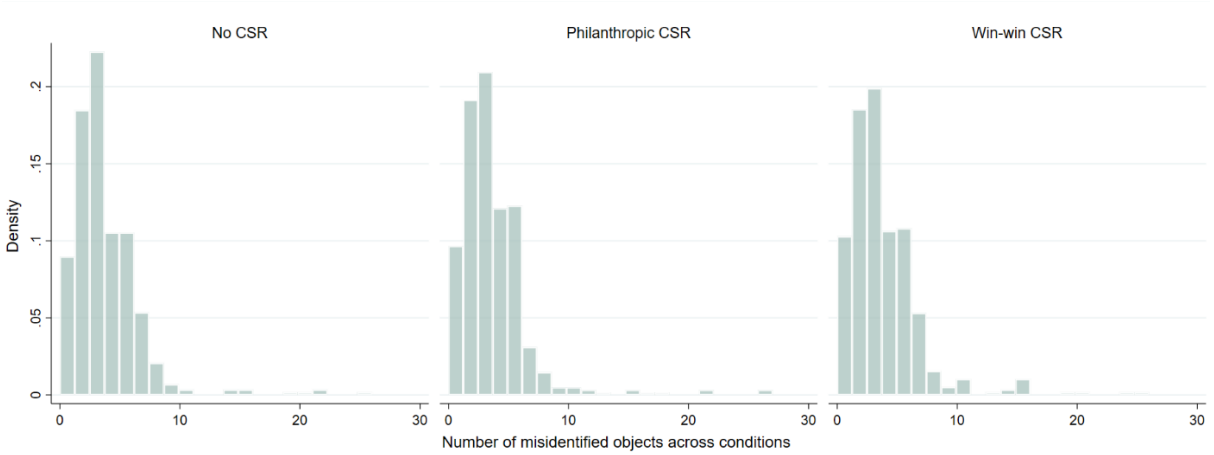


FIGURE 4.—The figure displays density plots of employees' total number of misidentified objects on the identification task (shirking measure) across treatment conditions. To improve readability, we censor 21 observations with over 30 misidentified objects.

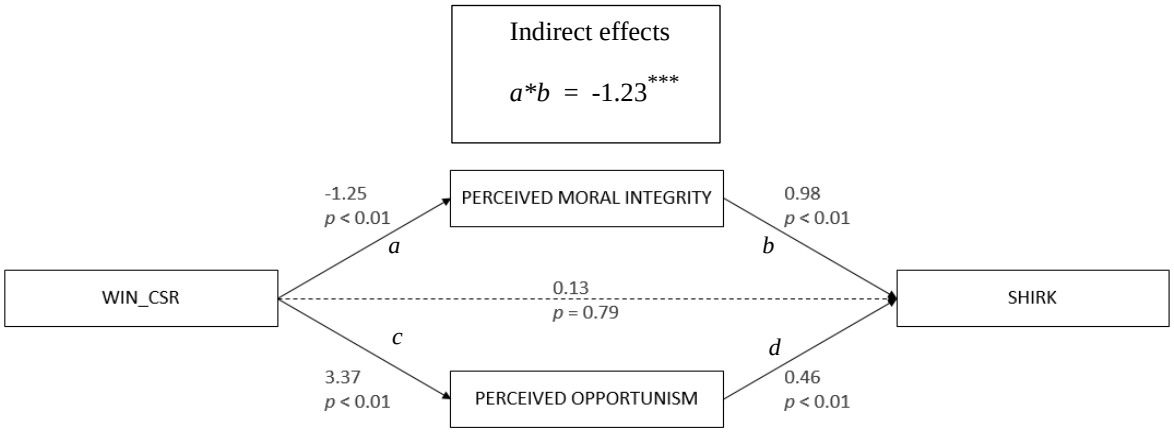


FIGURE 5.—The figure shows the path analysis (N = 945), where we compare the two CSR conditions, *CSR* and *WIN_CSR*. All paths displayed are estimated jointly using the maximum likelihood method. The standardized path coefficients and corresponding two-tailed p-values are shown next to each path. Solid lines indicate significant coefficients at a 0.1 level or less. WIN_CSR is the information about the CSR initiative that benefitted both the firm and the non-profit organization. This variable equals 1 if the employee received information about the win-win CSR initiative and 0 if they received information about the philanthropic CSR initiative that only benefited the non-profit organization. PERCEIVED MORAL INTEGRITY represents the extent to which employees agreed with the statement that Synosis is a firm with high moral integrity (0 = "Completely disagree", 4 = "Neither agree nor disagree", 8 = "Completely agree"). PERCEIVED OPPORTUNISM represents the average score in which employees agreed with the following statements: "Synosis would take advantage of others to benefit itself" and "Synosis cares ONLY about its own interests" (0 = "Completely disagree," 4 = "Neither agree nor disagree," 8 = "Completely agree"). SHIRK is the total number of misspecifications an employee made during the effort task.

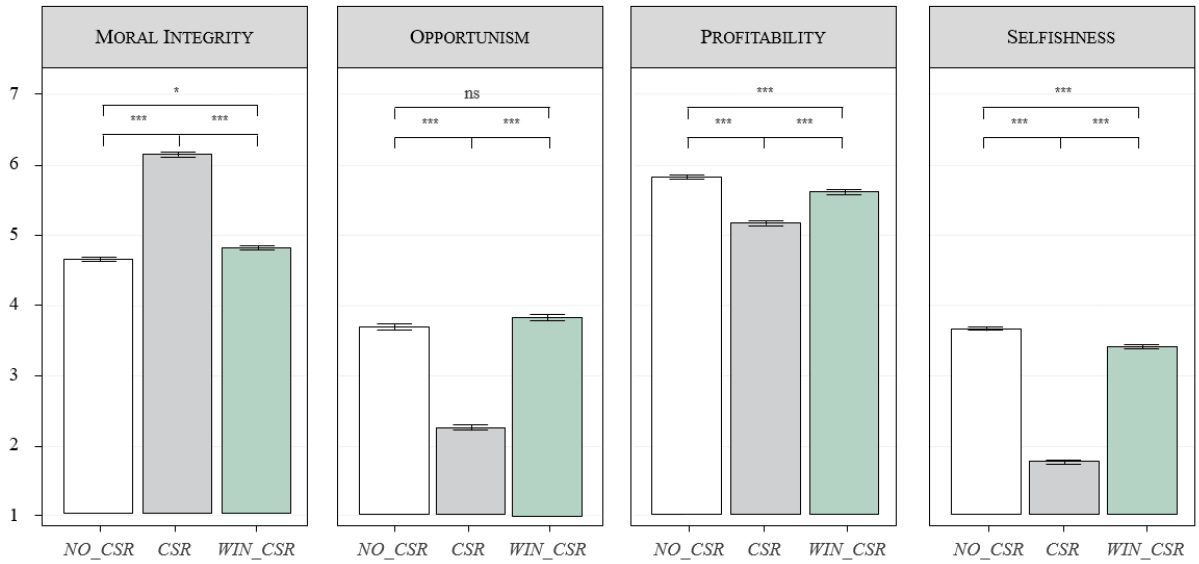


FIGURE 6.—Employees' reported perceptions of the employer across treatment conditions. Employees rate to what extent they agree with four different statements about the employer on a scale from 0 to 8. The figure displays the mean scores of employees' anonymous feedback to the employer (*bars are in ses)*. Stars indicate p-values above conventional significance levels for pairwise Mann-Whitney U-test comparisons.

TABLE A
Descriptive Statistics for Employees across Treatments

	Control condition (NO_CSR)	Philanthropic CSR condition (CSR)	Win-win CSR condition (WIN_CSR)
Age	39.97 (12.95)	40.74 (13.11)	41.25 (13.08)
Female (= 1)	0.50	0.51	0.52
Education level	4.412 (1.278)	4.397 (1.255)	4.408 (1.211)
Income level	4.037 (1.739)	4.006 (1.715)	4.017 (1.648)
Worry about Covid-19	4.795 (2.311)	4.796 (2.441)	5.012 (2.261)
N	493	519	488

NOTE.—Education level is the mean score of the highest level of academic achievement on a scale from 1 (less than high school) to 7 (doctorate). Income level is the mean score of employees' annual household income from 1 (less than $10 000) to 7 (higher than $120 000). Across all conditions, 28 participants did not want to disclose their income. Standard deviations in parentheses.

TABLE B
Frequency of Words Associated with Different Motives

	TREATMENT CONDITIONS		
	Control (*NO_CSR*)	Philanthropic CSR (*CSR*)	Win-win CSR (*WIN_CSR*)
PROFIT MOTIVE			
Profit/profitable	18	47	108
Money	46	6	6
Attract	148	0	95
Greed/greedy	0	0	2
Customer/Client	264	3	153
Reputation	224	1	167
Publicity	233	16	196
CHARITABLE MOTIVE			
Giving	1	21	29
Donation/contribution	0	182	176
Benevolent/altruistic	0	6	1
Free	0	54	63
Support	3	13	12
Doing good	4	160	85
Care	0	12	8
Ratio of profit-related words	99%	14%	66%

NOTE.—The table includes words that unambiguously relate to either a profit or a charitable motive. For example, the word "help" is omitted, even though it occurs frequently because employees use the word to describe both profit motives *"...help them make more money,"* and charitable motives *"help people that are in tough situations"*.

TABLE C
Regression Analyses of Employee Behaviors

	DEPENDENT VARIABLES			
	Self-reported prediction success (*dydx*)	Number of misidentified objects (shirk)	Willingness to volunteer (*dydx*)	Completed volunteer tasks
Philanthropic CSR (*CSR*)	0.0931 (0.136)	-0.339 (0.403)	-0.0183 (0.168)	0.211 (0.208)
Win-win CSR (*WIN_CSR*)	0.0456 (0.134)	0.141 (0.441)	-0.0582 (0.168)	-0.0190 (0.217)
Age	-0.0242*** (0.004)	-0.0164 (0.011)	0.00615 (0.005)	-0.00140 (0.007)
Gender (F = 1)	-0.148 (0.105)	-0.256 (0.319)	0.435*** (0.130)	0.288* (0.168)
Education level	0.020 (0.046)	0.081 (0.126)	-0.015 (0.058)	0.005 (0.072)
Income	-0.070** (0.033)	-0.0275 (0.091)	-0.003 (0.0410)	-0.077 (0.049)
Belief in philanthropy	0.028 (0.033)	0.095 (0.104)	0.009 (0.041)	0.063 (0.053)
Time spent on prediction task	-0.002*** (0.001)			
Time spent on reporting	0.00490 (0.006)			
Time spent on effort task		-0.005* (0.003)	0.004*** (0.001)	0.001 (0.001)
Constant	1.554*** (0.373)	5.292*** (1.178)	-2.709*** (0.469)	3.231*** (0.637)
No. of Obs.	1412	1412	1412	273
Regression type	Logistic	OLS	Logistic	OLS
Robust errors	YES	YES	YES	YES
R-Squared		0.00731		0.0415

NOTE.—Standard errors are in parentheses. * $p < 0.10$, ** $p < 0.05$,*** $p < 0.010$

7. APPENDIX

Supplementary Analyses (Pre-Test)

In the pre-test of our treatment instruments, we recruited 287 subjects on Amazon Mechanical Turk (mTurk) to participate in a survey experiment.[28] The survey contained a description of a hypothetical firm (Enera)[29] along with information about one out of three initiatives taken by the firm (note that our manipulations in the field experiment somewhat deviate from these because we had to change the non-profit organization):

> NO_CSR condition*: Recently, Enera has invested 10 % of its operating expenses into an extensive advertising campaign in the city where the company is based. The management invested the money because they knew that the good publicity would boost the reputation of the company and attract more clients.*
>
> CSR condition*: Recently, Enera has anonymously donated 10 % of its operating expenses to a non-profit organization dedicated to the global protection of human rights in the city the company is based. The management invested the money because they believe in doing good and protecting human rights.*
>
> Win-Win CSR condition*: Recently, Enera has donated 10 % of its operating expenses to a non-profit organization dedicated to the global protection of human rights in the city the company is based. The management donated the money not only because they believe in doing good and protecting human rights but also because they knew that the good publicity would boost the reputation of the company and attract more clients.*

Participants evaluated how altruistic, selfish, opportunistic, and moral they perceived the hypothetical firm based on this information. At the following stage, participants rated how likely on a

[28] To combat challenges associated with using online platforms in research (Bentley, 2018), participants had to correctly answer two attention-check questions and had to provide free-text explanations for their answers to prove they were not robots. Out of the 300 who participated, 287 participants passed the attention check and were randomly allocated to one of the experimental conditions.

[29] The general description of the firm: *Enera is a company devoted to providing insights and solutions to firms and start-ups by analyzing data. Enera has a team of individuals who specialize in predictive analysis, data mining, and data visualization.*

scale from 0 (extremely unlikely) to 100 (extremely likely) they thought that "Employee A" would claim reimbursement for the dinner with friends by falsely reporting it as a work-related expense.[30] Note that in our manipulations, we stated that the firm *recently* made initiatives. Hence, when participants read the case about "a representative of a regular employee," they were not thinking of an employee who started working for the firm *because of* its CSR engagement (reducing the role of self-selection effects in participants' evaluations).

We investigated the role of firm-level perceptions (i.e., moral integrity and opportunism) on participants' perceived likelihood of employee misreporting. We conducted a path analysis with structural equation modeling to investigate the mediating role of firm-level perceptions on evaluations of the likelihood of employee misreporting. The below figure shows results that suggest that engaging in win-win CSR – compared to philanthropic CSR – affects participants' perceptions of the firm (opportunism and moral integrity). These firm-level perceptions have significant effects on the perceived likelihood of employee misreporting.

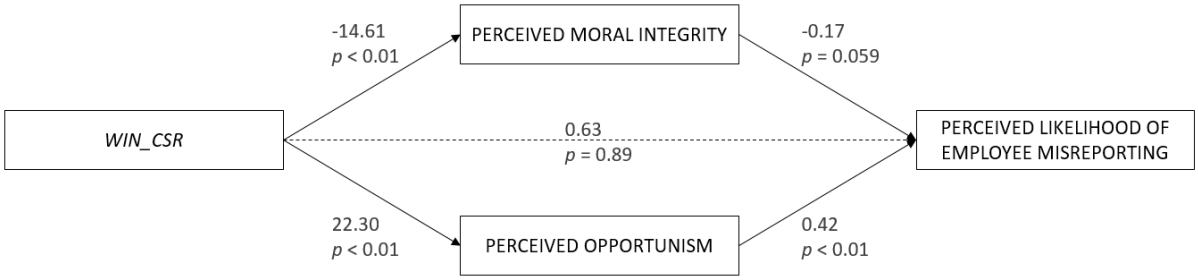


FIGURE A.1.—Path analysis of how CSR affects perceptions of employee misreporting. The figure shows the results of the path analysis (N = 195), where we compare the two CSR conditions, *CSR* and *WIN_CSR*. All paths displayed are estimated jointly using the maximum likelihood method. The standardized path coefficients and corresponding two-tailed p-values are shown next to each path. Solid lines indicate significant coefficients at a 0.1 level or less. WIN_CSR is a dummy variable that indicates treatment conditions. *CSR* is the reference condition. PERCEIVED MORAL INTEGRITY is the average reported score across two firm characteristics: *morality* and *altruism* (highly correlated measures: ρ = 0.64, p = 0.000). PERCEIVED OPPORTUNISM is the average score across the characteristics: *selfishness* and *opportunism* (ρ = 0.69, p = 0.000). PERCEIVED LIKELIHOOD OF EMPLOYEE MISREPORTING is participants' reported score (from 0 to 100) of how likely they think the employee in the case misreports travel expenses.

[30] Participants also filled out demographic information before exiting.

The path model results suggest that engaging in win-win CSR affects participants' expectations of employee misreporting through perceived moral integrity and opportunism of the firm. We find no direct link between CSR choices of the firm (philanthropic CSR or win-win CSR) and expectations of employee misreporting.

Supplementary Analyses (Field Experiment)

After employees finished working on tasks, they were asked whether they would be willing to work on additional unpaid tasks for the employer. To ensure that the employer's initiative was a salient factor, we put a reminder on the same page employees decided to volunteer. Although a significant number of employees choose to do volunteer work (average 19.4%), we observe no difference across conditions (for all pairwise comparisons, $p > 0.2$). The below figure provides an overview of how many transcribing tasks the volunteering employees completed across conditions. Though more of the volunteering employees in the philanthropic CSR condition do more tasks compared to the employees in the *WIN_CSR* or *NO_CSR* conditions, the difference is not statistically significant (*CSR* vs *NO_CSR*, $t(183) = 1.57$, $p = 0.12$; *CSR* vs *WIN_CSR*, $t(181)=1.24$, $p = 0.21$).[31]

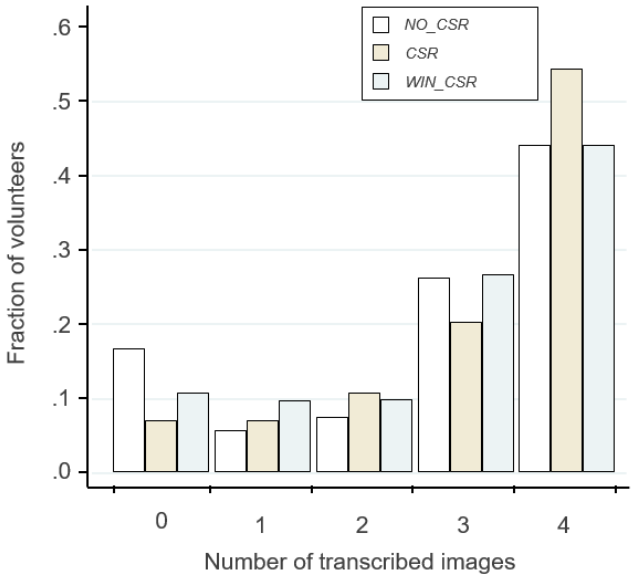


FIGURE A.2.—Volunteer behavior across conditions. The figure shows the distribution of how many optional tasks the volunteering employees completed between 0 (only read the description and then skipped) and 4 (all the tasks).

[31] Because we had a reminder before this decisions, we investigate how results would change if we do not drop those who initially failed the attention check (i.e., not classified as a bot). By including them, two-tailed tests turn marginally significant (*CSR* vs *NO_CSR*, $t(202) = 1.65$, $p = 0.09$; *CSR* vs *WIN_CSR*, $t(200)=1.87$, $p = 0.06$).

Screenshots from Field Experiment

i. Marketing Campaign (NO_CSR)

ii. Philanthropic CSR Initiative (CSR)

synosis

Welcome to the Synosis team!

What is Synosis?

Synosis is a company devoted to providing insights and solutions to clients by analyzing and making sense of large data sets.

- If you want to know more, visit synosis.org

A Synosis Initiative

Recently, Synosis made a non-publicized donation of 12% of budgeted expenses to a local non-profit organization that serves to protect human rights by giving free legal help to people in unfortunate situations. The donation was made because Synosis simply believes in doing good and protecting human rights.

Synosis did not want to use this donation for self-promotion and therefore decided not to publicize the donation on company websites - only full-time and part-time online workers are informed about it.

