KU LEUVEN

FACULTY OF ECONOMICS AND BUSINESS

KNOWLEDGE SHARING
A MANAGEMENT CONTROL PERSPECTIVE

Dissertation presented
to obtain the
degree of Doctor in
Business Economics

by

Katlijn Haesebrouck

Number 527 2016

Daar de proefschriften in de reeks van de Faculteit Economische en Toegepaste Economische Wetenschappen het persoonlijk werk zijn van hun auteurs, zijn alleen deze laatsten daarvoor verantwoordelijk.

Doctoral Committee

Advisors

Prof. dr. Alexandra Van den Abbeele	KU Leuven	advisor
Prof. dr. Martine Cools	KU Leuven	co-advisor

Members

Prof. dr. Jasmijn Bol	Tulane University
Prof. dr. Eddy Cardinaels	KU Leuven – Tilburg University
Prof. dr. Luk Warlop	KU Leuven – Norwegian Business School
Prof. dr. Michael Williamson	University of Illinois at Urbana-Champaign

Chairperson

Prof. dr. Kristien Smedts	KU Leuven

Acknowledgments

During my last Bachelor year, I got interested in pursuing an academic career. In order to make a carefully considered choice, I applied for a summer internship at the AFI-department of KU Leuven, which provided me with my first research experience. After the internship, I was asked whether I would consider starting a PhD and I said... "no". Although I am usually not an inconsistent person, this time, I did change my mind and I could not be happier with this turnaround. I never again doubted my decision to start a PhD and I never thought about quitting. For a large part, this is due to the people who believed in me, encouraged me, and brought some fun into my life the past years.

Two of those people are my supervisors. Alexandra and Martine, thank you for all the opportunities you gave me. You let me start a PhD, even though I first said I didn't want to pursue one (I still don't know what got into me at that time). You stimulated me to take part in courses and conferences, write articles and submit funding proposals and your enthusiasm in all of that was really contagious. You gave me advice and feedback, allowed me to go on several research visits and trusted me in doing my job there. I got more than every chance to develop my skills and career and for that I'm truly grateful.

I would also like to express my gratitude to my committee members: Luk, Eddy, Jasmijn and Michael. I feel honored you agreed to be part of my PhD committee. I know how busy you all are and yet you made a big effort in providing me helpful feedback and coming all the way to Leuven to be present at my defense. Luk, my papers definitely benefited from your marketing background. You always had inspiring ideas and constructive suggestions. Thank you for your enthusiasm. Eddy, I wish there had been more overlap in our Leuven-time, but even the few weeks we were there together were enough for me to realize you are a true enrichment for the AFI-group. You were always available when I asked for advice, made time for chitchat and even offered to read my paper again right before my last job seminar, which removed some of my stress. Thank you for being such a great person. Jasmijn, you treated me like a family member when I was in New Orleans. I really enjoyed our tea- and wine-evenings, your home-cooked meals and the adventures we undertook with Sofia. Thank you for your

hospitality! I think my life bears some resemblances to yours when you had my age. I hope I can still say the same ten years from now. Michael, thank you for all the knowledge you shared with me, both research and non-research related. You taught me how to write and present papers and how to answer tough questions. You expanded my vocabulary (in good and bad ways), showed me around in Austin and helped me complete my overly clichéd "things I should do in Texas" list. You wished me good luck before every presentation and never forgot to ask how it went afterwards. You supported me in every step I took and made me believe that the world is my oyster. I will always remember that.

Some people who definitely brought some fun into the past years are my colleagues. We did a lot of crazy-fun activities together, like a weekend trip in de Ardennes, brewery visits, a legendary wine tasting and tapas night, a unicolor day and a mustachio competition (for the record, I was a jury member in that last one, not a contender). I retain good memories of all these moments. Nevertheless, I could also bother you with work-related issues, since you were always willing to participate in the pre-tests of my experiments for example (or should I say "spellekes", Matthias S.). Anastasios, Ann-Florence, Aurélie, Ben, Elisabeth, Els, Ines, Jeroen, Karen II, Lisa, Lore, Matthias S., Nima, Randy, Rianne, Robin, Roel, Sander VK, Sanja, Stephan, Tim, Ward, Weidong, Wouter C. and Wouter V., thank you for being such a pleasant group of people!

A few colleagues deserve special mention. Liesbeth Bruynseels, thank you for acting like a friend rather than a superior. Bart and Stijn, I could count on your advice numerous times. Thank you for being so collegial even though we were never really colleagues. Kathleen, Nathalie and Sofie, I have to confess to certain nostalgia for the times you were still around. Thank you for being so inspiring to me. Luckily, Karen and Sharon were there to strengthen the female force again after you left. Our trips abroad (some more adventurous than others) were always good fun! Dieter, although you drove me crazy a few times, I hope you know I appreciated your humor, help and companionship many more times. On top of that, you are the best Easter bunny we ever had. I would also like to thank Christophe (for being my cultural buddy on several occasions), Jorden (for being such a positive person), José (for being our Latin-American George Clooney), and Sander DG (for always being ready to help). Also Corneel, Reina, Rosy and Yannick made my days in Leuven more pleasant, with enjoyable lunches and amiable conversations. For valuable help with this booklet, I would like to thank Geoff. Allowing me to shamelessly copy your lay-out is just one example of your generosity.[1] Moreover, your presence always improved the group atmosphere. Thank you for your good company. Mathijs, I am happy we can continue our academic journey together in Maastricht, where you undoubtedly

[1] As I explain in my introduction, well stolen is half done...

will keep taking care of everything that needs to be taken care of, telling not-so-well-checked facts and being awesome. Many thanks as well to the greatest ping-pong loser I ever met: Jorgels. The HOG wasn't the same after you left. I missed your early presence and our long-term bets (and also your cactus jenever). I am also grateful to Tom, my officemate during the first three years. Even though your own workload was overwhelming, you were always supportive of others and willing to step in. You perfectly sensed when I wanted to focus or needed a distracting chat (or guffaw). Although you are hard to reach sometimes, I will never stop spamming you for our Leuven dinners. Evelien, knowing a good friend is out there, facing the same challenges and working equally hard, helped me in frustrating times. I hope we can accomplish our "visit every bar on the old market" goal one day (don't worry people, the aim is not to do all of them in one evening) and that there will be many more happy trips like our Barcelona and Copenhagen visits. Marjan, I wrote this section of my acknowledgements the last, since I found it rather impossible to describe in a few sentences what you meant to me the past years. Thank you for your motivation and enthusiasm, for our daily lync conversations when I was abroad (and also when I was not abroad), for being supportive and patient like a saint, for being on the same wavelength about basically everything in life, for being a friend in need, and above all, a friend indeed.