To ensure that you read the information above and that there are no BOTs taking this HIT, please use your own words to describe why Synosis made the non-publicized donation to the non-profit organization.

Write here

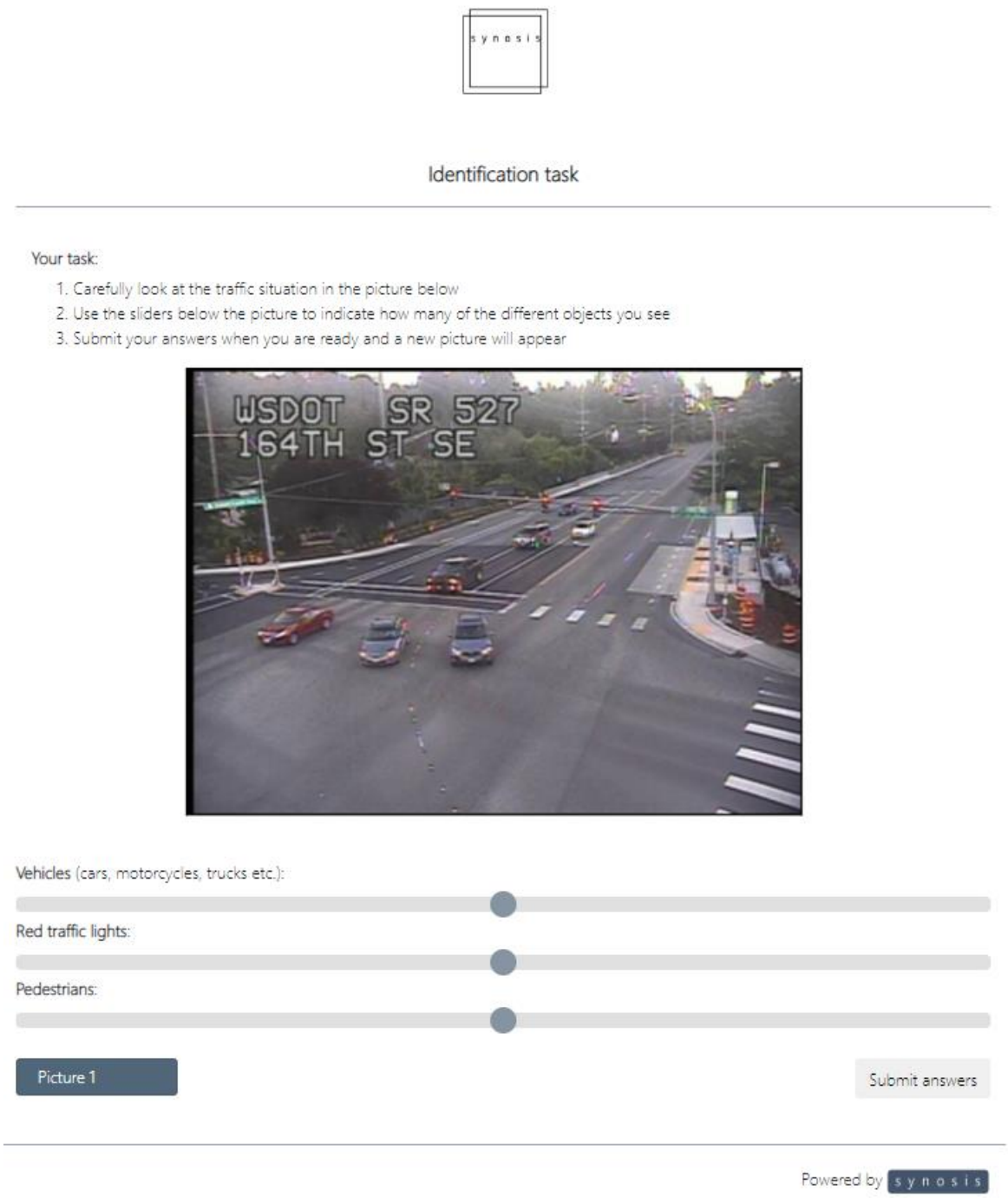
I am done writing and I want to start working on tasks

Start HIT

Powered by synosis

iii. Win-win CSR Initiative (WIN_CSR)

iv. Effort task



v. Prediction Task: Instructions

synosis

Prediction task

Automated speed cameras are sometimes restricted by law to only control the speed of some of the cars that pass by during a day. Therefore, a computer often selects what cars to control. Drivers, however, should not be able to always predict the choice of the computer. Below is an example of four cars that the computer has to choose between for a random speed control.

Your task:

1. In your mind, try to predict which of the cars below will be selected by the computer (A, B, C, or D).
2. Click the button "See computer's choice" to go to the next page, where you will see which car the computer chose.
3. On the next page, you also report whether your prediction was same as the computer's choice.
    - Before clicking the button, make sure to remember the letter of the car you predicted.

To motivate your prediction,
Synosis pays **a bonus of $0.60** if you make an accurate prediction, otherwise you only get **a bonus of $0.20**.

☐ I have made my prediction and I am ready to see the choice of the computer

See computer's choice

Powered by synosis

vi. Prediction task: Report Decision

The computer chose: CAR B

Report whether you accurately predicted that **CAR B** would chosen by the computer:

- Yes, I predicted that CAR B would be chosen by the computer
- No, I DID NOT predict that CAR B would be chosen by the computer

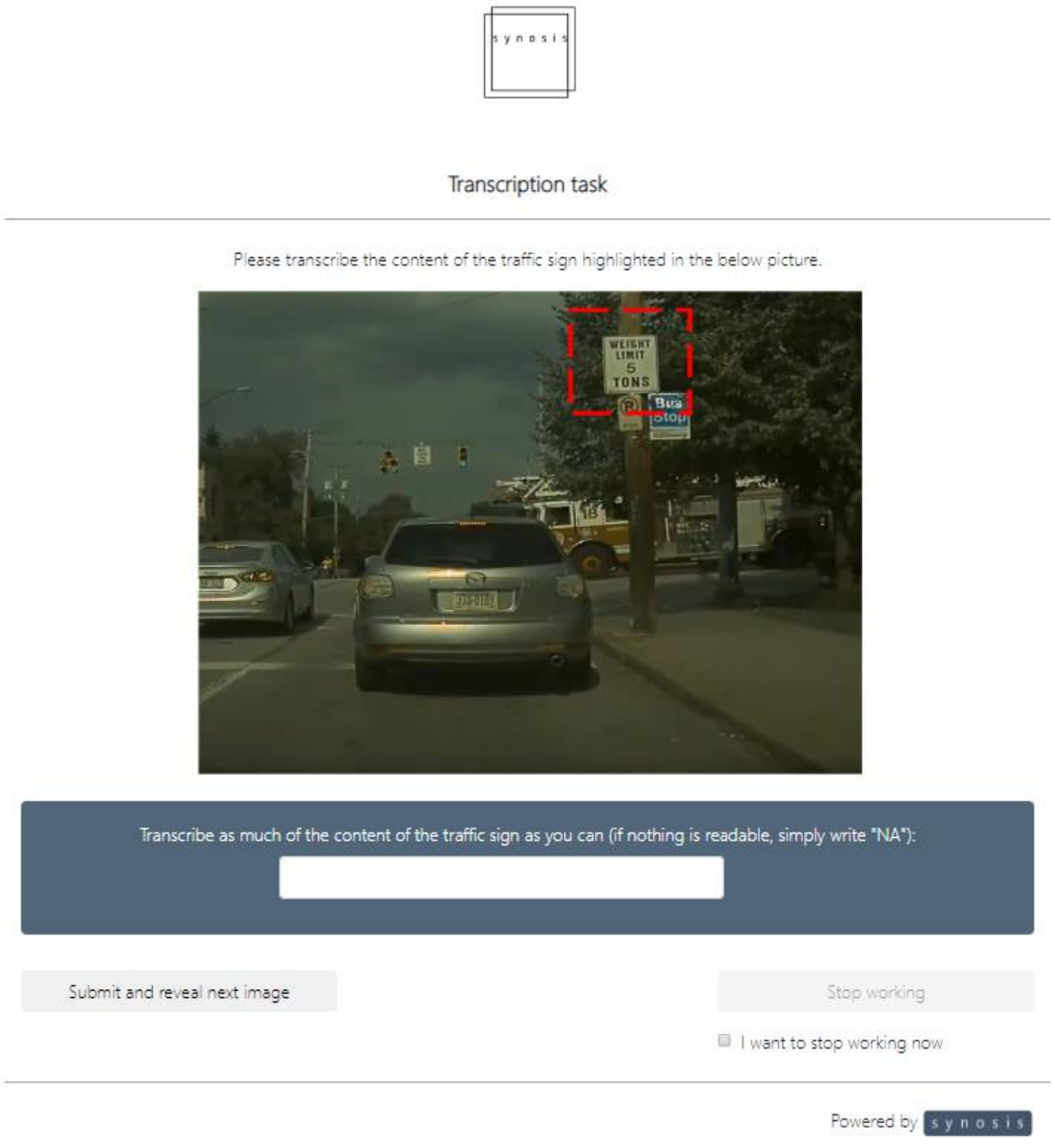
Extra pay from Synosis:

$0.60

Submit answer

Powered by synosis

vii. Optional Unpaid Transcribing Task



CHAPTER IV

Data-Driven Decision-Making:
A Review of the Experimental Management Accounting Research on the Decision-Facilitating Role of Information

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ABSTRACT

One of the major challenges with using management accounting systems to facilitate decision-making is that it relies on effective communication between multiple individuals with different interests, analytical abilities, and perceptual lenses. However, prior experimental research on the decision-facilitation process is relatively small and fragmented and lacks a coherent framework. In this paper, we develop a conceptual framework that specifies the key tasks and responsibilities of the decision-facilitation process. We use this conceptual framework to conduct and structure a systematic and comprehensive literature review of the last 20 years of experimental management accounting research on decision-facilitation. On this basis, we suggest several avenues for further experimental research - not by mere "gap-spotting"- but by drawing on trends in practice and recent insights from psychology and behavioral economics. Thus, this paper serves as a guide for those planning to research on factors that can distort the communication of decision-relevant information in firms.

Keywords; Decision-Facilitation; Communication; Literature Review; Experimental Research

JEL-Classifications:

1. INTRODUCTION

One of the most prominent roles of accounting information is to facilitate decision-making by providing decision-makers with valuable information (Arnold & Artz, 2019; Demski & Feltham, 1976; Zimmerman, 2003). To this end, accounting systems measure and store data that can be transformed into decision-relevant information that improves managerial decision-making. For example, internal reporting systems can provide managers with information that helps them select appropriate investment opportunities that will improve firm profitability (Hemmer & Labro, 2019). For accounting systems to be effective, it is essential that relevant information is acquired, reported, and incorporated into decision-making.

However, facilitating decision-making effectively may be challenging. On the one hand, transforming data into decision-relevant information often involves complex analyses that are technically challenging to perform (e.g., Anand, Balakrishnan, & Labro, 2017; Labro & Vanhoucke, 2008; Noreen, 1991). On the other hand, those who acquire information are often not the same individuals as those who, in the end, make decisions based on the information. Therefore, decision-facilitation can be seen as a communication process that involves multiple individuals with different interests, analytical abilities, and perceptual lenses (Bhimani & Willcocks, 2014; Demski & Feltham, 1976). These individuals are likely to have different preferences, assess data relevance differently, and vary in their use of analytical models when processing data.

The communication of decision-relevant information is, therefore, subject to several distorting factors. For instance, users might systematically disregard information that could have provided valuable insight into a decision (e.g., Chenhall & Morris, 1991), or preparers' mental models could be inappropriate when analyzing data (e.g., Farrell, Luft, & Shields, 2007). Another source of distortion is the potential misalignment of interest between those who prepare and use accounting reports. In such cases, preparers might intentionally misrepresent accounting information to benefit themselves (Rankin, Schwartz, & Young, 2008) or their business unit (Church, Hannan, & Kuang, 2012). Even if preparers truthfully disclose accounting information, users might disregard the information because they fear that they could be "fooled" by the sender (Rankin, Schwartz, & Young, 2003) or because they dislike the sender of the information (Kida, Moreno, & Smith, 2001).

In this paper, we conduct a systematic literature review of the last 20 years of experimental management accounting research on the decision-facilitation role of information. Though firms also find it challenging to capitalize on the potential gains from utilizing available data due to technical and analytical issues, the scope of this review is on the factors affecting the effective communication of decision-relevant information. We limit our review to experimental research because the experimental method helps overcome typical identification and data availability challenges when studying accounting systems (Bloomfield, Nelson, & Soltes, 2016; Sprinkle, 2003). Experimental research can generate precise data on what motivates behavior related to the acquisition, communication, and usage of information. Thus, experimental research can provide evidence on issues or settings where archival data may not exist or is difficult to obtain and analyze causally.

Previous reviews of the experimental management accounting research conclude that research on the decision-facilitating role of information is relatively small and fragmented (Luft, 2016; Sprinkle, 2003). Luft (2016) provides a plausible reason: there is a lack of analytical models of the decision-facilitation process that identifies the task structure, important variables, and baseline predictions of behavior (p. 16).

Thus, this paper aims to make three distinct contributions to the management accounting literature. First, it develops a conceptual framework that specifies key tasks and responsibilities in the decision-facilitation process. The conceptual framework is based on the General Communication Model (Shannon, 1948) but modified to the decision-facilitating approach where relevance, measurement, and evaluation of information depend on the decision and the user of the information (Demski & Feltham, 1976). This is an important contribution because prior research provides only a general description of the decision-facilitation role of information (Bromwich, 2006; Demski & Feltham, 1976; Luft, 2016; Sprinkle, 2003).

Second, we provide a focused review of the experimental management accounting literature. Using the conceptual framework, we review the last 20 years of experimental research published in leading accounting journals. Unlike Luft (2016), the review focuses solely on issues relating to the decision-facilitation process, enabling us to organize, integrate, and evaluate publications in 15 accounting journals that publish experimental management accounting research.

Third, we provide suggestions for future research and introduce new theoretical lenses that propose interesting and testable behavioral predictions deviating from the baseline predictions of classical information economics (Stigler, 1961). Our conceptual framework allows us to identify important gaps in the existing research literature. On this basis, we motivate our suggestions for further research by drawing on trends in practice and on research in related fields. Luft (2016) stresses the need for analytical models that postulate behavioral predictions relevant to decision-facilitation. Thus, we introduce two theories from behavioral economics. In settings with *aligned interests* between prepares and users of information, we introduce a belief-based theory of information that posits risk-taking behavior and decisions to acquire information depend not just on material payoffs but also on beliefs and the attention devoted to these payoffs (Golman & Loewenstein, 2018). In settings with *misaligned interests*, we introduce moral constraint theory that posits that individuals treat morality as a constraint rather than a preference (Rabin, 1995). The theory posits that individuals will selectively and self-servingly gather, avoid, and interpret data that will tell them whether it is morally acceptable to pursue their self-interest. Both theories provide new perspectives on decision-facilitation as they challenge underlying assumptions of how preparers and users interact with accounting systems and each other.

The remainder of this paper is as follows. In Section 2, we present the analytical framework we use in our systematic review of the extant literature. The following section outlines the research methodology. Section 4 is a topical presentation of the current literature on decision-facilitation under aligned and misaligned interests. Our suggestions for future research are found in Section 5. We conclude with a short discussion of the main contributions and limitations of our paper in Section 6.

2. ANALYTICAL FRAMEWORK

In their seminal work, Demski and Feltham (1976) propose that accounting information serves two distinct roles in organizations.[1] On the one hand, accounting information can be used to motivate specific behaviors via the effects that monitoring, measuring, evaluating, and rewarding actions and performance have on motivation (i.e., *decision-influencing role*). On the other hand, accounting information can serve

[1] These roles are also often referred to as accounting information for *decision-making* and *control* (e.g., Zimmerman, 2003).

as a valuable input in numerous judgments and decisions with the ultimate goal to facilitate better decision making (i.e., *decision-facilitating role*).[2] For example, more refined cost information (e.g., activity-based costing) can lead to more accurate pricing decisions. [3]

The Shannon Model of Communication (Shannon, 1948) is one of the most prominent communication theories with more than 75,000 scholarly citations. The Shannon model is a mathematical theory that posits that the communication process between individuals can be categorized into a few key concepts: sender, encoder, channel, noise, decoder, and receiver.[4] The model assumes a linear form of communication. A sender converts data into a message, chooses an appropriate channel (e.g., formal report or an informal phone call), and sends the message. Before the message reaches its destination (the receiver), the message must be encoded by the sender and then decoded by the receiver.[5]

The decision-facilitation process is particularly subject to three sources of noise. The first source is the noisy processing of data. Providing information to facilitate decision-making requires that senders (hereafter *preparers*)[6] determine what data is relevant for a focal decision. The general definition of information posits that an object is an instance of information if and only if; i) the object is derived from data, ii) the data is rightly put together according to the syntax that governs the chosen system, and iii) the object complies with the meanings (semantics) of the chosen system in question (Floridi, 2010). This definition implies that a preparer could collect all available data but as long as the preparer does not

[2] This includes judgments and decisions concerned with the past (e.g., performance evaluation) and the future (e.g., planning). In general, decision-facilitation is concerned with the acquisition, use, and disposition of both inputs and outputs to achieve organizational goals (Sprinkle, 2003). Regarding judgements of performance evaluation, it is important to note that it does not involve managerial performance evaluation where managerial behavior is evaluated in isolation (e.g., keep or drop the manager). Decision-facilitation involves a "*retrospective examination of prior choices and decisions and, as such, involve evaluating, appraising, and assessing performance, with the ultimate goal of improving future performance*" (p. 302).

[3] Many have criticized the "decision-facilitating approach" as it assumes that people collect data to inform their decisions. Some argue that people collect information independently of decisions (Cohen, March, & Olsen, 1972). March (1987) states that "*Theories of rational choice obscure the extent to which information handling and decision making contribute largely independently to the development of meaning. (…) Information shapes the meaning of a decision situation, thus normally changes both the structure of alternatives and the preferences being pursued*" (p.160). However, Demski and Feltham are not unaware of such processes in organizations, but state that *"(…) many would argue that no one is completely rational. Since we are conducting research to assist the evaluator, we choose to assume that he at least desires to be rational*" (p. 251).

[4] The model is also frequently called the Shannon-Weaver Model.

[5] The encoder and decoder are often referred to as machines in the classical literature. For example, the encoding of an image into binary code and then the receivers' machine need to decode the binary data to see the image. As we are interested in the behavioral research on this process, we view encoding as data processing and preparing reports, and decoding as the receiver's interpretation of the report.

[6] We make a distinction between user and receiver to emphasize that users are responsible for receiving information, e.g., decoding the information sent to them or actually checking the report before making decisions.

know its meaning - the preparer has not yet obtained any information. Thus, decision facilitation implies that preparers have to collect and process data to derive decision-relevant information from it. However, the process of deriving information from data is subject to noise because preparers' apriori knowledge of the world affects what conceptual and perceptual filters they apply when evaluating data (Bhimani & Willcocks, 2014).