I also extend a word of thanks to the people I met during my research visits and who made these experiences abroad even more worthwhile: Antonis, Jakob, Sebastian, Stephan, Xinyu and Zheng in Austin, Robert and Serena in New Orleans, and all my friends of the Maastricht family. In addition, I am indebted to the FWO (Fonds Wetenschappelijk Onderzoek – Research Foundation Flanders) for granting me PhD fellowship.

I would like to thank some "normal" people as well. Hanne, Lesley, Silke, Greet, Ine, Matthias, Michaël, Steven, Jessie, Lien, Linde, Karolien, Sarah and Tine; thank you for always being interested in what I was doing (or at least acting like you were). Brunches, lunches and dinners, weekend trips, baby-visits, Christmas parties and New Years' eve Bacchanalia; all those things helped me to put my PhD in the right perspective. Our get-togethers were the infrequent but very welcome moments where I really relaxed and didn't think about work at all. A special note of thanks goes to Niels. A good neighbor is worth more than a distant friend, but having the two nouns combined is the best scenario one could imagine. Our train rides in the beginning and our car rides toward the end –although terribly early– made for a perfect start of the day. Thank you for being my nearby friend.

Last but not least, I would like to thank my family: Annelies, Lies, Marco, Wout, Mom and Dad. Although it must have been hard sometimes to understand what all my fuzz, stress and lack of time was about, you were always there for me. With listening ears, observant eyes and rolled up sleeves, with good luck cards, surprise parties, goodbye- and welcome home gifts, with visits all over the world and holidays that charged my batteries for a while, with the proper questions and the right words, with attention and comfort, with inspiration and a salutary influence, with advice I could always count on, for smaller and bigger things in life. You got my back whenever I needed it and that truly improved this PhD journey in every aspect I can think of.

Katlijn Haesebrouck
Leuven, June 2016

Comments and Conferences

All three chapters in this PhD dissertation benefited from the feedback of my supervisors and committee members: Jasmijn Bol, Eddy Cardinaels, Martine Cools, Alexandra Van den Abbeele, Luk Warlop and Michael Williamson. As indicated below, I also appreciate comments from several other people.

The first chapter is co-authored with Alexandra Van den Abbeele and Michael Williamson. We thank Nicola Dalla Via, Jeremy Douthit, Andreas Ostermaier, Karl Schuhmacher, Bill Tayler, Mathijs Van Peteghem, Laura Wang, and Kimberly Zahller for their helpful suggestions. Also participants at the 9th Conference on New Directions in Management Accounting, 2015 Global Management Accounting Research Symposium, 2015 Management Accounting Section midyear meeting, 2015 Accounting Behavior and Organization conference, as well as workshop participants at KU Leuven, The University of Texas at Austin, The University of Bern, Tilburg University, Maastricht University, and Erasmus University Rotterdam provided useful feedback.

For the second chapter, co-authored with Martine Cools and Alexandra Van den Abbeele, we received helpful suggestions from Leslie Berger, Stijn Masschelein and Matthew Sooy. This chapter also benefited from comments received at the 2012 ENROAC doctoral summer school in management accounting, 2012 Limperg experiments PhD course, 2013 Conference on Performance Measurement and Management Control, 2013 European Accounting Association doctoral colloquium in accounting, 2013 Management Control Research conference and doctoral colloquium, 2014 American Accounting Association annual meeting, 2014 Accounting Behavior and Organization conference, 2014 ACMAR doctoral colloquium, and 2014 Management Accounting Section midyear meeting.

The third chapter is single-authored. I appreciate comments from Markus Arnold, Jeremiah Bentley, John Christensen, Robert Grasser, Lynn Hannan, Serena Loftus and Kyle Stubbs. In addition, I would like to thank participants at the 2015 ENEAR summer school, 2016 Management Accounting Section midyear meeting, 2016 European Accounting Association conference and workshop participants at Tulane University, The University of Amsterdam, The University of Southern Denmark and The University of Southern California for helpful suggestions.

Table of Contents

List of Figures

List of Tables

General Introduction

In this PhD dissertation, I investigate knowledge sharing from a management control perspective. I define knowledge sharing in organizations as individuals sharing organizationally relevant information, ideas, suggestions, and expertise with one another (Bartol and Srivastava 2002), whereas management control includes the mechanisms managers use to ensure that the behavior of employees is in line with the organization's objectives and strategies (Merchant and Van der Stede 2007).

In the first section of this introduction, I describe the general research motivation. The second section provides a short overview of the literature to date studying knowledge sharing from a management control perspective. Third, I present the method used in this dissertation. Finally, I provide an overview of the different chapters and their interdependencies.

Research Motivation

Through their day-to-day experiences, employees often learn important information about their task environment that, if shared, helps others in the organization (Jensen and Meckling 1992; Milgrom and Roberts 1992). For example, production workers can explain to superiors how to design manufacturing processes more efficiently, and employees can share personal experiences in order to improve the job performance of others (Miller and O'leary 1987; Sprinkle and Williamson 2004). Successful firms often crucially depend on this unique knowledge of their employees. Indeed, knowledge is a better source of success than other, "hard" assets , because it cannot be imitated easily by competitors (Grant 1996). As such, the uniqueness of a firm's knowledge plays a fundamental role in its sustained competitive advantage, economic growth and corporate value (Argote and Ingram 2000).

Making sure that such knowledge is actively and accurately shared amongst the key players in the organization is of major concern for firms. The failure to identify and take advantage of existing knowledge may lead to reinventing the wheel, repeating mistakes, wasting resources and the emergence of knowledge gaps when employees leave the organization or change positions within the organization (Huysman and de Wit 2003).

Nevertheless, the transfer of knowledge within organizations is often limited in practice and its effectiveness differs considerably between organizations (Gupta and Govindarajan 2000; Persson 2006). It seems that employees are not always prepared to share their knowledge with others and that –once shared– the knowledge is often not heard and considered by the recipient either (Bunderson and Reagans 2011). While shared knowledge can provide organizational benefits, it generally comes at a personal cost to the sharer. Costs associated with knowledge sharing include the time and effort it consumes, the loss of expert power and the prospect that employers can use shared knowledge to the employees' detriment (e.g., replacing them with more efficient processes or less costly junior employees). These issues indicate a need for management control practices that can encourage knowledge sharing.

As illustrated by numerous quotes and anecdotes, companies are increasingly getting aware of knowledge sharing's importance, but still struggle to properly manage and motivate it.[2] For example, Lew Platt, former CEO of Hewlett-Packard, perfectly realized the consequences of his companies' issues with knowledge sharing when stating: *"If only HP knew what HP knows, we would be three times as profitable"*. As an example of questionable management, Disney laid off dozens of employees last year and refused to pay out a severance bonus unless the dismissed employees trained their cheaper replacements (Preston 2015). This led to heavy protests and a few weeks later, Disney cancelled the layoffs and told employees to consider it as if nothing had happened. Various empirical studies find evidence of the lack of knowledge sharing in practice and the detrimental consequences thereof. A survey of the American research group IDC indicated knowledge workers cannot find the information they need 44% of the time (IDC 2014). In addition, the research group estimated that by not sharing their knowledge, Fortune 500 companies lose at least 31.5 billion dollar a year (Babcock 2004). Finally, several research papers show that knowledge sharing positively influences organizational performance, as reflected by reductions in production costs and sales growth for example (e.g., Baum and Ingram 1998; Cummings 2004; Darr, Argote, and Epple 1995; Hansen 2002; Kim and Yun 2015; Lin 2007b).

According to the literature, many factors can help or hinder the transfer of knowledge, like the nature of the knowledge (e.g., tacit, complex, incomplete), the traits of the individuals involved in the transfer (e.g., their expertise, leadership skills and intrinsic motivation) and the technological support to share knowledge (e.g., Larson, Christensen, Abbott, and Franz 1996; Osterloh and Frey 2000; Ruddy 2000; Turner and Makhija 2006; Zander and Kogut 1995). Recently,

[2] One of the notable exceptions is Texas Instruments. With the underlying thought "well stolen is half done", the company created the NIHBIDIA-Award (Not Invented Here But I Did It Anyway) for borrowing a practice from either inside or outside the company. All collaborators on the exchange of best practice are recognized with this award (O'dell and Grayson 1998).

this domain has gained interest, but it is understudied from a management control perspective. Indeed, although there exists some research investigating the effect of management control systems on knowledge sharing, most of the studies still tend to focus on the characteristics of the knowledge and the units involved in the transfer instead of the organizational choices that foster knowledge transfer. In addition, several studies that look into the effect of management control on knowledge sharing find mixed results. For example, research investigating whether reward systems can stimulate knowledge sharing have found positive (Davenport and Prusak 1998; Kankanhalli, Tan, and Wei 2005), negative (Bock, Zmud, Kim, and Lee 2005), and no effects (Lin 2007a). These inconsistencies led to calls for taking on a more interactional perspective (e.g., Wang and Noe 2010). Indeed, scholars studied the direct relationship between for example the social context and knowledge sharing, and reward systems and knowledge sharing, but this might not be sufficient to understand the underlying processes in practice. Investigating the possibility that the effectiveness of reward systems for motivating knowledge sharing depends on other factors, such as the social context of the interpersonal communication, can provide useful additional insights. On a more fundamental level, researchers have also argued we should examine theories and studies that provide insights in understanding other types of helping behavior, such as organizational citizenship behavior, in order to understand how to motivate knowledge sharing (e.g., Wang and Noe 2010).[3] This dissertation focuses on these issues and as such, it makes a valuable contribution to the literature to date and plays an important role in increasing the effectiveness of knowledge sharing within organizations.

Literature Review

This section provides an overview of the literature studying knowledge sharing from a management control perspective.[4] As explained earlier, management control systems are the mechanisms managers use to ensure that the behavior of employees is in line with the organization's objectives and strategies (Merchant and Van der Stede 2007). These control systems can be divided into three categories: results control, behavioral control and cultural control (Merchant and Van der Stede 2007; Ouchi 1979). I use this classification to structure the overview of the relevant literature.

[3] Organizational citizenship behavior is behavior that exceeds formal job requirements to help the organization (Organ 1990). For example, an employee could help by assisting a co-worker to get his job done by taking over some of his work.

[4] This literature overview is loosely based on Haesebrouck, Cools, and Van den Abbeele (2012), published in Management Accounting & Control.

Results Control and Knowledge sharing

Results control evaluates the result of a task without taking into account how this result was accomplished (Merchant and Van der Stede 2007; Ouchi 1979). An example of results control is a reward for meeting certain production or profit targets. These rewards can be monetary, like a bonus, but also non-monetary, in the form of recognition, job security and autonomy for example.

Although several studies stress the importance of intrinsic motivation (Osterloh and Frey 2000; Vera-Muñoz, Ho, and Chow 2006), there also exists considerable evidence on the importance of extrinsic motivation or rewards to motivate knowledge sharing (e.g., Burgess 2005; Davenport and Prusak 1998; Wolfe and Loraas 2008).[5] Rewards are often deemed necessary to compensate for the costs involved with sharing knowledge, such as the time investment and the loss of power (Persson 2006). Monetary rewards are usually considered more satisfactory than non-monetary rewards and therefore result in better knowledge sharing (Wolfe and Loraas 2008). Nevertheless, research studying the effect of monetary rewards on knowledge sharing is far from consistent, since also no or negative effects are reported (e.g., Bock et al. 2005; Lin 2007a). These inconsistencies indicate the effect of monetary rewards on knowledge sharing might not be that straightforward and suggest the possibility of moderators, such as personality or contextual conditions (Wang and Noe 2010). Some evidence hereof is already provided by an experimental study of Bol and Leiby (2015) who suggest that the effect of rewards on knowledge sharing is dependent on the status motives that are present. Not only the presence or absence of a reward, but also other aspects of the reward system design can influence knowledge sharing. For example, Cheng and Coyte (2014) indicate subjectivity weighting in a reward scheme encourages knowledge sharing more than employing a formula-based scheme.