The second source is the noise in the communication of information. When transmitting information, preparers send information to receivers through a communication channel (e.g., a cost report). Receivers then have to decode the message and infer its informational content. In general, noise in the communication stems from differences between the prepares' intended message and the receiver's *perceived* message. Transmitting information from one person to another inadvertently introduces noise because of individual and perceptual differences between the two.[7]

The third noise source is contextual differences between preparers and receivers. Decision-facilitation is often a multi-person endeavor where the users of information are not typically the same as the preparers of information (Balakrishnan, 1991; Demski & Feltham, 1976; Demski & Sappington, 1987). Preparers are typically employees who are specially qualified to acquire information. They might have methodological expertise (e.g., data scientist or engineer) or have specialized knowledge about local conditions (e.g., production manager). Users are typically those with decision-making authority in an organization (e.g., Chief Financial Officer). In some contexts, the preparer's interests are (predominately) aligned with the user of the information. Thus, the preparer's goal is to supply information that improves the welfare of both the preparer and the user (e.g., improving production efficiency). When interests are aligned, preparers are mainly concerned with providing users with the most accurate information to reduce users' ex-ante uncertainty of what decision is superior. In other contexts, however, prepares' interests might diverge from those of the superior. The preparers might then intentionally distort information to benefit themselves at the user's expense and potentially also the organization.

[7] Our framework does not exclude the possibility that one individual could be responsible for both the acquisition and usage of information.

In developing a framework to review the experimental research on decision-facilitation, we modify Shannon's model (Shannon, 1948) in three ways. First, the communication process is conditional on the decision at hand (Demski & Feltham, 1976). Through backward induction (starting with the focal decision), preparers determine the appropriate analysis and what data is relevant for that analysis.

Second, preparers have access to only a subset of "all available data". The relative size of the subset of accessible data is given by the firm's ability to measure and store data for employees to access and use. For example, a firm that monitors social media activity and stores this data increases the subset of available data compared to a firm that does not store it. However, measuring more data does not imply an increase in information as the additional data's entropy could be close to zero (Floridi, 2010).[8]

Third, the modified framework emphasizes the aspects that involve human evaluations and judgment. In our framework, the collection, processing, and reporting of information (encoding) is the preparer's responsibility. The user's responsibility is to receive information and to incorporate it into decision-making (decoding).

—INSERT FIGURE 1 ABOUT HERE—

The framework in Figure 1 serves as a mapping tool for experimental research within management accounting. The main components of the framework are the following. *Available data* denotes the data that is considered accessible to preparers. Prepares have to choose what data to collect and include in the data processing (*data collection*). *Data processing* implies structuring, analyzing, and contextualizing data such that it constitutes an instance of information (Floridi, 2010). *Communication* is the process of transmitting information from the preparer to the receiver through a chosen channel (e.g., cost report). The successful transfer of information rests on the preparer's ability to communicate information and the receiver's ability to decode and perceive the information correctly. The end goal of the information is to *affect* the users' decisions.[9]

[8] Despite being available, information could be less accessible because the data is unstructured, silo-based, or the user-interface is not suited to preparers' needs. As such, transforming data into information requires additional data processing.

[9] Demski and Feltham (1976) argue that the supply of any particular information does not merely rely on the focal decision but also on the users' perception of the decision situation, the method of analysis employed by the decision-maker, and the cost of supplying that information.

I choose to separate our review with respect to noise that stems from a misalignment of interests between preparers and receivers. This is because the misalignment of interests changes the reporting setting into a moral dilemma. In that case, preparers might choose not to acquire pertinent information because the effort is costly to the preparer (e.g., Balakrishnan, 1991), or the preparer might intentionally mislead the user by misreporting acquired information (e.g., Antle & Eppen, 1985). As the challenges that arise due to diverging interests are qualitatively different from those that arise when incentives are (predominantly) aligned, our literature review distinguishes between research in contexts with aligned and misaligned interests.

3. RESEARCH METHODOLOGY

To provide a comprehensive topical review of the experimental management accounting research on decision-facilitation, we conduct a systematic literature review (Okoli, 2015). The following presents the research methodology of our review.

3.1. Inclusion and Exclusion Criteria

Because the review's purpose is accounted for in previous sections, we now present the established inclusions and exclusion criteria. First, we only include research in management accounting concerned with the production or usage of information for internal decision-makers in an organization. Since there is no commonly accepted definition of management accounting (Bhimani et al., 2012; Bloomfield, 2015; Bromwich & Scapens, 2016; Krishnan, 2015; Salterio, 2015), we choose a pragmatic definition similar to Salterio (2015). That is, management accounting is about producing information for *internal* users or decision-makers in an organization. Consequently, we do not include research primarily concerned with external users (e.g., investors or external auditors). We acknowledge that this may be a too restrictive definition of management accounting (Krishnan, 2015). Still, we want a definition with clear boundaries from the adjacent research literature when conducting a systematic literature review.

Second, we only include experimental studies as defined by Bloomfield et al. (2016). We limit our review to experimental research because of experimental studies' advantage to examine the causal effect of a change in a manipulated independent variable on a dependent variable while controlling for other

factors (Libby, Bloomfield, & Nelson, 2002).[10] Experimental research can provide evidence on issues or settings where archival data may not exist or is difficult to obtain. Moreover, we focus on experimental research as we are building on prior review studies that exclusively focus on experimental management accounting research (Luft, 2016; Sprinkle, 2003; Sprinkle & Williamson, 2007).

Third, we limited the search to articles published in accounting journals ranked three or higher in the Association of Business Schools (ABS) list (unpublished research is not included). Although our goal is to provide a comprehensive topical review of prior research, we wanted to limit our investigation to journals that are considered to be leading the field. The Journal of Management Accounting Review (JMAR) is included despite its low ranking on the ABS list because it specializes in topics concerning management accounting and frequently publishes experimental studies.

Forth, the search was limited to publications during the last two decades (2000 to 2020). This choice allows us to build on Luft (2016). She noted that the experimental literature on decision-facilitation after 2000 has been relatively small and fragmented compared to the late 1970s and early 1980s (p. 9). This review focuses on research after the millennium as both Luft (2016) and Sprinkle (2003) cover experimental management research conducted before 2000. While Luft's (2016) review only included the top three accounting journals, we aim to systematically investigate the broader stream of accounting literature to identify what topics have been addressed and what topics are ripe for research.

3.2. The Search Process

We followed the recommendations of Webster and Watson (2002) in the search process. The search process included the following steps: (1) keyword search using the Scopus online database, (2) review of relevant articles, (3) review of relevant references to key publications identified in steps 1 and 2, and (4) identification of publications citing key publications.

Table A is an overview of all papers obtained through the search process described above. The number of publications identified through steps 3 and 4 is listed in the manually-collected column. To obtain a comprehensive overview of the selected journals, we used a broad search scope that reduced

[10] For example, in classical information economics, the value of information is derived from the difference between a decision taken with or without that information. Thus, this implies a counterfactual argument that necessitates controlling for other factors that could affect decision making.

the likelihood of overlooking relevant articles (Knudsen, 2020). We limited the search for relevant literature to published articles and excluded proceedings and other unpublished material. In step one of the search process, we searched for articles using "Experiment", "Experimental", or "Experimentally" in the title, abstract, or keywords. This search resulted in a set of 796 articles published across 15 journals.[11] Step 2 in the search process involved reviewing all the abstracts of the identified articles to determine which satisfied the criteria described in Section 3.1. While reviewing, we examined the references of the most relevant publications and other papers that cite the publications identified in Steps 1 and 2. In total, we ended up including 98 research papers in our review.

—INSERT TABLE A ABOUT HERE—

4. REVIEW OF EXANT LITERATURE

Figure 1 guides the structure of the review. Following the flow of the framework, we review the literature associated with the preparer's information acquisition (Phase A), then the communication of information from preparer to user (Phase A → B), and lastly, the usage of information in decision-making (Phase B). We first review research conducted in settings with (relatively) aligned interests between prepares and users. Alignment of interest implies that the goal is to obtain accurate and reliable information to facilitate better decision-making for the user.

4.1. Aligned Interests: Data Collection and Processing (Phase A)

Phase A is concerned with preparers' choices in collecting and processing available information. This process also involves decisions concerning measurement and evaluations of what data is considered relevant or reliable for focal decisions. The following is a topical presentation of the publications concerned with the preparers' data collection and processing (Phase A).

4.1.1 Information Processing and Motivation

Unbiased processing of information is paramount for acquiring information that facilitates better decision-making. Cardinaels and Labro (2008) use an experiment to investigate systematic measurement

[11] I manually searched through publications in Contemporary Accounting Research (CAR) and the Journal of Management Accounting Research (JMAR) because i) some publications in CAR do not have an abstract accompanying the publication in the Scopus database and ii) the Scopus database only contains publications in JMAR from 2009 and onwards.

errors in time-driven activity-based costing (TDABC) caused by psychological biases in information processing. They conduct an experiment where participants work on either incoherent or coherent tasks and receive a notification (before or after the task) to provide either aggregated or disaggregated time-estimates for time spent on these activities. All participants have incentives for accuracy. Their main finding reveals that psychological factors affect how individuals process information, which produces systematic measurement errors.

A slightly different stream of research investigates how responsibility affects how information is processed. Jermias (2001) shows that commitment to a cost system affects the incorporation of feedback about the usefulness of costing systems, which increases their resistance to changing the cost system when faced with negative feedback. Commitment to a favored cost system induces motivated reasoning whereby people only assess a subset of their knowledge to support their desired conclusion.

Hales (2007) provides compelling evidence that motivated reasoning can lead people to reach biased conclusions, even when they have incentives to draw accurate conclusions. Participants in the experiment read through a real company's financial information and provided estimates of the probability that earnings would result in gains or losses from their investment position. To manipulate directional preferences, participants were randomly assigned a payoff that was either a positive or a negative function of earnings. Results show that, despite incentives for accuracy, participants seem to agree unthinkingly with information that suggests they might make money on their investment and disagree with information that suggests they might lose money. Hence, this finding suggests that motivated reasoning can arise for purely psychological reasons. Complementing Hales (2007), Bloomfield and Luft (2006) provide additional evidence that biased information processing can occur despite incentives for accuracy. They find that participants responsible for choosing a cost improvement initiative are significantly less able to learn from market feedback than those who are not responsible.

Other studies examine what underlying characteristics seem to drive the tendency to process information in a preference-consistent manner.[12] Libby and Rennekamp (2012) show that the

[12] Though people tend to process data in a preference consistent manner, that does not necessarily imply that the interests of preparers and receivers are misaligned. For example, a loss-averse preparer might discount information that indicates losses for both the preparer and receiver.

psychological trait of *overconfidence* increases managers' willingness to issue earnings forecasts because of a heightened tendency to engage in self-serving attribution in making sense of past performance. In particular, participants who score high on facets of the overconfidence trait tend to give greater weight to internal than external factors as explanations for good performance, boosting their confidence in their ability and thereby increases their willingness to issue forecasts of future performance. A more recent study shows an interaction effect between performance incentives and aggregation level in management forecasts (Chen, Rennekamp, & Zhou, 2015).

Task interruption is another factor that can inhibit unbiased information processing. Long and Basoglu (2016) conduct an experiment with tax professionals where they manipulate goal commitment and whether or not participants are interrupted while working on a relatively ambiguous task. Findings show that task interruption exacerbates tax professionals' motivated reasoning, resulting in overconfidence in the defensibility of an aggressive tax compliance position.

Other studies investigate what factors might mitigate managers' tendencies to process information according to their directional preferences. Jermias (2006) investigates whether accountability can attenuate the self-serving processing of information. In the experiment, he finds that managers responsible for choosing a cost system tend to become overconfident in their ability to select the superior cost system, which leads them to discount negative feedback and be more resistant to changing the system. However, managers who are made accountable for the negative consequences of their decisions tend to exhibit less resistance to changing cost systems when facing negative feedback.

Tayler (2010) finds that managers involved in selecting strategic initiatives perceive those initiatives as more successful than managers who are not involved in the initiative-selection process (holding constant actual performance). Only when the scorecard is framed as a causal chain, in conjunction with involving managers in selecting scorecard measures, are the effects mitigated. A later study finds that visualization and interactivity features in the accounting system interface separately increases decision-makers' overconfidence (Tang, Hess, Valacich, & Sweeney, 2014). However, when both features are present, the level of confidence increases together with their performance accuracy.

One implication of motivated processing of information is the escalation of commitment to failing projects. Duxbury (2012) investigates whether decision-makers equally consider sunk costs and sunk

benefits when considering project continuation decisions. Findings suggest that participants are not influenced by the sunk outcomes when they do not have responsibility for the sunk cost or benefit themselves. Kadous and Sedor (2004) investigate whether third-party consultants could mitigate managers' tendency to escalate their commitment to failing projects.[13] Their experiment shows that the purpose assigned to the consultants before they begin processing information influences whether they are likely to construct the appropriate mental representations needed to support to abandon the failing project. Unless specially assigned to provide management with high-quality project-continuation recommendations, consultants also fail to recommend de-escalation.

More recently, Loh et al. (2019) investigate whether using external versus internal consultants is better able to hinder the escalation of commitment in firms. They find that the requirement to communicate project concerns to top management can frame the decision scenario as one that involves a social-identity conflict, causing internal consultants to be less willing to communicate their escalation concerns than external consultants.[14]

4.1.2 Experience and Accounting Knowledge

A body of accounting research is concerned with how experience or existing knowledge is associated with differences in data collection and processing. Magro (2005) examines how relevant experience affects tax professionals' ability to adapt their information search to changes in relevant features in the decision-setting. Results from an experiment with tax professionals indicate that relevant institutional knowledge enables individuals to adapt their information search to relevant changes in the decision context. Dearman and Shields (2001) use a quasi-experiment to examine whether higher activity-based cost (ABC) knowledge is associated with a greater ability to de-bias volume-based cost information when estimating the cost of heterogeneous products. They show that ABC knowledge is associated with higher decision-making performance by improving subjects' ability to process the cost data. Similarly, Farrell et al. (2007) find that their manipulation of performance measures affects decisions depending

[13] In this setting, the escalation decision is not a strategic choice. See Sections 4.4.1 and 4.6 for research on escalation decisions under misaligned interests.

[14] This study also indicates that conflicting interests play an important role in escalation problems.

on the subjects' experience.[15] They find that using profit rather than cost as the performance measure reduces the accuracy of individuals' judgment of a non-linear relation between a cost-reduction initiative and financial performance.

Vera-Munñoz et al. (2001) investigate how different types of accounting expertise influence the development of choosing appropriate problem representation (mental model) in processing data. In the experiment, accountants with different types of accounting experience receive task information in alternative formats and use this to prepare reports for a client's decision. The study shows that subjects are more likely to choose an appropriate problem representation when they have more accounting experience or receive an appropriate format. Management accounting experience is associated with improved development of relevant knowledge given correct task representation relative to public accounting experience. In a similar vein, Victoravich (2010) examines whether management accounting experience enables managers to identify relevant information (i.e., opportunity costs) when situational factors negate attention to this information. Results show situational factors (opportunity-cost vagueness and completion-stage of projects) exacerbate participants' tendency to discount opportunity costs unless they have substantial management accounting experience.

Whereas the above-mentioned research examines how experience is linked with information collection and processing, Bradley (2009) investigates whether high levels of inductive reasoning abilities can substitute for inexperience or knowledge on an ill-structured case. Results show that inexperienced participants with high inductive reasoning-abilities perform better than experienced participants with low inductive reasoning and similar to those with both experience and high inductive reasoning abilities. Despite being unable to manipulate experience and reasoning abilities, the results suggest that a high level of inductive reasoning can effectively substitute for inexperience on problems that require the appropriate processing of information.

[15] Participants with business knowledge and experience are relatively accurate in learning that relations between cost reductions and profits are non-linear.

4.1.3 Competitive Environment

A stream of research suggests that individuals tend to respond to changes in the competitive environment in ways not accounted for by classical economic theories. Krishnan et al. (2002) conduct an experiment investigating how competition affects decisions to obtain more accurate cost information to inform their production-quantity decisions.[16] While the main findings are in line with prior analytical models, results show that subjects seem to react asymmetrically to increasing and decreasing competition; subjects believe that increases in competition consistently imply an increase in the importance of accurate product costing but do not believe equally strongly that a decrease in the competition implies a decrease in the importance of accurate product costing (as long as there is still at least one competitor in the market). Hence, monopolists who face their first competitors tend to overreact by overspending on cost data.

Ackert et al. (2018) use an auction setting to investigate how the nature of the information environment among traders affects individuals' ability to assess the expected benefits of acquiring costly private information. When obtaining information is costly to market participants (fewer acquire private information), informed subjects' performance is inferior to the uninformed subjects. They tend to misjudge their ability to exploit the informational advantage and end up overspending on acquiring information.

4.1.4 Reliability of Information

A recent strand of accounting research focuses on how individuals assess the reliability of available information. Myers et al. (2017) examine how managers perceive the credibility and reliability of alternative IT-systems that are not sanctioned or monitored by the IT-department in a firm, i.e., Shadow IT-systems. Creating shadow IT-systems is a recent trend among practitioners where employees typically develop their own Excel spreadsheets or macros without the IT department's approval or oversight. The experiment shows that participants' perceived credibility of information produced by the IT system was lower than when produced by the organization's accounting system. Despite being more

[16] In the experiment, subjects act as accountants making the cost-data collection decision in the first stage and decision makers in later stages.

skeptical of the output from a shadow IT system, participants are no more likely to detect an apparent mathematical flaw in the shadow IT-system, suggesting that people fail to properly assess the reliability of the shadow IT system despite being more skeptical.

Ang and Trotman (2015) investigate information reliability in a group setting. They examine whether information is more frequently mentioned during group discussions when expressed quantitatively compared to qualitatively. In their experiment, experienced managers were asked to make capital investment decisions—first individually, then as a group. Before meeting together, each manager received a set of cues that contained both unique and common cues. The experimenters manipulated whether cues were expressed qualitatively or quantitatively and used video recordings to measure how often the cues were used and mentioned. Their main finding is that the managers use quantitative information more than qualitative information before group interaction and make more references to it during discussions. However, it is unclear what mechanisms drive the observed preference for quantitative information for individual use and in communicating with others (for research related to this, see Section 4.2.4).

4.2. Aligned Interests: Communication (Phase A → B)

Phase A → B is concerned with transmitting information between preparers and receivers using a mode of communication (e.g., formal report or face-to-face delivery). In this process, the transmitted information is subject to noise as receivers might perceive the information differently than what the preparers intended.[17] [18]

4.2.1 Receivers' Behavioral Reactions to Information

Receivers sometimes decode information differently than theories of rational information-processing predict. A compelling example of this is found in Buchheit (2003) that finds that reporting unused capacity leads decision-makers to myopically reduce these costs without realizing the opportunity costs of reducing capacity when demand is high. Although more refined information about unused capacity

[17] We identified no papers that mainly focused on the preparers' reporting decisions when interests are aligned.
[18] A sizeable portion of the papers categorized as Phase A → B are also concerned with how information is used in decision-making (Phase B). We choose to categorize papers that were mainly concerned with how receivers perceive information and how that affects their perceptions of the decision-situation.

should facilitate better decision-making, these results reveal unintended adverse effects of directing attention to unused capacity in cost reports. In a subsequent paper, Buchheit (2004) shows that a fixed-cost reporting format also influences participants' price-setting decisions in a repeated Bertrand-Edgeworth duopoly. Participants tend to factor in low-levels of fixed costs to reduce the frequency of reported accounting losses. However, when fixed costs increase to a level where price reductions no longer mitigated accounting losses, participants reversed their price-cutting behavior and increased prices. This suggests that fixed cost reporting affects pricing decisions because participants attempt to avoid accounting losses.