Apart from rewards, there are other means to remunerate employees for their knowledge sharing costs. Foss and Pedersen (2002) for example suggest giving more autonomy as compensation to units that share knowledge. Finally, rather than installing rewards to make up for the costs involved with knowledge sharing, organizations could try to reduce the perceived cost of sharing, by for example assuring employees have the time available to share knowledge (Cabrera and Cabrera 2002). All of that said, traditional systems in practice still seem to be focused on motivating those who produce rather than those who share knowledge (Zárraga and Bonache 2005). In addition, the studies mentioned above mainly focus on the knowledge sharer, but Dixon (2000) stresses management should also take into account the knowledge receiver. Also for the receivers, it should be clear how they can gain from participating in the knowledge transfer. If the

[5] Employees are extrinsically motivated if they are able to satisfy their needs indirectly, often through monetary rewards. Motivation is intrinsic however, if an activity is undertaken and valued for its own sake (Osterloh and Frey 2000, p. 539).

advantages are not direct and clear (e.g., the receiver can use the knowledge in his task), the transfer of knowledge will be less effective (Dixon 2000).

Behavioral Control and Knowledge sharing

Behavioral control contains mechanisms that clearly specify which behaviors and processes an employee should follow. For this type of control, it is essential management knows what the best method of working is and clearly communicates this method to its employees. Usually, employees are observed after which their behavior is tested against the formal standard procedure. Consequently, this type of control is applicable when the employees' duties can be divided in clearly defined and specialized tasks, but not when tasks are very complex and uncertain. Apart from motivating the desired behavior, behavioral control is also useful to discourage undesirable behavior. Examples of this type of control are formal standard procedures and rules (Merchant and Van der Stede 2007; Ouchi 1979; Turner and Makhija 2006).

Since it is not always easy to measure the extent or amount of knowledge shared, behavioral control can be a proper mechanism to ensure employees behave as if they intend to share knowledge (Björkman, Barner-Rasmussen, and Li 2004). One way to accomplish this is requesting employees to take part in trainings, which are formal opportunities to share knowledge (Ipe 2003). Although trainings are direct means to share knowledge, they can also encourage knowledge sharing behavior more indirectly. For example, trainings in communication skills can help employees to exchange information more effectively (Cabrera and Cabrera 2005) and trainings in the handling of the technological tools used to share knowledge can help employees use these systems more efficiently (Cabrera and Cabrera 2002). Finally, trainings that emphasize cooperation and build relationships among employees could also increase knowledge-sharing behaviors.[6]

However, with behavioral control it is not only important that behavior is encouraged, observed and judged, but also who performs this control. Especially if the CEO, top management or a special committee monitors the activities, knowledge will be shared (Dixon 2000; Lee, Kim, and Kim 2006). A case study with public accounting firms shows the relation between the employee and his supervisor can simplify the knowledge transfer (Vera-Muñoz et al. 2006). Because of the supervision, employers notice which challenges employees face, which leads to more frequent and proactive knowledge sharing. In addition, employees will share knowledge more easily with their employer when they are cooperating well in general.

[6] Note that this last example is a form of social control rather than behavioral control.

Social Control and Knowledge sharing

Social control stimulates shared values, norms and beliefs between employees in an organization (Ouchi 1979). For example, employees can be encouraged to influence and monitor each other's actions, but also group rewards and codes of conduct are forms of social control. Although group rewards are sometimes considered a type of results control, they are mostly divided into the social control category since the link between the individual performance and the rewarded result is not always clear (Merchant and Van der Stede 2007).

Gupta and Govindarajan (2000) investigate the influence of group rewards on knowledge sharing with a case study in the steel industry. The investigated company provides rewards for collective successes on every level of the organization. These rewards make sure individual performances only have a small influence on individuals' bonus when the performance of the group as a whole did not meet expectations. In this way, employees are motivated to share their best practices with other group members such that the group performance increases. Also John Deere, studied by Sprinkle and Williamson (2004), switched from individual to group rewards to stimulate knowledge sharing between its employees. In addition, several lab experiments find evidence of the positive influence of group or cooperative rewards on knowledge sharing (e.g., Ferrin and Dirks 2003; Quigley, Tesluk, Locke, and Bartol 2007; Taylor 2006). Finally, Hwang, Erkens, and Evans III (2009) show both theoretically and empirically that plants rely more on group-based (as opposed to individual-based) output performance measures when the value of knowledge sharing is higher. However, group rewards are not always considered the first best solution, since Siemsen, Balasubramanian, and Roth (2007) find a combination of group and individual rewards leads to more knowledge sharing relative to individual or group rewards apart.

An overview paper of Hinds and Pfeffer (2003) confirms knowledge will only be shared when there is no internal competition in the organization. Internal competition can be reduced in several ways. First, employees need to be focused on company-wide goals rather than individual goals (Björkman et al. 2004). Second, reward systems need to be designed to incorporate the performances of the organization as a whole. Third, as I already noticed in the results control section, the reward that employees receive should be sufficient enough to cover the costs of knowledge sharing (Hinds and Pfeffer 2003). Finally, formal hierarchical structures, such as centralization and formalization, should be minimized (e.g., Bunderson and Reagans 2011; Grant 1996; Kim and Lee 2006; Leonard and Sensiper 1998; Tsai 2002). Hierarchies implicitly assume wisdom accrues to those with the most impressive organizational title, which inhibits lower-level employees to speak up for example.

Because organizational units can differ a lot (e.g., with regard to their context, role and the means at their disposal), one control system for the whole organiza-

tion can be insufficient and companies might want to adapt their control systems to the specific conditions of each unit (Persson 2006). In this case, social control can simplify the coordination between the different units. For example, an organizational culture that supports knowledge sharing and emphasizes trust has been found to help (Delong and Fahey 2000; Kankanhalli et al. 2005). Remarkably, Persson (2006) finds in his case study on multinational enterprises that both reward systems and socialization positively affect knowledge transfer, but the effect of rewards is three times as large as that of socialization.

Method: Laboratory Experiments

In all three studies, we use laboratory experiments as the method to investigate the research questions. An experiment is a scientific investigation in which (independent) variables are manipulated and their effects on other (dependent) variables are observed (Sprinkle and Williamson 2007, p. 416). There are several reasons experiments are suitable for our studies.

First, experiments allow us to control theoretically relevant factors: they offer the opportunity to manipulate the independent variables of theoretical interest while excluding irrelevant or confounding variables (Sprinkle and Williamson 2007). In Chapter 1 for example, we can therefore examine the implications of knowledge sharing across environments where it is perfectly clear whether or not individuals can expect rewards for their help. This feature allows us to more cleanly test the relevant theory. Using methods like field studies or surveys would be questionable, because they would bring in many other factors that could interfere with, magnify or dilute the effects of the factor being investigated. A second advantage is the power of random assignment to eliminate spurious variables. With randomization, the manipulations are assigned to participants at random. This random assignment tends to balance out the potential effects of any other variable on the dependent variable, such as participants' personality traits. In that way, differences in the dependent variable can be attributed to manipulation differences and not to differences between the groups of participants. Finally, experiments are well suited to test predictions from the behavioral literature (Kachelmeier and King 2002) and explore individual and small-group processes (Luft 2016), which play an important role in this dissertation.

In all three experiments, we involved Master students in Business Economics and Business Engineering. The main advantage of using students is their availability, but students are also valuable participants for our experiments since the experimental tasks do not require domain-specific knowledge or task-specific experience (Peecher and Solomon 2001).

Experiments have been subjected to criticisms for their generalizability, i.e., whether the insights gained in the lab can be extrapolated to the world beyond. A lot of these doubts relate to the difference between mundane and experimental

realism. Mundane realism refers to whether laboratory experiments are similar to real-world events, which is not our goal. Contrary, we are concerned about experimental realism, which indicates whether laboratory events are believed, attended to, and taken seriously by participants (Swieringa and Weick 1982). In that way, experiments are suitable to test the theory.

Overview of the Three Chapters

In three chapters, I present three experimental studies that investigate knowledge sharing from a management control perspective. Note that the three chapters are written in such a way that they are readable as independent papers. Consequently, there might be some overlap in the general motivation and literature discussed.

Chapter 1

The first chapter, co-authored with Alexandra Van den Abbeele and Michael Williamson, explores whether research studying the effect of management control systems on helping behavior more generally can be generalized to knowledge sharing, a specific form of helping behavior. In particular we examine how individuals' willingness to help others depends on whether or not this help involves knowledge sharing and we do so across environments that vary whether or not those providing help can expect rewards from the recipients of this help.

As explained earlier, calls have been made to increase our understanding of the role management accounting practices, such as reward systems, can play in promoting knowledge sharing (Hwang et al. 2009; Vera-Muñoz et al. 2006). That said, a large literature already exists studying the effects of reward system design on helping or cooperative behavior more generally (e.g., Arya, Fellingham, and Glover 1997; Drake, Haka, and Ravenscroft 1999). Our main goal of this chapter is to explore whether we can generalize the research examining helping behavior that does not involve knowledge sharing to a knowledge sharing domain. If we can do so, we would need limited research examining the efficacy of management accounting practices on knowledge sharing as a specific form of helping behavior.

However, we develop and test theory that challenges this notion. This theory suggests that individuals perceive help that involves knowledge sharing quite differently than help that does not. We predict and find that knowledge sharing has a negative effect on helping behavior without the prospect of rewards, but increases helping behavior to a larger extent when rewards can be expected.

Our results have important implications. First, we must take care when attempting to generalize results across environments that contain helping behavior with and without knowledge sharing. Second, our results contribute to a

better understanding of how to design reward systems to promote knowledge sharing in practice. In particular, organizations that value knowledge sharing may need to specifically reward this behavior.

Chapter 2

In the second chapter, co-authored with Martine Cools and Alexandra Van den Abbeele, we examine how reward systems influence knowledge transfer between individuals with equal or different status. Differences in status emerge in almost every organization and affect how individuals interact with each other (Bales 1950; Bol, Keune, Matsumura, and Shin 2010; Bunderson and Reagans 2011). Researchers often argue that the way in which status differences affect an interaction depends on the personal characteristics of the individuals involved (e.g., Anderson, John, Keltner, and Kring 2001; Anderson and Kilduff 2009). In this paper we investigate whether the impact of status differences on knowledge sharing can also be influenced by management control systems, in particular group and individual rewards.

We predict that the positive effect of group rewards compared to individual rewards on knowledge sharing is greater under status differences than under no status differences and study behaviors that could mediate this relationship. The results of the experimental study support the hypotheses and are in line with theory suggesting that group rewards can induce cooperative behavior, mitigating the negative effects of status differences on knowledge sharing. In contrast, for equal-status groups, individual rewards can provide sufficient economic motive to share knowledge.

This paper contributes to the literature and practice in several ways. For example, we find that the effect of rewards on knowledge sharing depends on the presence or absence of status differences. This finding can shed light on why management control systems do not always have the intended outcomes and why scholars do not always reach the same conclusions when studying the effects of such systems. We also show that the behavior associated with status differences can be managed, as status differences matter less under group rewards than under individual rewards.

Chapter 3

The third chapter is single-authored and studies if managers' tendency to share or report knowledge opportunistically depends on whether they made effort to acquire the knowledge they need to report. Acquiring and reporting knowledge are crucial aspects of managers' jobs (e.g., Bruns and McKinnon 1993; Church, Lynn Hannan, and Kuang 2014). Although the accounting literature acknowledges the importance of both these managerial tasks, it often treats them as distinct responsibilities (e.g., Brown, Evans III, and Moser 2009; Schneider, Dai,

Janvrin, Ajayi, and Raschke 2015). However, the duties of acquiring and reporting knowledge are logically linked and could therefore also impact each other. I contribute to the managerial accounting literature by investigating whether the process of acquiring knowledge influences managers' opportunistic reporting of this knowledge.

Theory suggests that making effort to acquire knowledge can make opportunistic behavior more justifiable, but can also enhance feelings of responsibility when honesty concerns are sufficiently triggered. I argue that the reporting mode can be an important variable explaining which effect will dominate and under which circumstances making effort to acquire knowledge may or may not have a detrimental impact on opportunistic reporting. I examine these issues via a budget reporting experiment and find results consistent with my predictions.

These results are important for several reasons. First, I contribute to the literature on managerial reporting by taking into account the fundamental phase of acquiring the knowledge that needs to be reported. My results suggest that when knowledge is acquired, exerting more effort to do so can impact opportunistic reporting, where the direction of the effect depends on the mode of reporting. In that way, my findings also have important implications for practice. For example, it might be better to give managers less discretion in reporting results (e.g., let them report unprocessed numbers rather than measures that can be more easily manipulated) when it takes a lot of effort to acquire knowledge.