Jackson (2008) uses an experiment to investigate whether straight-line depreciation - relative to accelerated depreciation - causes non-executive managers to make non-value-maximizing capital investment decisions. As the depreciation choice is made for external financial reporting purposes, the choice should not systematically affect managers' decision-making. However, results show that participants that use straight-line depreciation are less likely to invest in a replacement asset than participants that use accelerated depreciation. In a subsequent study, Jackson et al. (2010) provide additional evidence of this fixation using multiple contexts, methodologies, and participant groups. Results consistently show that managers sell assets that have been depreciated using accelerated depreciation for lower prices than identical assets that have been depreciated using straight-line depreciation. The effect even endures in the presence of fair value information about the asset being sold. The study demonstrates that the effect is not driven by a failure to understand depreciation or that participants are not incentivized to take the decision seriously. Instead, the depreciation choice affects managers' mental conceptualization of the asset pricing tasks.

In a similar vein, Chen et al. (2013) show that due to managers' aversion to reporting volatile earnings, managers are more likely to forego economically sound hedging opportunities when considering the fair value accounting impact of hedging (i.e., increased earnings volatility). Their findings suggest that presenting the economic impact of hedging decisions before the accounting impact alleviates managers' concerns over financial statement volatility. Rennekamp et al. (2015) report similar findings. Managers responsible for recording an asset impairment invest more in those divisions when the accounting effect is reversible rather than irreversible. Managers who are not responsible do not

differ in their investment based on the impairment reversibility. When accounting effects are reversible, managers tend to focus on altering the outcome instead of revising their beliefs to rationalize the cash flow outcome.

A related case of how accounting choices affect managers' mental conceptualization of the decision-setting is provided by Mastilak (2011). Using an experiment, Mastilak (2011) examines how the classification of costs into different cost pools affects how people use the cost information. Results show that attention is directed toward within-pool relations and away from pool relations, which influences the accuracy of participants' cost spoilage predictions.

4.2.2 The Decision-Facilitating Role of the "Balanced Scorecard" Framework

The decision-facilitating role of the Balanced Scorecard (BSC) framework is to enable users of the framework to learn from past performance to make better-informed decisions in the future.[19] Lipe and Salterio (2000) published their findings on how superiors' evaluation of business unit managers' performance tends to be based only on BSC measures that are common across different business units while ignoring measures that are unique to individual business units. A tendency often referred to as the *common measures bias* because this is a 'natural simplifying strategy' (p. 293) when evaluating performance in complex settings using the BSC.[20]

Subsequent research finds that providing decision-makers with detailed strategy information makes them rely more on strategically linked measures even if they are unique than on non-linked measures that are common (Banker, Chang, & Pizzini, 2004). However, Humphreys and Trotman (2011) find that the common measures bias is eliminated only when all performance measures are linked to divisional strategy and strategy information is provided in the BSC framework.

Related to research on accounting fixation, Johnson et al. (2014) and Bartlett et al. (2014) demonstrate that superiors tend to fixate on lagged financial performance measures. Findings suggest that the provision of an implementation timeline seems to aid evaluators in decomposing large, complex, and multidimensional judgments into simpler components. A study that more directly investigates the

[19] Some of the publications are concerned with performance evaluation related to managerial compensation. However, we only report the findings that address the facilitating role of BSC.

[20] Dilla and Steinbart (2005) find that participants who have experience and training in BSC tended to not exhibit the common measures bias but only put greater emphasis on measures common to units.

facilitating role of BSC shows that presenting a set of strategic objectives with causal linkages to managers, with or without time delays, has a beneficial impact on long-term profit (Humphreys, Gary, & Trotman, 2016). While time delays do not affect overall performance, managers provided with the delay information demonstrate greater learning over time, which results in improved performance through the accuracy of managers' mental models of strategic causal relationships.

In a recent experiment, Dalla Via et al. (2019) investigate how accountability type and design of the accounting system affect information search and decision quality using eye-tracking technology. The experiment uses a 2×2 between-subjects design in which they manipulate accountability type (outcome or process) and balanced scorecard presentation format (with or without causal chain). Their results suggest that causal chain representation effectively focuses attention on decision-relevant cues, which reduce the need for extensive search efforts. They find that accountability type and causal chain framing interact. Providing a causal chain is much more helpful in improving decision quality when held accountable for the outcome, than the process.

Earlier research has also been concerned with decision tools that can help decision-makers learn from the environment. Rose and Wolfe (2000) show that decision aids can better facilitate learning when system-generated explanations are easily accessible. Lowe et al. (2011) find that providing a strategy map reflecting integrated dependencies can help debias evaluations of individuals with a high tolerance for ambiguity. Their results suggest that the effectiveness of using BSC to debias information processing might depend on individual traits and characteristics.

The BSC framework promotes the usage of "causal links" between the performance measures. However, testing these links and their weights is often challenging in practice. Kelly (2010) examines how the accuracy of assumptions about the relative strength of lead measures affects how managers receive the information. Findings suggest that inaccurate relative weights make managers more engaged in understanding the relations between key performance indicators. Results are in line with

psychological research showing that inconsistent information stimulates more detailed information processing than neutral or consistent information.[21]

Although the BSC is a way to organize internal information, Cheng and Humphreys (2012) investigate whether the BSC can enhance managers' abilities to assess the relevance of external information. Results show that causal linkages of key performance measures with a strategy map structure enhance managers' abilities to incorporate external information. In a similar vein, Cheng et al. (2018) examine whether integrating strategic risk information in the BSC affects managers' responses to the information relative to when the risk information is presented in a stand-alone list. While they do not find an overall difference, their results suggest that incorporating risk information in a BSC increases managers' tendencies to distinguish between performance driver risks and performance outcome risks and to place greater emphasis on the former.

Although not being about the BSC, Sawers (2005) complements the above research as he demonstrates that decision aids can mitigate choice avoidance among experienced managers. When accounting systems facilitate a better structuring of decision-tasks, managers are less anxious and are therefore less likely to postpone making decisions in difficult choice-settings.

4.2.3 Using BSC as a Communication Tool

An essential aspect of the decision-facilitation role of information is to ensure that members of an organization have a common understanding of what decision should be made and how to make them (e.g., strategy). Aranda and Arellano (2010) conduct a field experiment and find that using BSC to communicate strategy—compared to an alternative accounting system that lacks the hierarchical structure of links—is more successful at communicating strategy and generating consensus among managers.

Other research finds that people tend to fail to fully appreciate that BSC's performance measures are merely representations of the strategic constructs they represent. Choi et al. (2012) conduct an abstract experiment to investigate whether participants tend to act as if performance measures are the same as

[21] Notably, the study does not reward managers on the lead measures based on the relative weights in the causal model. In light of the research on motivated reasoning, the positive effect of providing inaccurate weights could reverse if managers are rewarded based on the measures.

strategic constructs of interests—a phenomenon labeled "surrogration". They find that managers tend to use strategic performance measures as surrogates for strategy when compensated on these measures, especially when compensated on a single measure.[22] This result suggests that using BSC to communicate strategy might be hampered when combined with financial performance incentives.

A recent study on surrogation shows that prompting participants to provide explanations for decisions reduces surrogation because participants reflect upon their decisions in more holistic terms, focusing on the unmeasured aspects of performance, in addition to the measured aspects of performance (Bentley, 2019). Choi et al. (2013) investigate how strategy selection involvement affects managers' propensity to exhibit surrogation in later phases. Results suggest that being involved in selecting strategy reduces surrogation. However, involvement in the strategy-deliberation process does not reduce surrogation.[23] Thus, managers' involvement in the actual choice of strategy appears to be a necessary and sufficient condition to mitigate surrogation.

4.2.4 Formatting Choices

One strand of accounting research is concerned with how formatting choices affect how receivers perceive the information presented. The most cited study, Cardinaels (2008), looks at how the appropriate presentation format depends on the receiver's accounting knowledge. Participants work on a complex pricing task and are provided data on customer profitability but receive this data in either tabular or a graphical format. Decision-makers with a low level of cost accounting knowledge attain higher profits when using a graphical format compared to a tabular format. However, graphs versus tables have an adverse effect on profits for users with a high level of cost knowledge partly because the graphic format is less appropriate for knowledgeable decision-makers who approach the problem in an analytical way.

Prior research on formatting effects investigates how providing participants with graphs (either bar charts or schematic faces) in addition to tabular information affects the accuracy of participants' bankruptcy predictions (So & Smith, 2004). Results suggest that, compared to only having tabular

[22] This study is in the intersection between the facilitation and influencing role of information.

[23] Participants in the deliberation-process condition were provided with a list of the pros and cons of strategic initiatives.

information, graphical representations that complement the numerical financial data significantly reduce accuracy. This result suggests that providing subjects with graphical representations shifted participants' decision-frame from analytical to more intuitive, which is more prone to cognitive biases. The results show that graphical formats are not always complementary to tabular information but that subjects tend to substitute tabular information with graphical when this is provided. Thus, formatting choices can have detrimental effects on decision performance because receivers evaluate the information less thoroughly.[24]

Other research on formatting effects shows that reporting a confidence interval instead of a point estimate affects performance (Foong, Lawrence, & O'Connor, 2003). Though the confidence interval report contains more information than a point estimate, results show an unintended effect; the disclosure of such information transforms a seemingly complex decision task to one that is less complex, which makes the task intrinsically less rewarding to work on, resulting in a deterioration of performance. Thus, introducing performance-based incentives becomes crucial for promoting a diligent use of the confidence interval information in decision-making.

A more recent study on formatting effects investigates how qualitative (quantitative) information has a positive (negative) indirect association with managerial perceptions regarding strategic risk management activities (Stoel, Ballou, & Heitger, 2017). Using highly experienced participants, they find that the choice of format is directly associated with the perceived reliability and perceived relevance of the strategic risk information. Superiors favor qualitative information for strategic risks, whereas they are skeptical about quantitative measures for complex strategic risks. In contrast, a quantitative report format is preferred for operational risks, which reflects that these risks are easier to manage and estimate such that quantitative point estimates may be expected as the norm.

4.2.5 Accounting Fixation

Earlier research in accounting identified a behavioral tendency among accountants to insufficiently adjust their decision processes to changes in accounting methodology (e.g., changes in depreciation

[24] Earlier research focuses more closely on how graphs should be presented to facilitate decision-making (Beattie & Jones, 2002). Based on theory of graphical parameters, they provide evidence that suboptimal slope parameters produce distorted judgement in participants who evaluate corporate performance.

method or cost-estimation method); often referred to as *functional fixation*. Luft and Shields (2001) examine whether fixation persists even when individuals have opportunities to learn from their choices and find that learning does not mitigate fixation on accounting—because the accounting choice (expensing versus capitalizing intangible expenditures) affects the learning process itself. Further research shows that fixation exists in a repeated design setting with feedback (Arunachalam & Beck, 2002). Their findings show that fixation is a relatively robust behavioral phenomenon.

Despite the robustness of the accounting-fixation phenomenon, scant research has examined ways to mitigate the effect. The exception is Dearman and Shields (2005), whose research finds that participants who exhibited high scores for relevant accounting knowledge, general problem-solving abilities, and intrinsic motivation tend to avoid fixating on the cost estimation method.

4.2.6 Feedback Information

Though feedback is often tied to performance remunerations (decision-influencing role),[25] feedback information facilitates learning that can improve future decision-making. Experimental accounting research has started to thoroughly investigate these aspects of feedback information. Thornock (2016) conducts an experiment where he examines whether the effectiveness of feedback information depends on the timing of the feedback. Based on the theory of how learning costs fluctuate over a multi-period task, he predicts and finds that providing feedback immediately following implementation most effectively promotes learning and fosters better performance. Viator et al. (2014) document that individual traits, such as reflective cognitive capacity, further differentiate who are likely to benefit from feedback information.

Regarding the frequency of feedback, Casas-Arce et al. (2017) conduct an experiment where they examine the frequency of feedback and the level of detail affect the behavior of professionals working for an insurance repair company. Contrary to the notion that more frequent feedback is better,[26] they find that the best performance is achieved when professionals receive detailed but infrequent feedback.

[25] Only papers that examine the learning effect of feedback information are included in this review. Consequently, papers that examine the influencing role of feedback (e.g., performance evaluations that are linked to compensation) are not included.

[26] The management team of the participating firm strongly believed in this relation, prompting the experimenters to populate the high-frequency condition with relatively more employees than the low-frequency condition (300 vs 100). However, frequent feedback, regardless of the level of detail, did not improve performance.

This result suggests that the employees cannot correctly process detailed feedback information when provided too often.

Concerning the content of feedback information, Kelly (2007) shows that providing non-financial feedback-measures that reflect key value-creating activities do not increase decision-quality unless coupled with incentives. Managers only perform better when non-financial measures are incentivized because this directs attention to broader aspects of the decision-situation. Loftus and Tanlu (2018) investigate a different aspect of the feedback information; how the use of causal language in feedback impacts subsequent task performance. In contrast to regular feedback, feedback with causal language explains why performance was evaluated differently from their peers. Their study finds that causal language has a differential effect depending on past performance. If initial performance is low, the use of causal language results in improved subsequent performance compared to non-casual feedback.[27] However, if initial performance is good, using causal language resulted in decreased subsequent performance compared to non-casual feedback.

4.3. Aligned interests: Usage of Information (Phase B)

Phase B of the decision-facilitation process concerns the usage of information in decision-making. Unlike the communication phase (Phase A → B), the papers included in the following section are primarily concerned with how decision-makers use information.

4.3.1 Value of Information

One strand of experimental management accounting research is concerned with the value of additional—or more accurate—information. The value of information is defined as the increased monetary benefit from decisions taken with information compared to without information. Cardinaels et al. (2004a) examine whether providing participants with detailed customer profitability analysis improves their resource allocation decisions in a marketing environment varying in complexity. They find that providing more accurate customer profitability information enhances decisions in highly complex marketing settings. In simple settings, more accurate information does not enhance performance because

[27] In the experiment, treatment groups are denoted “high casual” and “low causal” feedback.

decision-makers are able to combine their traditional volume-based cost data with other available types of feedback to perform.

To investigate whether the benefits of more accurate cost data extend to more competitive settings where participants could learn from market feedback, Cardinaels et al. (2004b) conduct an experiment where participants act as price setters in a duopoly. Participants receive imperfect cost reports (either ABC or traditional volume-based costing) and market feedback (either informative or uninformative) in the form of a report containing the price choices and their competitor's profit.[28] Findings show that more accurate cost information improves price-setting under two conditions. First, when the market feedback is uninformative, more accurate cost information (ABC) enables participants to filter out irrelevant cues and more quickly reverse price distortion than participants with less accurate cost information (volume-based costs). Second, when optimal pricing decisions produce accounting losses under volume-based costing but not under ABC, participants tend not to set optimal prices but set prices that do not incur accounting losses. More refined cost information (ABC) improves price-setting decisions because participants are less concerned with avoiding accounting losses. However, when both cost reports produce accounting profits under optimal pricing, the informative competitive feedback dominates the effect of more accurate cost information.

Further research documents the benefits of having more accurate cost reports in a duopolistic market with sequential price-setting (Cardinaels, Roodhooft, Warlop, & Van Herck, 2008). Their findings show that when only the leader (first mover) is given a high-quality cost report, an information leakage occurs because the follower infers information from the leader's prices. As a result, higher quality information is incorporated into market prices, leading to an improvement in profits for both the leader and the follower. While the leader's profits are unaffected by the quality of the follower's cost report, the follower's profit is significantly increased by having a high-quality cost report only when the leader has a low-quality cost reporting. Hence, the results show that the additional value of more accurate information depends on whether it is the leader or the follower who invests in better cost information.

[28] Market feedback is either highly informative (modeled as a rival making optimal price choices given participants' price choice) or uninformative (modeled as a competitor setting a random price close to the participant's price).

Davis and Albright (2004) have a slightly different approach to this topic as they use a field setting to examine whether financial performance improved after implementing a balanced scorecard framework. In particular, the BSC framework contained both financial and non-financial performance measures, while the traditional performance measurement system used only financial measures. Despite not being able to do a random assignment, the authors suggest that financial performance was improved among branches that implemented BSC. A more recent study uses a field experiment to examine whether an information-sharing system of employees' creative work between the firm's stores increased financial performance (Li & Sandino, 2018). Although their pre-registered hypotheses show no significant effects, supplementary analyses suggest that the system improved the quality of creative work and financial performance in stores that had accessed the system more frequently.

Luft et al. (2016) examine whether additional information might have adverse effects on decision-making in a setting with subjective performance evaluation. In contrast to the previous literature, they find that additional information (non-accounting and external information) causes coordination failures between subordinates and superiors when the relation between performance and tasks is ambiguous. The reason is that, due to differences in cognitive abilities, the presence of additional information diverts attention from the most crucial aspects of the decision-task.

4.3.2 Value of Information in Negotiations

Decision-makers often participate in bargaining and negotiations both within the organization (e.g., transfer-pricing) and between organizations (e.g., asset procurement). A body of experimental accounting research investigates how the provision of information affects the outcomes in negotiation processes.[29] Early research shows that changes in the accounting system that reduce uncertainty about how different bargaining outcomes affect payoff (e.g., more accurate identification and measurement of cost drivers) can improve bargaining outcomes (Haka, Luft, & Ballou, 2000). Subsequent research finds that refined accounting information can, under certain conditions, stimulate cooperative behavior between negotiators (Chang, Cheng, & Trotman, 2013; Essa, Dekker, & Groot, 2018; Masschelein,

[29] Studies that focus on the efficient use of information in contracting between negotiators are not included as our review focuses on how information affects organizational decision-makers in a bargaining or negotiation process.

Cardinaels, & Van den Abbeele, 2012). However, Drake and Haka (2008) demonstrate that because of strategic concerns, information sharing between negotiators is less pronounced when they have to share fine versus coarse information, resulting in more hold-up problems when cost information is fine. Similarly, Miller and Drake (2016) show that aggregation of shared cost information could mitigate hold up problems in supply chains relative to disaggregated cost information; suggesting that a higher level of information asymmetry can improve coordination in supply chains.

A different perspective is offered by Van den Abbeele et al. (2009), who investigate how power imbalance between negotiators affects the efficient use of more detailed cost information. Results show that less powerful buyers' performance disadvantage is less pronounced when they have detailed cost information. In contrast, more powerful buyers do not seem to be able to exploit this information. Whereas less powerful buyers use the information in problem-solving techniques more frequently, more powerful buyers tend not to exploit the information but rely instead on distributive bargaining techniques. Thus, power seems to interact with the usefulness of additional information in bargaining situations.

4.4. Misaligned Interests: Data Collection and Processing (Phase A)

The following research is conducted in settings where preparers and users have misaligned interests. In these settings, the preparers often have incentives to distort private information to benefit themselves at the firm's expense.

4.4.1 Data Collection and Processing

As pointed out in Luft (2016), experimental management accounting research on the private acquisition of information is scarce, especially in contexts with misaligned interests between preparers and users. In our review, Church et al. (2014) is the only study investigating preparers' information-collection decisions in a setting with misaligned interests. Across two experiments, the authors find consistent evidence that, although participants tend not to collect costless—but valuable—information before reporting, having the discretion to do so does not affect reporting decisions. By not collecting information, participants can avoid the psychological discomfort associated with knowingly misreporting. Their finding contrasts a body of behavioral economics research that shows that

information avoidance increases self-interested behavior (Dana, Weber, & Kuang, 2007; Golman, Hagmann, & Loewenstein, 2017; Grossman & van der Weele, 2017). Additional findings show that only those categorized as moderately ethical report more opportunistically when able to avoid information.

Similarly, we identify no papers that focus on how preparers process information in a setting with misaligned interests. We identify some papers investigating information processing in project continuation decisions (Kadous & Sedor, 2004; Loh et al., 2019). However, failing to discontinue failing projects is often in the interest of both project managers and their superiors. It harms both the reputation of the project manager and the firm's profitability. In fact, Sleesman et al. (2012) find in their literature review that "agency problem" is only one out of 16 determinants of escalation.[30]

4.5. Misaligned Interests: Communication (Phase A → B)

In contrast to the non-existence of research on preparers' reporting decisions in settings where interests are aligned, a wealth of research exists on preparers' reporting decisions in settings with misaligned interests. Although a substantial share of the research on this topic is concerned with control aspects (i.e., decision-influencing role), the following papers are concerned with factors that influence preparers' reporting decisions.

4.5.1 Honesty Concerns and Individual Differences

Classical agency theory suggests that, when interests are misaligned, preparers will take full advantage of opportunities to misreport as long as the expected monetary benefit exceeds the expected costs (e.g., penalty if caught). Evans et al. (2001) test the assumptions of agency theory in a capital budgeting setting based on Antle and Eppen's (1985) formal model. Their findings sparked a strand of subsequent research as the results significantly deviate from agency predictions. They find that participants are willing to sacrifice wealth to report more honestly. Even when the experimenters increase the monetary benefits of misreporting, ceteris paribus, most participants still produce honest or partially honest reports. Later research shows that these honesty concerns are triggered when budget reports require a factual assertion (Rankin et al., 2008). Rankin et al. (2008) show that misreporting is significantly lower when a factual

[30] Brüggen & Luft (2016) study project continuation decisions from an agency perspective but focus on reporting decisions and not on how misaligned interests affect data collection and processing (see more on this in Section 4.6).

assertion is required because it transforms the reporting decision into a moral dilemma where participants have to explicitly lie to earn more money (i.e., send a factually untrue report). They find that honesty concerns matter less when supervisors have the authority to reject reports because strategic concerns dominate the reporting decision. However, later research revisits the latter finding and shows that honesty concerns (factual assertion versus no factual assertion) have strong effects on budgetary slack despite superiors' rejection authority (Douthit & Stevens, 2015).[31]

One strand of research on honesty concerns is focused on understanding individual differences that are predictive of honest reporting. Hobson et al. (2011) find that participants who scored high on traditional values and empathy on a pre-experiment personality-questionnaire were more likely to judge significant budgetary slack as unethical.[32] In a similar vein, Davidson (2019) classifies participants according to their score on the Social Value Orientation scale and finds that those classified as pro-selfs or pro-socials react differently when exposed to changes in the reporting context; suggesting that individuals are heterogeneous with respect to honesty concerns. Further research supports this notion (Blay, Douthit, & Fulmer, 2018; Murphy, 2012), demonstrating that honesty concerns seem to originate from an individual's desire to avoid negative affective reactions from violating social norms. In support of their argument, they find that individuals systematically differ in the intensity with which they experience negative affective reactions to misreporting and that lower levels of this intensity are predictive of misreporting.

Murphy (2012) shows that individuals who are higher in Machiavellianism are more likely to misreport.[33] Furthermore, participants who misreport experience negative emotions, but high-Machiavellian participants feel significantly less guilt than others who misreport. Murphy (2012) finds that misreporting is significantly reduced when prompting participants to think about common

[31] They observe strong treatment effects on budgetary slack when the salience of distributional fairness is reduced by withholding the relative pay of the superior from the subordinate. Honesty continues to have a strong effect on budgetary slack when the salience of reciprocity is increased by giving the superior the ability to set the subordinate's salary.

[32] They find that participants only judged significant budgetary slack as unethical when no formal control design to induce truthful reporting was present. The presence of such controls seems to "crowd out" honesty concerns. We discuss similar findings in Section 4.5.2.

[33] Machiavelliansim is one of the personality traits in what is often called the "Dark Triad". It refers to a personality trait which sees a person so focused on their own interests that they would deceive and exploit others to achieve it.

rationalizations before the reporting decision. However, those who still misreported rationalized to an even greater extent.

4.5.2 Contextual Factors and Honesty concerns

Psychology theories on moral cognition suggest that individuals trade-off the benefits of misreporting with the intrinsic cost of updating one's moral self-view (e.g., thinking of oneself as dishonest). Because people like monetary rewards and to think of themselves in favorable terms, these theories suggest that people use contextual factors as potential justifications for why acting selfishly is morally acceptable. Accounting research finds that contextual factors affect the honesty of reporting decisions. Cardinaels (2016) provides evidence that a company's earnings situation affects subordinates' tendency to induce slack in their budget proposals. In the absence of formal controls to induce truthful reporting, misreporting is less pronounced when it determines whether the firm earns a gain or loss than when their report does not affect whether the firm earns a profit or loss. However, formal controls seemingly crowd out participants' motivation to report honesty, resulting in an insensitivity to the company's earning situation.

A strand of accounting research uses a reporting setting similar to the "trust contract" in Evans et al. (2001) because it allows for the clean investigation of participants' moral motivations when participants have strong economic incentives to act opportunistically. Trust contract implies that the firm trusts the manager to report in good faith, rather than mechanisms such as hurdles or audits to induce truthful reporting. In this setting, Church et al. (2012) find that managers' tendency to misreport increases when the reporting manager is not the sole beneficiary of the slack benefits. When others also benefit, managers can more easily justify inflating their budgets. Only when the reporting managers know that the beneficiaries have negative attitudes toward misreporting is the effect mitigated. Later research finds that similarity in peer environments—without knowledge of peer actions—can increase the tendency of misreporting in a budgeting setting (Cannon & Thornock, 2019).

Contextual cues about the social aspects of the reporting situation play an essential role under trust contracts. Brown et al. (2014) find that rankings that are not tied up to participants' compensation significantly affect the honesty of their budget reports. They find an increase in misreporting when rankings are based on participants' own compensation. Rankings based on firm profit decrease

misreporting compared to random ranking. When ranked on both firm profit and individual compensation, participants tend to focus on firm-profit ranking, resulting in a lower level of misreporting than individual compensation.

Matuszewski (2010) provides findings that suggest that misreporting is affected by changes in the horizontal pay dispersion, i.e., relative pay among peers. Complementing these findings, Guo et al. (2017) find that high vertical pay dispersion motivates subordinates to misreport costs to a greater extent than low vertical pay dispersion.[34] The combination of these results suggests that fairness concerns interact with participants' honesty concerns. Further support for this notion is presented by Douthit and Majerczyk (2019). They show that the level of misreporting is significantly lower when subordinates perceive superiors to be legitimate in their roles. Results suggest that, if the superior role is assigned based on luck rather than merit, subordinates feel less obliged to adhere to property-right norms (i.e., superior is the residual claimant of profits) and therefore tend to misreport.[35] Thus, perceptions of fairness seem to be a predictive factor of misreporting.

Brüggen and Luft (2016) provide an interesting case where subordinates' beliefs about superiors' decisions in the later stages of a multi-period project affect their initial budget reports. They examine how replacing superiors after the first stage affects escalation tendencies in firms. The motivation for the study is to investigate whether replacing superiors reduces escalation tendencies because new superiors tend to react more skeptically to continuation proposals when first-period cost overruns have occurred. However, in settings with private project-cost information, changing superiors leads to greater initial understatements because subordinates anticipate that new superiors will be more critical of their projects. Therefore, they become more focused on gaining initial funding and choose to underestimate project costs to a greater extent. When initial cost overruns have been high, new superiors are less influenced by an additional unit of predicted second-period profit than are continuing superiors. Hence, subordinates ''need'' to promise more units of higher profit (i.e., understate costs more) to changing

[34] This study does not use a "trust contract" setting as superiors set hurdles.

[35] The authors suggest that the underlying mechanism is property-rights norm activation when roles are perceived to be legitimate. Desirable roles that are assigned based on luck are perceived as less fair such that participants do not feel obliged to adhere to property-right norms.

superiors to achieve a given probability of receiving second-period funding. Thus, subordinates' perceptions of their superiors affect their level of reporting honesty.

Seybert (2010), however, finds that participants are more likely to continue a suboptimal project when past expenditures are capitalized (versus expensed), and they are responsible for initiating the project. Additional evidence suggests that overinvestment is driven by reputation concerns associated with reporting accounting losses. A supplementary survey shows that experienced executives also anticipate this behavior.

4.5.3 Report Format

Experimental research has also devoted attention to whether the report format affects managerial misreporting. In particular, Church et al. (2019) study whether the measurement basis used in participants' budget proposals affected their tendency to misreport under a "trust contract" setting. Their findings show that a non-financial measurement basis increases the level of honesty relative to a financial measurement basis but only when the benefits of slack are direct. When slack benefits are indirect, the measurement basis does not affect reporting decisions. This is because a financial measurement basis activates the concept of money—which is associated with independence and self-interests—thereby promoting opportunistic reporting behavior. However, when slack benefits are indirect, participants can better maintain a positive moral self-image while misreporting, thereby making misreporting equally likely when the measurement basis is financial.[36]

The aggregation level of reports has also received attention in the research literature—but the results are somewhat mixed. In particular, Nikias et al. (2010) investigate the behavioral effects of aggregation and timing on budgeting in a face-to-face "trust contract" setting. By manipulating whether budget reports are aggregated and whether budget reports are reported simultaneously or sequentially, they find that misreporting is less pronounced for disaggregated budget reports and that a sequential budgeting process leads to more truthful reporting. Therefore, the report format (aggregated or disaggregated) affects reporting decisions because participants' are less able to maintain an honest appearance when

[36] The authors argue that these two effects are non-additive such that there is no difference between misreporting between measurement-basis conditions when slack is indirect. This could also be because of ceiling effects (e.g., Douthit & Majerczyk, 2019).

the report format is aggregated. In contrast, Schwartz et al. (2012) find that more aggregated budget-reports result in less misreporting (inflated proposals) when superiors can reject proposals. Findings suggest that, as actual costs increase, subordinates with the aggregated report-format moderate their proposals because they anticipate that superiors are more likely to reject large high-cost proposals.

Despite its focus on the control aspects of information, Majors (2016) investigates whether mandating range disclosures to uncertain estimates affects reporting managers' tendency to report private information more aggressively. In the experiment, managers privately learn a narrowed-down range of possible asset values and their point estimate's relative position within that range (low, medium, high). Each manager reports the asset's value to a paired investor who could potentially impose a cost on the manager in suspicion of misreporting.[37] Experimental results show that managers report less aggressively when ranges are disclosed because they anticipate investors will suspect aggressive reporting and take action against them when ranges are disclosed. Moreover, the results show that the disciplinary effect of range disclosures is most pronounced for managers exhibiting higher levels of at least one of the personality traits collectively referred to in psychology as the Dark Triad.

4.5.4 Internal Whistleblowing

Employees can potentially play an important role in the early detection of fraud within organizations. As business-unit managers and other employees are typically "closer to operations", they are often the first to obtain information about ethically questionable practices in the organization (e.g., sub-contractor exploiting cheap labor). Research on employees' decision to report such behavior finds that willingness to report depends on the firm's characteristics, the perception of the responsible superior, and the type of behavior they discover (Kaplan S.E., Pope, & Samuels, 2015). Further research suggests that, after an unsuccessful social confrontation, employees' reporting intentions to their supervisor's supervisor are stronger than to an internal auditor, suggesting that employees experiencing unsuccessful social confrontation seek out more powerful internal report recipients (Kaplan S.E., Pope, & Samuels, 2010).

Zhang (2008) investigates internal whistleblowing in a capital budgeting setting where participants can observe whether their peers misreport or not. Consistent with previous findings, results show that if

[37] Investors never learn the private information of the manager. Thus, penalties are given based on suspicions.

there is a high reward for whistleblowing, perceived superior fairness positively affects subordinate reporting honesty and negatively affects explicit collusion attempts against the superior. Thus, perceptions of the superior play an essential role in combating collusion among subordinates. Collectively, this research strand suggests that the reporting of ethically questionable practices depends on a variety of factors that should be considered when firms design procedures for internal whistleblowing in firms.

4.5.5 Receivers' Reactions to Reports

While a large body of research investigates reporting decisions when interests are misaligned, a relatively small research body is concerned with how receivers perceive these reports. Kida et al. (2001) investigate whether affective reactions to reports can impact how superiors perceive reports and, thus, influence superiors' capital-budgeting decisions. Results show that superiors are influenced by their affective reactions to the senders of budget proposals. In particular, managers tend to reject decision alternatives that elicit negative emotional responses, even though these alternatives have higher expected financial benefits.[38]

More recently, Fehrenbacher et al. (2020) find that superiors are more likely to select financially inferior projects when proposed by a manager triggering a positive affective reaction. That is, "*Roger (the preparer) has been appreciative of your work and pleasant to interact with*" versus "*Joe (the preparer) has never been appreciative of your work and has been unpleasant to interact with*".[39] They find that this tendency is attenuated by making superiors accountable for their decision.[40] However, regardless of accountability, participants are less likely to select a financially superior project when proposed by a manager triggering a negative affective reaction. Even though affective reactions do not impact the underlying economics of a proposed capital project, this research suggests that managers tend

[38] Although the study uses the term "managers", we use the term "superiors" to make clear that the decision-makers in question are receivers of a report and use this to form their beliefs and make decisions.

[39] These are short excerpts from manipulations used in the experiment. Complete manipulations are found on page 6 in their paper.

[40] Accountability refers to the implicit or explicit expectation that one may be called on to justify one's beliefs, feelings, and actions to others (p. 2).

to make decisions based on affective reactions instead of solely considering the underlying economic factors.

4.6. Misaligned Interests: Usage of Information (Phase B)

The final phase of the decision-facilitation process is concerned with the usage of information in decision-making. Because the misalignment of interests reduces the reliability of the information provided by prepares (e.g., cheap talk), considerably less research has been done on this topic than settings with aligned interests. While no research papers focus solely on how decision-makers use information produced by subordinates with misaligned interests, some papers provide some insight into how users (often superiors) consider such information.

Rankin et al. (2003) investigate superiors' rejection decisions of budget proposals under asymmetric information. Their main finding concerning superiors' decisions is that superiors claim to reject projects when they suspect misreporting, despite the project being profitable. However, these non-binding announcements seem to be used more as a bluff and an attempt to convince managers that they will reject profitable projects more often than they intend to. In a later study, Rankin et al. (2008) find that superiors reject about 1/3 of all projects even though this choice reduces their own pay. Subsequent research also finds that superiors tend to reject budgets they suspect are untruthful even when their own compensation does not depend on accepting such budgets (Schwartz et al., 2012). These results suggest that superiors use the threat of rejection as a non-binding threat and that this threat is not merely a bluff. Superiors seem to have preferences for fairness and are therefore willing to incur personal costs to punish behavior they suspect is unfair or dishonest.

5. DISCUSSION AND SUGGESTIONS FOR FUTURE RESEARCH

This section aims to discuss topics relevant to decision-facilitation that has received little attention in the previous research in experimental management accounting.[41] We use the framework to identify unexplored topics that are considered sufficiently promising for future research. The following is an overview of the identified topics in the different phases of the decision-facilitation process.

[41] The purpose is not to provide suggestions on how to extend the research topics covered in Section 4. However, that does not imply that these research topics are saturated.

5.1. Aligned Interests: Data Collection and Processing (Phase A)

5.1.1 Challenging the assumptions of classical information economics

While a body of experimental research has challenged the assumptions of classical agency models (e.g., assumption of narrow self-interest), the assumptions of information economics—which most of the management accounting is built on (Bromwich, 2006)—has mostly been unchallenged.[42] In particular, classical information economics assumes that information is valuable to the extent and only to the extent that it leads to better decisions (Stigler, 1961). Accordingly, decisions to acquire additional information rely solely on the cost-benefit analysis of acquiring information. New perspectives on information economics—that also consider psychological factors—suggest that the acquisition of information depends not just on material payoffs but also on beliefs and the attention devoted to these payoffs (Golman & Loewenstein, 2018).

This theory has potentially significant implications for management accounting research because it proposes that individuals acquire (or avoid) information based on whether they anticipate what they discover will be pleasurable (or painful). The theory suggests that the valence of information (positive, neutral, or negative) determines whether individuals tend to avoid information (Golman et al., 2017). For instance, preparers who are excited to think about a new potential project might systematically collect information that they anticipate will confirm the project's viability (positive valence) but avoid collecting information that might indicate potential cost overruns (negative valence). The valence of information also affects attitudes toward risk-taking and ambiguity (Golman, Loewenstein, & Gurney, 2020). When thinking about missing information is pleasurable (e.g., your business unit outperforming other units), this theory suggests that people will be more willing to bet on that information. However, when thinking about the missing information is aversive (e.g., the failing of a pet-project), people prefer not to bet on it (Golman et al., 2020; Peysakhovich & Karmarkar, 2016).[43]

[42] With the exception of earlier research that investigates problems related to "information overload", in which more information decreases performance (Luft & Shields, 2009)

[43] Golman et al. (2020) also provide experimental evidence that the missing information's valence affects people's risk taking decisions. They find that people bet more money on uncertainties they like to think about than uncertainties they do not like to think about.

Based on these recent theoretical developments, research in experimental management accounting could investigate whether these implications manifest themselves in a managerial accounting setting. As the assumptions of classical information economics are pervasive in most management accounting tools (Bromwich, 2006) (e.g., relevant cost analysis, cost estimation, information systems), this line of analytical research could produce novel insights into how individuals interact with management accounting tools.[44]

5.1.2 Data Reliability, Relevance, and Privacy

The massive generation of data (both structured and unstructured), coupled with plummeting data storage costs, has led to an explosion of data in firms (Deloitte, 2018a; McKinsey, 2018). The proliferation of mobile devices, applications, and operating systems, requires firms to understand how to deal with this abundance of data and how their employees assess and evaluate available data. We identify three areas related to data collection that warrant the attention of future management accounting research.