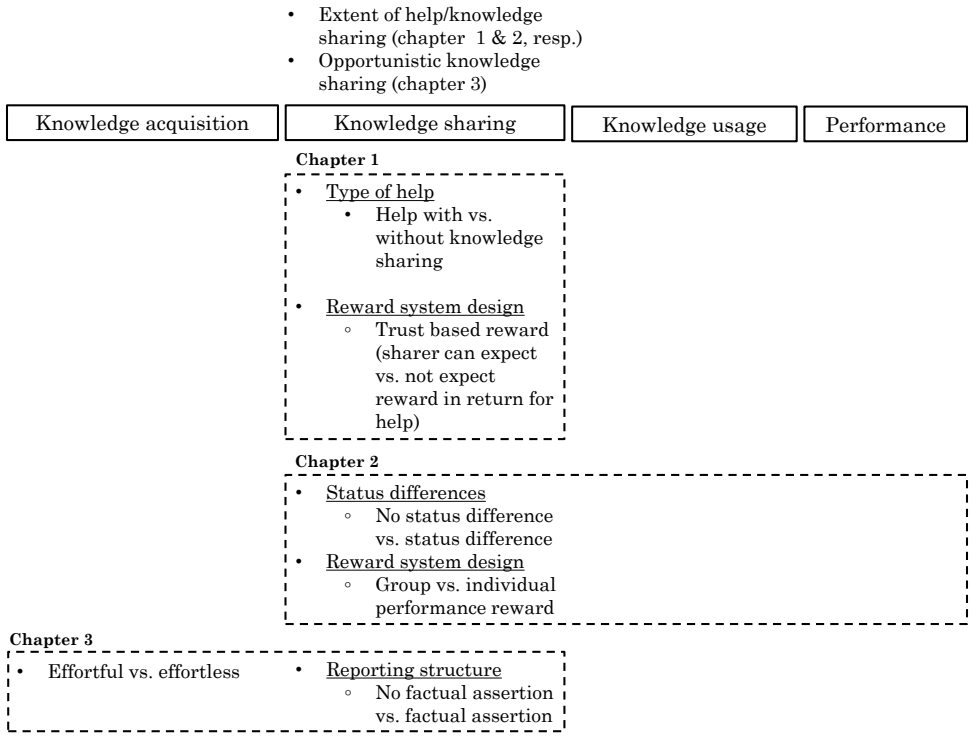
Relation between Chapters

Although the three chapters employ different perspectives, a central theme in all of them is the role of rewards in knowledge sharing. Whereas Chapter 1 and 2 explicitly focus on reward system design, Chapter 3 includes this theme more implicitly by studying opportunistic reporting, where individuals can earn a higher reward by reporting more opportunistically. In addition, Chapter 1 focuses on the knowledge sharing phase and treats a very fundamental question herein (is knowledge sharing different from other helping behavior?), while Chapter 2 and 3 include stages that precede or succeed the knowledge sharing phase. A graphical depiction of the three chapters can be found in Figure 1.

Chapter 1 shows that sharing laboriously acquired knowledge is perceived as a particularly costly activity for which the sharers feel they should be rewarded in return. This is consistent with the results of Chapter 3, since individuals believe they deserve a higher payoff, and hence share their knowledge more opportunistically, when they acquired it in an effortful way. However, in this third chapter, I also find that when the reporting environment explicitly allows for honesty concerns by requiring a factual assertion (e.g., require to report raw facts rather than processed knowledge), the need to be compensated for sharing laboriously acquired information is alleviated. As such, the knowledge

acquisition process moderates the effect of management control systems used to discourage opportunistic knowledge sharing. Similarly, Chapter 2 indicates the effect of group and individual rewards on knowledge sharing varies depending on the social context (i.e. the presence or absence of status differences).

Figure 1: Overview of the Three Chapters



The remainder of this booklet is structured as follows. I present the three research papers in Chapter 1, 2, and 3 and I end with a general conclusion chapter. In this last chapter, I summarize the main theoretical and practical contribution and list de limitations and future research possibilities.

Chapter 1

The Effects of Knowledge Sharing on Helping Behavior: Implications for Reward System Design

Abstract
We examine how individuals' willingness to help others depends on whether or not this help involves knowledge sharing. We do so across environments that vary whether or not those providing help can expect rewards from the recipients of this help. In our experiment, one set of participants learns how to perform a task and decides how much help to provide a different set of participants, where joint payoffs but also the helper's personal costs increase in the help provided. We manipulate whether or not help involves the sharing of task-relevant knowledge, holding the economic cost and benefit of help constant. Results suggest that knowledge sharing's effect on helping behavior hinges on whether or not helpers can expect rewards from those they help. Knowledge sharing decreases help in an environment where helpers cannot receive rewards from those they help, but increases help motivated by anticipated rewards. Our results are consistent with theory suggesting that individuals perceive their knowledge as an important part of their identity, making it costly to freely share but facilitating greater trust that recipients of this knowledge will reciprocate with future rewards. Moreover, our findings challenge the practice in accounting and economics of generalizing results from research studying helping behavior without knowledge sharing to knowledge-sharing domains. In doing so, this paper contributes to a better understanding of reward systems designed to promote knowledge sharing in practice.

1.1 Introduction

Through their day-to-day experiences, employees often learn important information about their task environment that, if shared, helps others in the organization (Jensen and Meckling 1992; Milgrom and Roberts 1992). While shared knowledge can provide organizational benefits, it typically comes at a personal cost to the sharer. To help mitigate this tension, the accounting literature calls for a better understanding of the role management accounting practices, such as reward systems, can play in promoting knowledge sharing (Hwang et al. 2009; Vera-Muñoz et al. 2006). That said, a large literature already exists studying the effects of reward system design on costly helping or cooperative behavior more generally (e.g., Arya et al. 1997; Drake et al. 1999). We explore the generalizability of research examining helping behavior that does not involve knowledge sharing to a knowledge sharing domain. Specifically, we examine whether individuals' willingness to help others depends on whether this help involves knowledge sharing, holding the economic consequences of these help forms constant. Moreover, to better understand the role reward systems play in facilitating knowledge sharing, we examine the effect of knowledge sharing on individuals' willingness to help across environments that vary whether or not those providing help can expect rewards from the recipients of the help. After all, implicit or trust-based rewards are often used to promote knowledge sharing or helping behavior in practice (e.g., Cheng and Coyte 2014; MacCormack, Voelpel, and Kerry 2002).