First, assessing data reliability: Reliability represents the extent to which information is unbiased, free from error, and representationally faithful. Despite the central role of data reliability, it is a complex and elusive aspect of accounting information (Maines & Wahlen, 2006). While there is some auditing research on how auditors evaluate reliability (e.g., Kadous, Koonce, & Thayer, 2012), no research investigates how internal preparers assess data reliability from various sources. More non-accounting data makes the boundary of accounting and non-accounting information increasingly elusive (Knudsen, 2020), exacerbating the task of evaluating data-reliability for decision-making. Understanding how employees evaluate data reliability is an important step in developing modern accounting systems.[45]

Second, determining information relevance: A recent survey finds that the usage of relevant cost analysis is close to non-existent among UK medium-sized firms (CIMA, 2016). While only a few papers focus on how individuals approach the concept of relevant cost (Buchheit, 2003, 2004; Chenhall &

[44] Belief-based theories on information acquisition suggest that attention drives information acquisition depending on the valence of the missing information. Interestingly, management accounting tools are often thought of as being "attention-directing".

[45] One business leader exclaimed, "*Most of big data – most of Internet data – is completely unimportant for most of the questions in the world. Only a few things are relevant for answering specific questions. The art is to reduce the amount of noise to find really interesting patterns"* (PWC, 2016, p. 3).

Morris, 1991; Victoravich, 2010), little research has investigated how preparers filter out data in a decision-facilitation setting. Economics research suggests that individuals are cognitively biased towards only considering information they observe ("what you see is all there is") and fail to consider information that is not explicitly in front of them (Enke, 2020). Many factors in a relevant cost analysis require people to consider implicit information, e.g., opportunity cost. Why practitioners tend not to base their decisions on a thorough analysis of relevant costs is not clear. One potential explanation might be that thinking about both explicit (e.g., differential costs) and implicit costs (e.g., opportunity cost) often has negative valence (Golman & Loewenstein, 2018). For example, a product manager estimates a positive net present value of a new and exciting product. However, considering the opportunity costs will reduce the new product's attractiveness, leading the product manager to ignore these costs.[46]

Third, understanding attitudes to privacy and data security: As internal databases become populated with sensitive information, privacy and data security issues become more pressing in firms. Except for Myers et al. (2017), little experimental research has addressed this aspect. Behavioral research on individuals' attitudes towards privacy and data security suggests that privacy concerns are highly malleable and context-dependent (Acquisti, Brandimarte, & Loewenstein, 2015). For firms, this implies that there are potentially hidden data-security hazards associated with not properly understanding how employees' attitudes towards data security interact with organizational and situational factors. As data security and privacy is a top concern for many businesses, practice could benefit greatly from experimental research investigating the micro-foundations of employee behavior in such settings.

5.1.3 Integrated Profitability Analyses

The presence of more non-accounting information (e.g., social media data) poses a challenge for preparers on how to incorporate these aspects into their reports. While there are many theoretical guidelines on how to estimate costs using accounting information (Bromwich & Scapens, 2016), little

[46] Some researchers in accounting suggest that individuals' decision-making process does not adhere to normative theories of rationality; in which accounting becomes an "answering machine" (Burchell, Clubb, Hopwood, & Hughes, 1980). Yet, Cabantous et al. (2010) argue that "people try to formulate problems, they do try to find alternatives, and they do try to calculate and compute to arrive at a decision (…) the paraphernalia of decision making makes people rational; they become framed into rationality and become economic agents by means of accounting". Experimental research could shed new light on the determinants of usage of management accounting tools based on the assumption that people at least try to be rational.

guidance is provided to incorporate non-accounting data in analyses of profitability, e.g., customer profitability analysis. While most of the profitability analyses in management accounting are descriptive and based on historical transaction data, there is a growing need to understand how to incorporate and harness the value of other types of data surrounding the organization (KPMG, 2015). Future experimental research could investigate how non-accounting data affects the processing of accounting information and the relative weight preparers and users place on such data. For example, if social media data indicates a successful product launch, how would that affect how preparers analyze accounting data? Future research could also look at this topic from a visualization perspective. For example, how to visually demonstrate the difference between internal accounting data and external big data in accounting reports?

5.1.4 Cost Estimation in a Digital Age

Regarding cost estimation, we identify two areas that could benefit from future behavioral research. First, digitalization and robotization pose new challenges for how firms estimate costs. In time-driven ABC, the costs associated with excess capacity should be allocated to activities because that would direct managers' attention to considering reducing capacity over time. However, the excess capacity becomes permanent with robotization (the practical capacity surpasses usage), making it difficult to allocate costs to activities (Bjørnenak, 2017). With more overhead costs, providing an objective and nuanced analysis of profitability becomes more difficult. Although this challenge is mostly technical (i.e., how to allocate costs), experimental research could complement the technical research by investigating how people perceive the fairness of different trade-offs between measurement accuracy and the relative cost of using human labor with limited capacity. This trade-off is an essential issue because the measurement method would, in many cases, determine whether human labor should be substituted with robots, e.g., customer service personnel versus a chat robot. In this sense, management accounting could play an important role in estimating the "fair" value of using human labor in firms.

Second, how do people determine cost variability? Determining what costs are considered relevant is often tricky and depends on a subjective evaluation of the relevant time-horizon. The nature of costs depends on the time-horizon of a decision. For instance, a fiber optic cable on a drum may be a variable

cost when determining a network's size but considered fixed once it has become part of the network. Though decisions regarding the relevant time-horizon for a given decision significantly impact profitability evaluations, there is scant experimental research on these decisions. Like Cardinaels and Labro (2008), future research could investigate the psychological factors that affect people's assessment of relevant time-horizons in determining cost variability.

5.1.5 Interdependencies between External and Internal Accounting Information

In a special issue in the Journal of Management Accounting Research (JMAR), Labro (2015) suggests that future research should investigate the links between the different accounting disciplines. For instance, financial and management accounting tends to be closely related in many firms. Surveys find that firms usually manage internal operations with the same information used to report to external constituencies (Kaplan R. S. & Atkinson, 2014). While some investigate the consequences of using a single accounting system for multiple purposes in a firm (Arnold & Artz, 2019; Arnold & Gillenkirch, 2015), few investigate how accounting choices made for external reporting purposes influence internal processing accounting data, [47] and in particular, how accounting choices cascade in the organization (e.g., IFRS versus GAAP) and how preparers appropriate information to facilitate internal decision-making when it has been produced to cater to external users' needs.

5.2. Aligned Interests: Communication (Phase A → B)

5.2.1 Preparers' Reporting Choices

Noise in communication often comes from differences in perception, mode of analysis, analytical abilities, and context between preparers and receivers. However, little research on how preparers deal with anticipated noise when they choose what reports to send. For example, preparers might consider the receivers' lack of time and knowledge of local conditions as an argument to bias their report or explicitly misreport to avoid superiors rushing to conclusions.[48] In practice, management teams often consist of individuals with different abilities and skills (e.g., business majors) than those who process

[47] Research in auditing and financial accounting has devoted attention to how accounting changes affect auditors' and investors' information processing and decision-making (Agoglia, Doupnik, & Tsakumis, 2011; Capps, Koonce, & White, 2017; Clor-Proell & Nelson, 2007; Jamal & Tan, 2010; Psaros & Trotman, 2004).

[48] An interesting example of this is found in Roberts and Scapens (1985, p. 454).

data and prepare reports (e.g., data scientists or engineers). Although previous research finds that formatting choices affect how users receive information (e.g., Buchheit, 2003; Cardinaels, 2008), little research is concerned with how preparers adjust their reports when anticipating how users perceive reports.[49] For example, suppose an analyst knows that the supervisor often bases decisions on a particular graph. In situations where that graph does not capture all relevant aspects of the decision, the analyst might choose to disclose this information in a tabular format to prompt a more analytical mindset from the supervisor.

5.2.2 Internal Whistleblowing of Profit-Enhancing Activities

Another topic that has received little attention is internal whistleblowing of profit-enhancing activities. Research on internal whistleblowing examines reporting behavior in settings where employees discover misconduct (e.g., peers misreporting costs) that does not directly affect their wealth. However, many ethically questionable practices benefit both upper- and lower-level managers in firms (aligned interests).

For example, a local manager may learn that one subcontractor supplies components for a significantly lower cost than competitors because the subcontractor exploits its workers (e.g., Daniela, 2018). The low cost allows the company to sustain its role as a cost leader, which generates significant profits for the local manager's division and the company. Sharing information about the subcontractor's questionable practices might pressure the upper-level management to deal with the issue (e.g., enact costly programs to ensure subcontractor compliance with ethical standards). By sharing this information, the upper-level managers are more likely to be held accountable if they fail to enact appropriate measures. However, suppose the local manager decides to withhold information from those responsible. In that case, the upper-level managers are less likely to be held accountable because of "plausible deniability" if these practices are exposed. Thus, as many questionable practices enhance (short-term) profits, firms often have incentives on both lower- and upper-levels to withhold information from those with decision authority (Phillips, 2010).

[49] Related research in financial accounting provides experimental evidence that prompting preparers to take the perspective of a reasonable investor affects preparers' reporting decisions (Mayorga & Trotman, 2016).

A recent survey reports that 77 percent of surveyed corporate managers believe that modern slavery is likely to occur in their supply chains (Lake, MacAlister, Berman, Gitsham, & Page, 2016). Research in behavioral economics has already started investigating how willful ignorance is used in hierarchical settings (Shalvi, Soraperra, van der Weele, & Villeval, 2019). Future research in experimental accounting research could help develop a better understanding of how institutional and contextual cues affect internal whistleblowing of profit-enhancing activities.

5.3. Aligned Interests: Usage of Information (Phase B)

5.3.1 Incorporating External Information into Accounting Reports

A body of prior research investigates the instrumental value of having more refined or accurate information in various decision settings. While accounting reports become more populated with external information (e.g., social media reports), we know little about how such information affects managerial decision-making. While some suggest that more data will lead to better and faster decision-making (e.g., Deloitte, 2017), others are skeptical and fear that the introduction of "big data" will lead to "the wrong decisions much more quickly than before" (Quattrone, 2016, p. 3). That is, the provision of "big data" in accounting reports can make the reports themselves so persuasive that decision-makers become less critical to its content, making them vulnerable to cognitive biases (Quattrone, 2016). Similar to the finding that graphical representations can lead to faster and less analytical decision-making (Cardinaels, 2008; So & Smith, 2004), future experimental research could further investigate the "pitfalls" of receiving more comprehensive and visually appealing reports on decision-making performance. By better understanding this link, accounting research could produce valuable insights to practitioners on designing and integrating external information into their accounting reports.

5.3.2 Usage of Advanced Decision Aids

Advanced decision-aids are becoming more common in practice. However, behavioral research finds that people tend to be algorithm-averse and are often reluctant to follow decision-aids' recommendations (Longoni, Bonezzi, & Morewedge, 2019). Future research in accounting could investigate whether—and potentially why—managers would be reluctant to rely on decision-aids in different decision-contexts (e.g., budget forecasts or investment decisions). By understanding the mechanisms that drive

algorithm aversion in managerial decision-making, accounting researchers can provide implementable solutions that can significantly improve decision-making performance.[50]

5.4. Misaligned Interests: Data Collection and Processing (Phase A)

5.4.1 Examining the Predictions of Moral Constraint Theory

Our review of previous literature reveals a significant gap in the literature in the information acquisition phase (Phase A) in settings with misaligned interests. While the existence of a gap is not in itself a sufficient argument for conducting research, a large stream of literature in related fields seems to suggest that research on this topic deserves more attention from accounting scholars. Though researchers in accounting tend to attribute honest reporting behavior to honesty preferences (Douthit & Majerczyk, 2019; Evans et al., 2001; Rankin et al., 2008), Rabin (1995) suggests that people tend to view morality as a constraint rather than a preference. This distinction has thought-provoking implications because people pursue preferences but seek to circumvent constraints. If morality is treated as a constraint on the real goal of pursuing self-interest, "*a person will be keen to selectively and self-servingly gather, avoid, and interpret evidence that will tell her whether it is morally okay to pursue her self-interest*" (p. 1).

Experimental evidence supports the moral-constraint theory by showing that people tend to avoid information to excuse selfish decisions (e.g., Dana et al., 2007; Grossman, 2014; Grossman & van der Weele, 2017). Recently, Ay et al. (2020) provide further evidence that people will also gather unnecessary information when the temptation to misreport is present.[51] The amassed research lends credence to the notion that people tend to view honesty as a moral constraint, which would influence their information-acquisition decisions when interests are misaligned.

As more data becomes available, firms rely more on individuals with expertise and specialized knowledge to transform the data into decision-relevant information. Therefore, understanding what drives information-acquisition decisions in the managerial-reporting contexts could be crucial for research to guide firms. For example, Berge (2020) shows that, because managers are reluctant to

[50] One example of such an implementable solution is found in Dietvorst, Simmons, & Massey (2018).
[51] This paper is found in Chapter II of this dissertation.

physically avoid relevant information in the managerial reporting context, making internal accounting systems more effective in assisting private information acquisition increases reporting honesty.[52]

5.5. Misaligned Interests: Communication (Phase A → B)

5.5.1 Modes of Deception

Even though a large body of research investigates managerial reporting honesty, we know little about other forms in which preparers might deceive users to make suboptimal decisions that benefit preparers. In practice, opportunities to misreport are limited by internal controls such as internal audits (e.g., Cardinaels & Jia, 2016) and truth-inducing incentive schemes (e.g., Evans et al., 2001). Even if managers have opportunities to misreport, they often refrain from doing so out of a desire to maintain an honest self-image (Mazar, Amir, & Ariely, 2008) or avoid negative affective reactions from misreporting (Blay et al., 2018). Thus, reporting decisions that involve explicit deception might be less common than other forms of deceptive communication.

A distinct form of deceptive communication is paltering. Paltering is the active use of truthful statements to convey a misleading impression. Though the underlying motivation to deceive is the same, paltering is distinct from both lies of commission and omission (Rogers, Zeckhauser, Gino, Norton, & Schweitzer, 2017). Because paltering does not involve making untruthful statements, a manager who palters might more easily preserve an honest self-image while effectively misleading their superiors. Consider a situation where sales have grown consistently in recent years but a business-unit manager expects sales to be flat. To convey the impression that sales will continue to grow, the manager might palter by reporting, "over the last ten years our sales have grown consistently" and not highlight the expectation that sales will be flat this coming year.[53] With more data sources to choose from, managers have more leeway in what to include in their reports, which makes this form of deceptive communication particularly tempting. [54]

[52] This paper is found in Chapter I of this dissertation.

[53] Example taken from Rogers et al. (2017). The difference between lies of omission and paltering is that paltering involves more "active selective disclosure of other true information – that the discloser expects will lead the recipient to a false conclusion".

[54] While a substantial body of research investigates the use of language to persuade investors (Barton & Mercer, 2005; Hales, Kuang, & Venkataraman, 2011; Rennekamp, 2012; Tan, Wang, & Yoo, 2019), little research exists on how language is being used within the organizations when interests are misaligned. This is somewhat surprising

Another form of deceptive communication is obfuscation. Obfuscation implies telling the "whole truth"[55] but in a complicated manner that exploits the receiver's limited ability or expertise to understand all the complexities. In auditing, Alles (2015) proposes that for an external auditor auditing a firm whose balance sheets reflect decisions made based on big-data analysis, verifications require that the auditor evaluates or replicates the analysis herself. This evaluation necessitates that the firm in question provides a detailed report of estimation techniques used even though these might be highly complex.

Extending the example by Alles (2015), the firm could produce a highly complex report ostensibly to provide all the information. However, the firm might also strategically use complexity to present truthful information in a convoluted fashion so that it becomes difficult for the receiver to infer its true meaning. From a non-expert receiver's perspective, it is hard to discern what level of complexity is needed in each case. In contrast, an expert receiver would be able to discern the appropriate complexity level, hence detect obfuscation. Cardinaels' (2008) findings suggest that reporting managers need to adapt the presentation format to the users' level of accounting sophistication. However, with obfuscation, reporting managers can exploit their discretion over the accounting report to serve their self-interest.[56]

With the introduction of automated budget reports and system-generated decision-recommendations (Deloitte, 2018b, 2018a), lies of omission might become more frequent in firms. For example, the accounting system suggests a budget proposal of 100 based on the system's data. A manager might possess private information—not available to the accounting system—that the actual cost is 70. In this situation, a lie of omission is simply not correcting the system's budget proposal, creating budgetary slack "by default". The research findings on lies of omission are mixed (Fochmann, Müller, & OVeresch, 2018; Fonseca & Grimshaw, 2017; Fosgaard, 2019; Mazar & Hawkins, 2015). Hence, future experimental accounting research that improves our understanding of how lies of omission differs from

given how common the existence of unofficial reports managers keep, internal emails, or just face-to-face interaction (Hall, 2010; Simon, Guetzkow, Kozmetsky, & Tyndall, 1954). Thus, using language to persuade is likely to be a common phenomenon in the daily workings of firms.

[55] That is, not leaving out any truthful relevant information.

[56] In a similar vein, the American Institute of Certified Public Accountants (AICPA, 1975 cited in Nikias et al. (2010)) notes "information is classified and summarized in a reasonable manner that is neither too detailed nor too condensed". In general, choosing the optimal level of complexity calls for a balance between the amount of information made available and the ease of use (Nikias et al., 2010).

lies of commission could produce valuable insights into designing accounting systems that avoid inducing agency costs unnecessarily.

5.6. Misaligned Interests: Usage of Information (Phase B)

5.6.1 Reaction to Information Produced under Misaligned Interests

In firms where management relies on employees with expertise in acquiring information, management often has no better options than to "rubber stamp" the information provided to them (Aghion & Tirole, 1997).[57] In contrast to classical economic predictions, prior experimental studies show that superiors often reject budget proposals they suspect are untruthful even if that means reducing their pay (e.g., Rankin et al., 2008). Considering that information is often acquired in a setting with misaligned interests, future research should investigate whether superiors' aversion to being "fooled" causes them to disregard information when they learn that the preparers could have diverging interests. In such settings, superiors could risk making suboptimal decisions because they underestimate the honesty of their subordinates. In settings with higher stakes (e.g., project selection setting), an unwillingness to base decisions on information produced under misaligned interests might have detrimental effects for the firm. Thus, experimental research should further investigate how superiors' usage of information differs when they know the subordinates' incentive structure.

Although superiors are often the users of information, subordinates are also users of the information provided by their superiors. For example, upper-level management prepares strategy reports to inform decision-making at lower levels of the organization. In some settings, the information provided by superiors (e.g., code of conduct) is intended to reduce employee misconduct (e.g., theft, shirking, misreporting).

An interesting trend among practitioners is to use corporate social responsibility (CSR) initiatives as an employee governance tool (Flammer & Luo, 2017). That is, CSR initiatives are communicated to employees to motivate them to work harder (Balakrishnan, Sprinkle, & Williamson, 2011) or misreport less (Burbano & Chiles, 2018). Future research could investigate how employees use such information

[57] Especially when expertise is costly to acquire (e.g., degree in data analytics) and prohibitively costly to communicate (e.g., how to interpret an MRI scan) (Demski & Sappington, 1987).

when they know that the employer has diverging interests from the employees. Recent research has started to investigate whether CSR communication can backfire depending on the employer's approach to CSR. For instance, Arshad and Berge (2020) use an experiment with online employees to investigate whether a win-win versus a philanthropic approach to CSR affects employee opportunism towards the employer.[58] They find that the approach to CSR matters for how online employees perceive the employer but that these changes in perceptions do not result in an overall effect on actual employee opportunism.

6. CONCLUSION

In the aftermath of the recent data explosion in firms (Deloitte, 2018a; Mohr & Hürtgen, 2018), there is a need to develop new insights into the factors that can distort the decision-facilitation process in firms. To that end, this paper provides an overview of the existing experimental management accounting research on decision-facilitation and provides numerous suggestions for future research. In particular, we develop a conceptual framework that postulates key tasks, responsibilities, and sources of noise across three distinct phases of the decision-facilitation process. Using this framework, our paper provides a comprehensive and systematic review of the experimental management accounting research on decision-facilitation in organizations. While our review suggests that substantial research on decision-facilitation has already been done, we identify many unexplored and emerging topics that could spur future research in experimental management accounting research.

We draw on trends in practice and recent insights from psychology and behavioral economics to suggest multiple avenues for future experimental research for each phase of the decision-facilitation process. Furthermore, we introduce two theories that introduce assumptions and predictions of behavior related to decision-facilitation. In settings with *aligned interests*, we introduce a belief-based theory of information acquisition based on psychologically grounded assumptions about how people think and feel about the presence and absence of information (Golman et al., 2017). In settings with *misaligned interests*, moral constraint theory posits that people might behave morally—not because they have a preference for morality—but because they treat morality as a constraint on their self-interested behavior (Rabin, 1995).

[58] This paper is found in Chapter III of this dissertation.

This paper is subject to some important limitations. First, identifying experimental research on the decision-facilitating role is challenging as there is no unique keyword that would correctly specify all relevant research contributions. Thus, I used a broad approach to identify all experimental research published in the relevant period in high-quality accounting journals and manually went through the abstracts to determine relevance. Despite having pre-specified the inclusion and exclusion criteria, human errors might have resulted in leaving out contributions that should have been included, and vice versa.

Second, we found no commonly accepted definition of management accounting in the research literature (Bhimani et al., 2012; Bloomfield, 2015; Bromwich & Scapens, 2016; Krishnan, 2015; Salterio, 2015). Because we needed to define clear inclusion and exclusion criteria, we choose a pragmatic definition similar to Salterio (2015). That is, management accounting is about producing information for *internal* users or decision-makers in an organization. Consequently, research that primarily focuses on external users (e.g., investors or external auditors) is not included in our review. We acknowledge that this may be a too restrictive definition of management accounting (Krishnan, 2015), and thus ignores research contributions that could have been relevant to the review.

Third, the review does not include unpublished papers. This choice focuses the review on the research agenda that is set by the academic journals. However, there might be unpublished work that addresses the gaps identified in this review. In that case, this review could help motivate such research and increase its chances of being incorporated into the body of published management accounting research.

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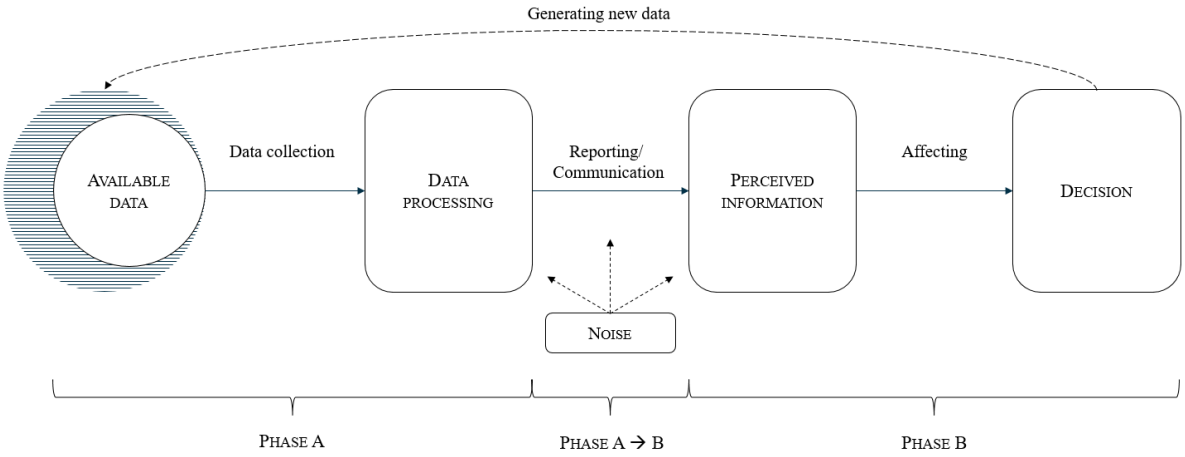

FIGURE 1.—Conceptual framework of the decision-facilitation process.

TABLE A
Complete List of Collected Articles

	Keyword search on Scopus	Papers satisfying inclusion criteria	Manually collected papers
TAR	190	23	2
AOS	112	16	1
CAR	111	13	1
BRIA	89	9	1
JMAR	83	5	0
JAR	67	7	1
AH	33	2	0
EAR	29	1	0
MAR	24	7	1
JAE	18	1	0
ABACUS	15	2	0
AF	10	2	0
BAR	9	2	0
IJA	6	0	0
AAAJ		1	1
Total	796	91	7

8. APPENDIX

The lists below are ordered by phases of the decision-facilitating process and sorted by journals.

List A: Aligned Interests – Phase A (Information Acquisition)

Citation	Journal	Object of the study	Key findings	Theme
(Dalla Via et al., 2019)	AOS	Examine how accountability type affects information search and decision quality and how accountability type interacts with BSC presentation format	• Under outcome accountability, providing a causal chain is paramount to achieve high decision quality. • When process accountability is employed, providing a causal chain reduces information search effort and does not improve decision-making. • Causal chain representation focuses attention on decision-relevant cues, reducing the need for extensive search efforts.	Information collection
(Rose & Wolfe, 2000)	AOS	How the location of explanations in a computerized decision-aid affects learning from its use.	• Results show that when explanations are integrated into its problem-solving steps, cognitive load is reduced, and users acquire more knowledge from aid use.	Information collection
(Ackert et al., 2018)	AOS	Has the nature of the information environment, impoverished versus enriched, an effect on traders' ability to properly assess the expected benefits of acquiring private information?	• In impoverished information environments, informed traders' performance is inferior to that of uninformed traders. • Results show that when the environment is impoverished, informed traders misjudge their ability to exploit an informational advantage and overspend to acquire private information.	Information collection
(Long & Basoglu, 2016)	AOS	Does task interruption compromise the processing of information, leading to reduced quality of professional judgments?	• Task interruption exacerbates tax professionals' motivated reasoning, which leads to overconfidence in the defensibility and support for an aggressive tax compliance position. • Absent goal commitment, task interruption also inhibits performance on the task that is being interrupted.	Contextual features affect information processing
(Jermias, 2001)	AOS	How commitment to a cost system affects the incorporation of feedback about the usefulness of costing systems and people's resistance to changing the cost system.	• Commitment to a favored cost system induces motivated reasoning whereby people only assess a subset of their knowledge to support their desired conclusion. • Commitment also leads to a tendency to disregard negative feedback.	Motivation and information processing
(C. X. Chen et al., 2015)	AOS	Examine how the preparation of disaggregated forecasts interacts with performance-based incentives to influence the accuracy and optimism of forecasts	• Preparing aggregated versus disaggregated forecasts leads to greater improvements in accuracy in the absence of a performance incentive. • When performance incentives are present, disaggregate reporting induces a forecast optimism due to motivated reasoning (despite having incentives for accuracy).	Format and information processing
(Bradley, 2009)	BRIA	Can inductive reasoning-abilities substitute for professional experience?	• Inexperienced participants with high inductive reasoning abilities perform on a similar level to experienced participants on an ill-structured case. • Experienced participants perform better given low-inductive reasoning abilities.	Experience affects information processing
(Victoravich, 2010)	BRIA	Examine decision-makers' ability to identify relevant information in the presence of situational factors that may negate attention to this information	• Finds that opportunity-cost vagueness and completion-stage of projects affect tendencies to discount opportunity costs • Management accounting experience negates the effect of these factors.	Experience affects information processing
(Ang & Trotman, 2015)	BRIA	Does the quantification of information result in increased information sharing and use in a group setting?	• Quantitative information is used and shared more than qualitative information – both before group interaction and during group discussions. • Groups tend to prefer common to unique information, regardless of whether it is quantitative or qualitative.	Information sharing (reliability)

(Tang et al., 2014)	BRIA	How do visualization and interactivity affect information processing?	• Visualization and interactivity features increase overconfidence. • When both interface features are present, visualization increases confidence while also increasing accuracy.	Formatting affects information processing
(Krishnan et al., 2002)	CAR	How changes in competition affect the collection of cost data	• Subjects collect the most cost data in monopoly, least in a duopoly, and an intermediate amount in the four-firm market. • Monopolists who face their first competitors tend to overreact by overspending on cost data.	Information collection
(Kadous & Sedor, 2004)	CAR	How effective third-party consultants are at preventing managerial escalation of commitment	• Consultants are only effective when explicitly assigned to that purpose. • Expending additional effort likely will not improve consultants efficiency because of inappropriate mental representations.	Information processing
(Farrell et al., 2007)	CAR	Are managers' financial performance influenced by using profit rather than cost as non-linear predictors of performance?	• The use of profit rather than cost as the performance measure reduced the accuracy of individuals' judgement. • The underlying mechanism is that individuals use causal mental representations which are more direct for the cost-driver than for the profit-driver relations.	Individual traits and information processing
(Hales, 2007)	JAR	Do investors' preferences influence how information is processed and affect expectations of future earnings performance?	• Directional preferences affect how information is processed. • Investors tend to agree with information that suggests they might make money on their investment but disagree with information that suggests they might lose money.	Motivation and information processing
(Libby & Rennekamp, 2012)	JAR	How does overconfidence explain managers' willingness to issue earnings forecasts?	• Higher confidence in improved future performance is linked with the willingness to issue forecasts. • Stable psychological traits that are associated with overconfidence is predictive of willingness to issue forecasts.	Individual traits and information processing
(Dearman & Shields, 2001)	JMAR	How does performance depend on managers' cost-knowledge when a volume-based cost system is used on products that are not homogenous?	• Higher ABC knowledge is associated with greater ability to debias volume-based cost information, leading to better judgment performance.	Experience affects information processing
(Jermias, 2006)	MAR	Examine how commitment to a cost allocation system leads to biased information search in favor of the chosen cost system	• Commitment leads to increased desirability and overconfidence in the preferred system, which leads to high resistance to changing it. • Making managers accountable for the negative consequences of their decisions mitigates these effects.	Motivation and information processing
(Magro, 2005)	TAR	Examine the relations between institutional knowledge, information search adaptivity, and performance	• Relevant institutional knowledge enables people to adapt their information search to relevant changes in the decision context. • Performance increased with information search adaptivity, and adaptivity mediates the relation between institutional knowledge and performance.	Experience affects information collection and processing
(Cardinaels & Labro, 2008)	TAR	Examine systematic human-measurement errors in TDABC time-estimates	• Increased aggregation in the definition of activities leads to lower measurement error. • Ex-ante notification reduces measurement error compared to ex-post, especially in settings with aggregated activities or incoherent tasks. • Strong overestimation bias time estimates are provided in minutes versus the percentage of time spent on tasks.	Formatting affects information processing
(Tayler, 2010)	TAR	Does framing the scorecard as a causal chain rather than a balanced set of measures mitigates the effects of motivated reasoning when involved in implementing the scorecard?	• Managers who are involved in selecting strategic initiatives perceive those initiatives as having been more successful than managers who are not involved in the initiative-selection process. • Only when the scorecard is framed as a causal chain, in conjunction with involving managers in the selection of scorecard measures, are the effects mitigated.	Formatting affects information processing
(Vera-Muñoz et al., 2001)	TAR	How do different types of expertise influence appropriate problem	• When given an inappropriate task format, participants are less likely to choose an appropriate problem representation.	Experience affects

		representation and the acquisition of relevant information?	• Management vs. public accounting experience helps to mitigate inappropriate problem representation. • More management experience is associated with better acquisition of relevant knowledge/information only if choosing an appropriate problem representation.	information processing
(Bloomfield & Luft, 2006)	TAR	Does responsibility for cost management hinder learning from market feedback in an auction setting?	• Being responsible for choosing a cost management system decreases learning form market feedback. • Responsibility decreases decision performance because learning is inhibited.	Motivation and information processing

List B: Aligned Interests – Phase A → B (Communication)

Citation	Journal	Object of the study	Key findings	Theme
(Beattie & Jones, 2002)	ABACUS	Investigate the impact of graph slope on rate how people process information in corporate reports	• Suboptimal slope parameters produce distorted judgments of corporate performance.	Formatting affects how information is received
(So & Smith, 2004)	AF	Examine the interactive influence of presentation format and information complexity on multivariate decision accuracy	• When information complexity is low, the presentation format has no impact on accuracy. • When information complexity is high, the tabular-alone format shows the highest accuracy. • The advantages of graphical and pictorial formats reported in earlier studies are not supported.	Formatting affects how information is received
(Stoel et al., 2017)	AH	Do receivers of risk reports care whether the format is quantitative or qualitative?	• In the strategic risk setting, the choice of format is directly associated with the risk information's perceived reliability and perceived relevance. • Receivers favor qualitative information for strategic risks. • Receivers accept quantitative operational risk measures but are skeptical about quantitative measures for complex strategic risks.	Formatting affects how information is received
(Cardinaels, 2008)	AOS	Does presentation format affect cost-based decision-making, and is this conditional on the level of cost accounting knowledge?	• Decision-makers with a low level of cost accounting knowledge attain higher profits when using a graphical format compared to a tabular format. • Graphs (versus tables) have an adverse effect on profits for users with a high level of cost knowledge.	Formatting affects how information is received
(Cheng et al., 2018)	AOS	Investigate whether integrating strategic risk information in a BSC affects managers' responses to different strategic risk profiles	• When risks are integrated, managers make less favorable strategy evaluations and recommendations with high-performance driver risks. • No overall difference between a stand-alone approach and an integrated approach	Formatting affects how information is received
(Arunachalam & Beck, 2002)	AOS	Evaluates the presence of functional fixation when varying the level of feedback and what period (and order) the accounting change happened	• The period of the accounting change and feedback do not significantly affect accounting fixation. • Feedback is differentially effective depending on the period in which the accounting change occurred.	Formatting affects how information is received
(Jackson et al., 2010)	AOS	Examine whether straight-line depreciation, relative to accelerated depreciation, influences selling prices that managers seek to obtain when they dispose of used capital assets	• Managers sell used capital assets that have been depreciated using accelerated depreciation for lower prices than identical used capital assets that have been depreciated using straight-line depreciation. • This effect even endures in the presence of fair value information about the asset being sold. • The effect is robust with respect to context, methodologies, and participant groups.	Formatting affects how information is received
(Thornock, 2016)	AOS	Study the effect of performance feedback timing on future performance	• Feedback is given after no delay adversely affects future performance relative to when feedback is given after a short delay. • Finds support for an inverted-U relation between the delay of performance feedback and future performance.	Timing of information (feedback) affects how information is received

(Buchheit, 2003)	AOS	Examine how reporting unused capacity affects decision-makers' resource planning decisions	• Decision-makers tend to reduce capacity costs in times with low demand but fail to realize the opportunity costs in times with high demand when capacity costs are reported.	Formatting affects how information is received
(Foong et al., 2003)	BAR	Examine whether disclosing confidence intervals (CI) affect performance in an investment choice task	• CI information transforms a seemingly complex decision task into one that is less complex. • When a decision task is made more structured by disclosing CI information, it is perceived as intrinsically less rewarding, and performance deteriorates. • The drop in intrinsic motivation is offset by providing financial incentives	Formatting affects how information is received.
(Duxbury, 2012)	BAR	Examine whether framing an initial investment produces a sunk cost or benefit project continuation decisions.	• Sunk outcomes do not affect decisions when evaluating good investments but only when evaluating poor investments. • When evaluating poor investments, participants are less likely to authorize additional funds in the presence of a sunk cost versus a sunk benefit.	Accounting effects changes how users perceive information
(Viator et al., 2014)	BRIA	Investigate whether reflective cognitive capacity measures can differentiate which participants are more or less likely to benefit from feedback intervention.	• Reflective cognitive capacity scores reasonably partitioned participants into two groups: those that were more likely, versus those that were less likely, to benefit from feedback intervention.	Individual differences in receiving information
(Dilla & Steinbart, 2005)	BRIA	Examine whether the common measures bias exists among participants with experience and training in designing balanced scorecards	• Decision-makers who are knowledgeable about the BSC attended to both common and unique measures but placed greater emphasis on common measures.	Experience affects how information is received
(Dearman & Shields, 2005)	CAR	Does avoiding accounting fixation depend on certain individual characteristics and intrinsic motivation to appropriately engage in the decision task?	• Participants who did adapt to the change in accounting method and thus avoided accounting fixation did so by debiasing costs reported by volume-based costing but not by ABC. • Adapters exhibited high values of i) accounting knowledge, ii) general problem-solving abilities, and iii) intrinsic motivation compared to non-adapters.	Accounting effects affect how users perceive information
(Kelly, 2010)	CAR	Investigate how the accuracy of relative weights on multiple leading performance measures affect how managers evaluate information	• Inaccurate relative weights are better than either no weights or accurate relative weights when weights are not rewarded. • Finds that inconsistent information stimulates more detailed information processing than neutral or consistent information.	Design of BSC affects how information is received
(Buchheit, 2004)	CAR	Investigate how fixed cost magnitude and fixed cost reporting format affect competitive pricing behavior in a capacity-constrained, duopolistic setting	• Fixed cost reporting format increasingly influences competitive prices. • After repeated exposure to accounting feedback, participants receiving capacity costing feedback reports established lower selling prices relative to the prices established by participants receiving contribution margin feedback reports.	Formatting affects how information is received
(Kelly, 2007)	CAR	Investigate whether providing feedback on non-financial measures leads to better managerial decisions	• Managers perform better only when non-financial measures are rewarded in firms with heavier investments in intangible assets. • When non-financial measures are not rewarded, feedback on non-financial measures does not influence performance in any case.	Contextual features affect how information is received
(Bartlett et al., 2014)	EAR	Examine whether fixation on financial measures is mitigated when managers are provided with an explicit strategy implementation timeline in strategy maps	• The implementation timeline is effective in helping evaluators overcome fixation on lagged financial performance measures. • The implementation timeline aid evaluators in decomposing large, complex, and multidimensional judgments into simpler components.	Design of BSC affects how information is received