Understanding when and how knowledge sharing influences helping behavior is important. In particular, some scholars argue that the vast literature investigating general cooperative or helping behavior that does not involve knowledge sharing generalizes to knowledge sharing domains (e.g., Levine and Prietula 2012; Monge, Fulk, Kalman, Flanagin, Parnassa, and Rumsey 1998). If so, we would need limited research examining the efficacy of management accounting practices on knowledge sharing as a specific form of helping behavior. For example, one stream of literature that studies general helping or cooperative behavior is the social dilemma literature in economics. In a typical social dilemma experiment, one individual decides whether to help or cooperate by deciding how much of a fixed amount of money to give to someone else, where the helper's payoffs decrease but joint payoffs increase in the money given. To the extent that knowledge sharing just adds context to this more general tension, scholars argue that we can simply apply findings from the social dilemma literature to knowledge sharing domains (e.g., Levine and Prietula 2012; Monge et al. 1998).

However, we develop and test theory that challenges this notion. This theory suggests that individuals perceive help that involves knowledge sharing quite differently than help that does not. On the one hand, individuals believe that their knowledge is an important part of their identity (Pierce, Kostova, and Dirks 2001) and, as such, they perceive help involving knowledge sharing as inherently

more costly to provide than help without knowledge sharing (Beggan 1992). On the other hand, theory also suggests that sharing identity-related knowledge increases the psychological bond between the sharer of the knowledge and the recipient of it. This bond can facilitate trust that sharing knowledge will result in future benefits or rewards from the recipients of this knowledge (Nahapiet and Ghoshal 1998).

To the extent that these competing forces are at play, difficulties would arise when attempting to generalize from research studying general helping or cooperative behavior to knowledge sharing domains. That is, the influence of knowledge sharing on helping behavior would depend on whether or not individuals can expect future rewards for their help. Specifically, we predict that knowledge sharing would have a negative effect on helping behavior without the prospect of rewards. Indeed, to the extent that individuals perceive that help involving knowledge sharing is more costly, they would be less likely to offer this form of help without any possibility of receiving rewards for it. However, when individuals know it might be possible to receive rewards in return for their help, they may be more willing to do so when it involves knowledge sharing, expecting higher rewards for this form of help.

Testing these predictions using a laboratory experiment provides important advantages. First, while help with and without knowledge sharing often has different economic consequences in natural environments, using a stark laboratory experiment allows us to hold the monetary costs and benefits of these forms of help constant. As such, differences in help can only be explained by the behavioral consequences of knowledge sharing on helping behavior, which ensures a more powerful test of our theory. Second, an experiment allows us to examine the implications of knowledge sharing across environments where it is clear whether or not individuals can expect rewards for their help. This feature allows us to more cleanly test theory that the impact of knowledge sharing on helping behavior hinges on whether or not individuals can anticipate rewards for it. In doing so, we can contribute to a better understanding of the efficacy of implicit reward systems designed to encourage knowledge sharing in practice.

Our experiment consists of two phases. In the first phase, all participants attempt to solve seven number series puzzles, earning €1.5 per solved puzzle for a total of €10.5. Solving these puzzles required participants to write down the algorithm used to create the initial sequence of numbers and use this algorithm to complete the next two numbers in the series. We ensure that one set of participants has the time and resources needed to solve all seven puzzles. However, as communicated to all participants, the other set of participants had several disadvantages that prevented them from solving the puzzles, such as insufficient time and opportunity. In that way, the first set of participants was able to solve all seven puzzles, while the second set was not able to solve any of them. In the second phase of our experiment, we create dyads by matching one participant of

each set. Those who were able to solve all seven puzzles chose how much "help" to provide the others, by selecting the number of puzzles for which the disadvantaged participants could continue working. Capturing the primary tension of a social dilemma, helpers incurred a cost of €1.5 but provided a €4.5 benefit to those they helped for each puzzle chosen. Thus, helpers' personal costs but also the joint payoffs of the dyad increased in the help provided.

We manipulated two factors at two levels each between dyads. First, we manipulated whether help involved knowledge sharing. When help involved knowledge sharing, helpers' algorithm descriptions were revealed while the recipients of the help could continue to work on the selected puzzles. Since no one's pay was dependent on whether puzzles were successfully solved in the second phase of the experiment, the economics of the two forms of help are held constant across conditions, allowing us to isolate the behavioral consequences of knowledge sharing on helping behavior.

Second, we manipulated whether or not those providing help could receive rewards from the recipients of this help. In our no-reward condition, recipients of help kept the entire amount resulting from the help. In our reward condition, recipients of help could choose to give back none, some, or all of the amount generated by the help. Here, before they learn how much help was actually provided, the disadvantaged participants pre-committed to how much of this amount they want to give back to their helpers. They made this reward choice for each of the possible levels of help (i.e., between one and seven puzzles). However, helpers were not aware of these reward choices at the time they decided about the level of help to offer, making this essentially a trust based reward. At the end of the experiment, helpers received the pre-committed reward from those they helped for the actual amount of help provided.

Consistent with theory, our manipulated factors interact in explaining the extent of help. In the no-reward environment, helpers provide less help when it involved knowledge sharing than when it did not. Moving from the no-reward to the reward condition, help increases to a greater extent in our condition with knowledge sharing relative to our condition without knowledge sharing. Moreover, results suggest that when help involved knowledge sharing, helpers expect to receive higher rewards for their help. Finally, we highlight that many recipients of help do, in fact, provide greater rewards for help involving knowledge sharing.

These results have important implications. First, our supported theory challenges the suggestion that results from literatures studying helping or other cooperative behavior without knowledge sharing generalizes to knowledge sharing domains. Competing behavioral forces affect individuals' willingness to help in the presence relative to the absence of knowledge sharing. As such, we must take care when attempting to generalize results across these environments. Specifically, implications of knowledge sharing on helping behavior hinge on whether

or not individuals can anticipate rewards for their help.