(Choi et al., 2013)	JAR	Investigate how involvement in strategy selection affects managers' propensity to exhibit surrogation	• Strategy selection reduces surrogation while engaging in strategy deliberation does not reduce surrogation. • Managers' involvement in the actual choice of strategy appears to be both a necessary and sufficient condition to mitigate surrogation.	Design of BSC affects how information is received
(W. Chen et al., 2013)	JAR	Examine how fair value accounting information affect managers' real economic decisions	• Providing fair-value impact-information leads to suboptimal decisions compared to providing economic impact information, or when both the economic and historical accounting impact information is presented. • Sequential (separate) presentation of information mitigates managers' concerns over financial statement volatility.	Design of BSC affects how information is received
(Casas-Arce et al., 2017)	JAR	Studies the aspects of feedback information provided to professionals working for an insurance repair company	• Frequent feedback, regardless of how detailed it is, does not lead to better performance compared to those who receive infrequent feedback with aggregated information. • Infrequent and detailed feedback produces the best outcomes among the professionals.	Timing of information (feedback) affects how information is received
(Humphreys & Trotman, 2011)	JMAR	Investigate the role of strategy information and strategically linked performance measures in eliminating the common measures bias	• The common measures bias is eliminated only when all performance measures are linked to divisional strategy, and strategy information is provided.	Design of BSC affects how information is received
(Johnson et al., 2014)	JMAR	Does providing a timeline for strategy implementation reduce the reliance on non-strategic performance metrics in BSC performance judgments?	• The absence of timeline guidance in strategy implementation resulted in evaluators ignoring the subordinate's inability to influence lagging measures outside of the relevant time period for evaluation. • The provision of timeline information is associated with reduced financial fixation in a BSC context.	Design of BSC affects how information is received
(Aranda & Arellano, 2010)	JMAR	Study which scorecard approach is more successful at communicating strategy and generating consensus on strategy among managers in a field setting	• A hierarchal structure of linked measures is better at communicating strategy effectively to managers. • The dispersion in managers' interpretation of the strategy generated by lacking a linked structure is greater than the tension created by confronting managers' views with the disclosed link structure.	Design of BSC affects how information is received
(Luft & Shields, 2001)	TAR	Does expensing versus capitalizing intangibles expenditures result in fixation even when individuals have opportunities to learn?	• Prediction accuracy, consistency, consensus, and self-insight are lower when intangibles are expensed. • Learning does not mitigate fixation on accounting because accounting affects the learning process itself.	Accounting effects affect how users perceive information
(Mastilak, 2011)	TAR	How the classification of costs into cost pools affects the accuracy of understanding of relations among costs	• Location of relations within and across cost pools affects individuals who make predictions based on relations among the costs. • Attention is directed toward within-pool relations and away from pool relations and influencing the predictions' accuracy.	Formatting affects how information is received
(Loftus, S. & Tanlu, 2018)	TAR	Examines how the use of causal language in conveying relative performance feedback impacts subsequent task performance.	• The use of causal language affects how feedback is perceived depending on whether the initial performance was high or low. • If initial performance is low, the use of causal language leads to a greater improvement in subsequent performance. • If initial performance is high, the use of causal language results in less performance improvement than descriptive language.	Formatting affects how information is received
(Choi et al., 2012)	TAR	Whether and how strategically linked performance measures for compensation purposes affect managers' propensity to exhibit surrogation	• Participants compensated on a single measure of a strategic construct are more likely to exhibit strategy surrogation than participants who received a fixed wage. • Participants compensated on multiple measures of a strategic construct are less likely to exhibit surrogation than participants compensated on a single measure of a strategic construct.	Design of BSC affects how information is received

(Bentley, 2019)	TAR	Examine whether narrative reporting vs. note-taking affects operational distortion and surrogation.	• Narrative reporting reduces surrogation and prompts a more holistic view of the decision situation. • Narration reporting requirement makes participants focus on the unmeasured aspects of performance in addition to the measured aspects of performance.	Formatting affects how information is received
(Cheng & Humphreys, 2012)	TAR	Examine the effects of scorecard causal linkages and categorization have on managers' judgments of information relevance	• A strategy map structure (as opposed to a randomly ordered list without a strategy map structure) enhances managers' ability to interpret the strategic relevance of external information and assess the implications of this external information on the appropriateness of their strategy.	Design of BSC affects how information is received
(Banker et al., 2004)	TAR	Examine the impact that explicit and detailed strategy information has on the use of strategically linked performance measures in conjunction with common and unique measures	• Managers who have detailed strategy information will rely more on strategically linked performance measures and less on non-linked measures than those with less knowledge of business unit strategy. • When managers have detailed strategy information, they will rely more on strategically linked measures, even if they are unique than on non-linked measures that are common.	Design of BSC affects how information is received
(Jackson, 2008)	TAR	Examine whether straight-line depreciation, relative to accelerated depreciation, causes non-executive managers to make suboptimal capital investment decisions	• Straight-line depreciation affects managers' asset replacement decisions. • Managers perceive that an asset depreciated using straight-line depreciation has provided less retrospective utility than an asset depreciated using accelerated depreciation.	Accounting effects affect how users perceive information
(Lipe & Salterio, 2000)	TAR	Examine how including measures common to multiple units and other measures that are unique to a particular unit affect superiors' evaluations of that unit's performance	• Evaluations are based only on BSC measures that are common across different business units. • Measures that are unique to individual business units are ignored (i.e., common measures bias).	BSC design affects how information is received
(Humphreys et al., 2016)	TAR	Does presenting causal linkages between strategic objectives and time delay information in a strategy map enhance managers' decision performance?	• Presenting strategic objectives with causal linkages - with or without time delays – improve performance compared to no causal linkages. • Time delays do not affect overall performance, but managers provided with the delay information demonstrate greater learning over time.	Design of BSC affects how information is received
(Seybert, 2010)	TAR	Examine whether the capitalization of R&D expenditures can lead to overinvestment in continuing projects	• Capitalized expenditures lead to more further investments in suboptimal projects when managers are responsible for initiating the project. • Reputation concerns drive overinvestment, and experienced executives anticipate this behavior.	Accounting effects affect how users perceive information
(Rennekamp et al., 2015)	TAR	Investigate how the reversibility of asset impairments affects managers' investment decisions	• Managers responsible for recording asset impairments invest more in the impaired division when accounting effects are reversible compared to irreversible. • Managers not responsible - or given the opportunity to deny responsibility - do not differ in their investment decisions with respect to impairment reversibility.	Accounting effects affect how users perceive information

List C: Aligned Interests – Phase B (Usage of Information)

Citation	Journal	Object of the study	Key findings	Theme
(Cardinaels et al., 2004a)	ABACUS	Examine the impact of customer profitability reports on resource allocation decisions in marketing environments varying in complexity	• Reports only improve decisions in highly complex marketing settings. • In simple marketing settings, decisions makers provided with volume-based cost information perform as well as those with a more accurate customer profitability report.	Value of more accurate information

(Moriarity, 2005)	ABACUS	Explore the value of having more accurate costing information in a competitive market	• The value of more accurate information comes from the advantage it provides over disadvantaged competitors.	Value of accurate information
(Van den Abbeele et al., 2009)	AOS	Study whether bargaining power prevents buyers from sharing private cost information and whether this results in less effective negotiation outcomes between buyers and suppliers	• Less powerful buyers can compensate for their power disadvantage by acquiring more detailed total cost of ownership (TCO) information. • Powerful buyers seem unable to use TCO information to exploit their power advantage. • Less powerful buyers use TCO information in problem-solving techniques more frequently than powerful buyers, who tend to rely on distributive bargaining techniques instead.	Value of more accurate information
(Sawers, 2005)	CAR	Investigate whether decision aids can reduce choice avoidance	• Choice avoidance among experienced managers increases with choice difficulty. • Using a decision aid mitigates choice avoidance.	Value of information
(Luft et al., 2016)	CAR	Examine the value of additional information (non-accounting) information in subjective performance evaluation	• Profit plus additional (e.g., nonfinancial or external) information leads to more coordination failures in management decisions, and subordinates are more often negatively surprised about their performance evaluations.	Value of additional non-accounting information
(Li & Sandino, 2018)	JAR	Examine in an information-sharing system that records if employees' creative work affects the quality of creative work, job engagement, and financial performance	• Field results show no significant effect on any of the outcomes. • Stores that accessed the information system more frequently in stores improved the quality of creative work. • Creative work and job engagement were improved in stores where customers needed more customization.	Value of information
(Cardinaels et al., 2008)	JAR	Examines how private cost reports of differing accuracy (quality) affect outcomes in markets with different overhead costs	• When only leaders are given high-quality cost reports, private cost information of higher quality is better incorporated into market prices because followers infer information from leaders' prices. • If followers are given high-quality cost reports, cost information is concealed, and followers can take advantage of leaders with low-quality cost reports.	Value of more accurate information
(Cardinaels et al., 2004b)	JMAR	Examine whether informative markets make cost-system choice redundant for price-setting	• In informative markets where biased cost allocations produce accounting losses that hinder learning from superior competitors, providing ABC improves price-setting decisions compared to volume-based costing. • In less informative markets, ABC still outperforms traditional costing, presumably because it helps filter irrelevant competitor feedback from the decision process.	Value of more accurate information
(Haka et al., 2000)	JMAR	Investigate the role of accounting systems in bilateral bargaining setting	• Accounting information reduces uncertainty about payoffs in bargaining situations, which leads to more efficient bargaining and reduces premium paid to the bargainer bearing second-order risks.	Value of more accurate information
(Davis & Albright, 2004)	MAR	Examine whether financial performance improved after implementing BSC	• Financial performance was improved among branches that implemented BSC (field setting).	Value of additional information (BSC)
(Essa et al., 2018)	MAR	Examine whether refined accounting information enhances negotiation processes and outcomes	• When both negotiators face payoff uncertainty, this evokes a reduction of cooperative behavior, resulting in a lower joint profit. • The presence of TCO information mitigates the negative effect of payoff uncertainty on behavior and joint outcomes.	Value of accurate information
(Miller & Drake, 2016)	MAR	Studies the role of information asymmetry in hold-up problems	• Aggregating the seller's cost information encourages the seller to make a relation-specific cooperative investment.	Value of accurate information
(Masschelein et al., 2012)	TAR	Examine the effect of more precise cost information on contract renegotiations between supply-chain	• Precise cost information improves the joint profit independent of supply chain inefficiency. • Only when buyers cause the inefficiency does more precise information positively impact sellers' perceptions of the fairness of the buyers' argument and, in turn, on the buyer's profit.	Value of accurate information

(Drake & Haka, 2008)	TAR	Examine whether fine information systems can exacerbate hold-up problems	• Negotiating pairs achieve significantly higher trade efficiencies when sharing detailed compared to coarse cost information. • Fewer negotiating pairs share fine compared to coarse information due to strategic and fairness concerns.	Value of accurate information

List D: Misaligned Interests – Phase A (Information Acquisition)

Citation	Journal	Object of the study	Key findings	Theme
(Church et al., 2014)	CAR	Examine whether having discretion over information collection affects opportunistic reporting	• Discretion does not affect the overall level of opportunistic reporting. • Only participants who are moderately concerned about honesty are affected by having the opportunity to avoid collecting information before reporting.	Information collection under conflict of interest

List E: Misaligned Interests – Phase A → B (Communication)

Citation	Journal	Object of the study	Key findings	Theme
(Douthit & Majerczyk, 2019)	AOS	Investigate the effect of role legitimacy on subordinate misreporting choices	• Misreporting is lower when subordinates perceive superiors to be legitimate versus illegitimate in their roles. • Role legitimacy decreases misreporting relative to random (neutral) perceptions. • Role illegitimacy does not affect misreporting compared to random role allocation.	Contextual features affect reporting decisions
(Church et al., 2019)	AOS	Investigate how managerial misreporting is influenced by the measurement basis used in reports and whether slack benefits come directly or through an intermediate activity	• A non-financial measurement basis increases the level of honesty relative to a financial measurement basis only when slack benefits are direct. • When slack benefits are indirect, the measurement basis does not affect the level of honesty.	Formatting affects reporting decisions
(Cardinaels, 2016)	AOS	Investigate whether a company's earnings situation affect misreporting	• Misreporting is less pronounced if the choice determines whether the firm earns a gain or loss. • Earnings situation only matters for misreporting in the absence of formal controls to induce truthful reporting.	Contextual features affect reporting decisions
(Murphy, 2012)	AOS	Explore how individual attitudes and process of rationalization affect misreporting	• Participants whose attitude favors misreporting and individuals who are higher in Machiavellianism are both more likely to misreport. • Misreporting evokes negative emotions, but high-Machiavellian participants feel less guilt than others who misreport. • Thinking of rationalizations before the reporting decision significantly reduces misreporting, but those who still misreport rationalize their decisions to an even greater extent.	Individual factors affect reporting decisions
(Brown et al., 2014)	AOS	Study how budget reporting decisions are affected by subordinate rankings that do not affect remuneration	• Rankings based on firm profit significantly increase honesty. • Rankings based on participants' own compensation significantly decrease honesty. • Participants who received both rankings focused more on the firm profit metric than on their own compensation metric.	Contextual features affect reporting decisions
(S. E. Kaplan et al., 2015)	BRIA	Examine whether characteristics of the firm, the report recipient, and the type of wrongdoing influence internal whistleblowing	• Managerial likeability and the type of fraud influence participants' reporting intentions. • Managerial procedural safeguards nor the interaction with managerial likeability affect reporting intentions.	Contextual features affect reporting decisions
(S. E. Kaplan et al., 2010)	BRIA	Examine whether unsuccessful social confrontation with one's supervisor regarding fraud influences reporting intentions to the supervisor's	• With unsuccessful social confrontation, reporting intentions to the supervisor's supervisor are stronger than to an internal auditor. • Without confrontation, reporting intentions to the supervisor's supervisor are not stronger than to an internal auditor.	Contextual features affect reporting decisions

		supervisor and an internal auditor	• Employees experiencing unsuccessful social confrontation may be more likely to seek out powerful internal report recipients.	
(Nikias et al., 2010)	BRIA	Investigate the behavioral effects of aggregation and timing on misreporting	• Misreporting decreases with disaggregated budgeting than for aggregated budgeting. • Misreporting is lower for step-wise budgeting (sequential) than for aggregated budgeting (all costs at once) and delayed budgeting (sequential but know all costs).	Formatting affects reporting decisions
(Hobson et al., 2011)	BRIA	Investigate the role of moral concerns regarding misreporting to create budgetary slack	• Under a slack-inducing pay scheme, significant budgetary slack is considered to be unethical, whereas participants who set budgets under a truth-inducing pay scheme did not. • Those high in traditional values and empathy on a pre-experiment personality questionnaire are more likely to judge significant budgetary slack to be unethical.	Individual factors affect reporting decisions
(Guo et al., 2017)	CAR	Examine how vertical pay dispersion affects misreporting	• High vertical pay dispersion leads to higher levels of misreporting than low vertical pay dispersion.	Contextual features affect reporting decisions
(Kida et al., 2001)	CAR	Examine whether affective reactions can influence managers' capital-budgeting decisions	• Affective reactions impact managers' capital budgeting decisions. • Managers tend to reject alternatives that elicited negative emotional responses, even though these alternatives had higher expected values.	Affective reactions affect how information is received
(Matuszewski, 2010)	JMAR	Investigate whether changes in salary that affect the horizontal equity of salary affect misreporting	• Honesty increases when horizontal equity comes from a pay increase for the subordinate. • Honesty decreases when horizontal equity comes from a peer salary decrease.	Contextual features affect reporting decisions
(Davidson, 2019)	JMAR	Examine the role of reciprocity, self-awareness, and social value orientation on managerial misreporting	• Pro-socials report more honestly when they are required to sign the budget report or when they are endogenously hired. • Pro-selfs report more honestly only when they are endogenously hired, and they are required to sign the budget report.	Contextual features affect reporting decisions
(Schwartz et al., 2012)	JMAR	What is the effect of aggregated budget proposals on slack when superiors cannot commit to an acceptance policy?	• The aggregation of budget proposals increases the frequency of mutually beneficial budget approval.	Formatting choices affect reporting decisions
(Blay et al., 2018)	MAR	Examine whether preferences for honesty originate from an individual's desire to avoid negative affect from violating social norms	• Misreporting is associated with the intensity with which they experience negative affective reactions. • A higher level of this intensity is predictive of misreporting.	Individual differences affect misreporting
(Cannon & Thornock, 2019)	MAR	Investigate whether peer environments, without knowledge of peer actions, can subtly affect misreporting	• Managers facing a similar decision environment to a peer manager misreport more than managers facing a different decision environment. • Managers predict peers to report as they would, given similar environmental circumstances.	Contextual features affect reporting decisions
(Fehrenbacher et al., 2020)	MAR	Does affective reaction to a proposing manager influence supervisors' capital investment decisions?	• Superiors are more likely to select the economically non-preferred project when proposed by a manager triggering a positive affective reaction. • The tendency is mitigated when supervisors are held accountable for the decision. • Accountability did not mitigate the tendency to not invest in an economically preferred project from a manager triggering a negative affective reaction.	Affective reactions affect how information is received
(Zhang, 2008)	TAR	Examine whether whistleblowing and collusion depend on perceptions of the superior's fairness and communication with peers	• If there is a high reward for whistleblowing, perceived superior fairness positively affects subordinate reporting honesty and negatively affects explicit collusion attempts. • Communication between agents increased misreporting when they received a low wage, but not when they receive a high wage.	Contextual features affect reporting decisions

(Majors, 2016)	TAR	Study whether and how mandating range disclosures for uncertain estimates influence managers' reporting decisions	• Managers' report less aggressively when ranges are disclosed. • Range disclosures have the greatest effect on managers with stronger levels of psychopathy, narcissism, or Machiavellianism (''the Dark Triad'' of personality in psychology).	Contextual and individual factors affect reporting decisions
(Evans et al., 2001)	TAR	Investigate preferences for honesty and whether the level of honesty depends on the size of monetary incentives	• The level of honesty is higher than predicted by traditional agency models. • The level of honesty is insensitive to incentive size. • A modified version of the optimal agency contract, which makes use of preferences for honesty, yields the highest firm profit.	Individual features affect reporting decisions
(Rankin et al., 2008)	TAR	Examine whether requiring a factual assertion affect misreporting and the effect of superior rejection authority	• Requiring a factual assertion significantly reduced misreporting only when superiors do not have the authority to reject budgets. • Rejection authority of superiors increases honesty in reporting.	Formatting choices affect reporting decisions
(Douthit & Stevens, 2015)	TAR	Study the robustness of the findings of Rankin et al. (2008)	• Honesty concerns (factual assertion vs. no factual assertion) matter despite giving the superior rejection authority. • Honesty affects misreporting when withholding the relative pay of the superior from the subordinate. • Honesty continues to affect misreporting, despite giving the superior the ability to set the subordinate's salary.	Formatting choices affect reporting decisions

List E: Misaligned Interests – Phase B (Usage of Information)

Citation	**Journal**	**Object of the study**	**Key findings**	**Theme**
(Brüggen & Luft, 2016)*	TAR	Examine how changing versus continuing superiors affect project continuation decisions and cost overruns	• Changing superiors reduces escalation tendencies as new superiors react skeptically to continuation proposals when first-period cost overruns have occurred. • Changing superiors leads to greater initial understatements as subordinates anticipate that new superiors will be more critical of their projects. • New superiors are less sensitive to additional reported second-period profit, prompting subordinates to understate costs more.	Superior reactions to cost estimates in a project selection setting
(Rankin et al., 2008)**	TAR	Study how superiors react to budget proposals by subordinates with diverging interests	• Superiors reject about 1/3 of funding proposals because of suspicion of misreporting – even though superiors have incentives to accept proposals.	Superior reactions to cost estimates in capital budgeting

* This paper is primarily concerned with the subordinates' reporting decisions. We include it here because it touches upon how superiors react to subordinates' information with potentially misaligned interests.
** Though this paper is in List D, the findings presented here are concerned with superior rejection decisions.