Second, our results contribute to a better understanding of how to design reward systems to promote knowledge sharing in practice. In particular, absent the prospect of rewards, individuals appear less willing to provide help that involves knowledge sharing relative to help that does not. Thus, to the extent organizations value knowledge sharing, they may need to specifically target this form of help. For example, our results could help explain why organizations such as PricewaterhouseCoopers provide rewards for knowledge sharing, which are incremental to rewards for cooperation more generally.[1]

Additionally, given the finding that knowledge sharing enhances trust that help will result in future benefits, our results suggest that informal, implicit promises to reward knowledge sharing can be quite effective. That is, knowledge sharing can increase the efficacy of trust-based, implicit contracts where employees share knowledge today in the hopes, but no formal guarantees, to receive rewards for this help in the future. This implication contributes to a better understanding of observations across manufacturing settings. Here, despite the often contentious relation between unions and management, promised future rewards for workers' production knowledge such as job security are often effective (Miller and O'leary 1987; Sprinkle and Williamson 2004), notwithstanding the risk that management can use this knowledge to the employees' detriment (Arnold 1998).

The next section describes our research setting and develops the hypotheses. Section III describes the experimental design used to test these hypotheses. Results are presented in Section IV, and Section V provides a summary and discussion of the results.

1.2 Research Setting and Hypotheses

1.2.1 Research Setting

We examine how individuals' willingness to help others depends on whether this help involves knowledge sharing. We do so across environments that vary whether or not those providing help can receive rewards from the recipients of this help. In essence, our aim is to examine whether knowledge sharing affects individuals' intrinsic motivation to provide help (i.e., when they cannot expect rewards) and / or their help in anticipation of future rewards.

To do so, we extend an experimental framework for separating out these two motivational sources of helping behavior (Balakrishnan, Sprinkle, and Williamson 2011; Cox 2004). Specifically, using a single-interaction experiment, Cox (2004) examines how much help a sender-participant provides a receiver-participant by

[1] PWC rewards high performing teams (PWC 2016), but also provides incremental bonuses for excellent knowledge transfers (Hackett 2000).

sending none, some, or all of a fixed endowment.[2] The amount sent triples in the hands of the receiver, thus joint payoffs increase in the amount of help provided. In one condition, the receiver keeps the entire tripled amount. Since senders cannot receive anything back, they can only be intrinsically motivated to help receivers. In another condition, receivers can return none, some, or all of the tripled amount back to senders. Here, senders' help could be both intrinsically motivated and motivated by the expectation of receiving a return for the help. As such, Cox (2004) interprets the difference in help between these two conditions as help motivated by expected rewards.

To allow us to study the incremental effect of knowledge sharing on helping behavior, we add an initial task to the Cox (2004) framework where two sets of participants attempt to solve seven types of number-series puzzles. Participants solve these puzzles by writing down the algorithm used to create the initial sequence of numbers and using this algorithm to complete the next two numbers in the series. We ensure that one set of participants is able to solve all seven puzzles earning €1.5 per puzzle for a total of €10.5. However, the other set of participants is unable to learn these algorithms or otherwise solve the puzzles due to insufficient time and opportunity.[3]

The set of participants that is able to solve all seven puzzles has the opportunity to help the disadvantaged participants on between zero and seven of the puzzles by deciding whether they can continue working on these puzzles. Analogous to Cox (2004) and other social dilemma experiments, helpers incur a cost of €1.5 for each puzzle chosen, but this amount triples to €4.5 in the hands of those they helped. These amounts represent the increase in both the helper's personal cost and the payoffs to the organization resulting from this helping behavior.

We examine the incremental effect of knowledge sharing on helping behavior by varying whether or not the helper's algorithm descriptions of the selected puzzles are revealed while the recipients of the help could continue to work on these puzzles.[4] Recipients of the help can use these descriptions to solve the puzzles. However, no one receives additional compensation if recipients of help successfully solve the puzzles. Thus, we hold the monetary costs and benefits of help constant across these two conditions.

We also vary whether or not those providing help could receive rewards from the recipients of this help. In our no reward environment, recipients of help keep the entire tripled amount resulting from the help. Hence, helpers' payoffs are

[2] For expositional ease, we refer to the wealth transfer from the sender to the receiver as "help". That said, this literature considers the transfer more broadly as any cooperative act that is costly to the sender but increases joint welfare.

[3] Similarly, some employees can acquire superior information about important aspects of the firm, because they are in closer proximity to and spend more time with particular markets, customers, production processes, etc. (Milgrom and Roberts 1992).

[4] Modelling a stark experimental setting allows us to more easily hold the monetary consequences of help with and without knowledge sharing constant, something that would be difficult using a scenario-based study (e.g., Cheng and Coyte 2014).

strictly reduced by helping and as such, they must be intrinsically motivated to help by such factors as altruism or concerns for fairness. Moreover, we can attribute any difference in helping behavior we observe between our environments with and without knowledge sharing to the impact of knowledge sharing on help that is intrinsically motivated.

In our reward condition, recipients of help can choose to send back none, some, or all of the tripled amount resulting from the help on the puzzles. Similar to Cox (2004), we interpret the difference in help between our no-reward and reward conditions as help motivated by expected rewards, since helpers are not aware of other participants' reward choices at the time they decide about the level of help to offer. Moreover, we can attribute any interactive effect of knowledge sharing environment across our reward conditions as the impact of knowledge sharing on help motivated by expected rewards. For example, if the increase in help when moving from the no reward condition to the reward condition is greater in our knowledge sharing environment relative to our no knowledge sharing environment, then knowledge sharing increases help motivated by expected reward. Below, we develop hypotheses regarding the impact of knowledge sharing on helping behavior across the no reward and reward conditions.

1.2.2 The Effect of Knowledge Sharing on Intrinsically Motivated Help

In our no-reward condition, recipients of help keep the entire tripled amount resulting from the help. Because helpers know for certain that every unit of help strictly reduces their payoffs but benefits the disadvantaged participants, helpers motivated solely by self-interest would provide no help. As such, non-monetary (intrinsic) factors must motivate help in the no-reward condition.

The results of Cox (2004) suggest that helpers will be intrinsically motivated to provide some help in our no reward condition. Moreover, results from dictator games (Eckel and Grossman 1996; Johannesson and Persson 2000) and more natural settings (Constant, Sproull, and Kiesler 1996; Podsakoff, MacKenzie, Paine, and Bachrach 2000; Smith, Organ, and Near 1983) suggest that individuals are willing to incur a personal cost to help (benefit) others even when they know that this help cannot be rewarded. Scholars attribute this intrinsically motivated helping behavior to such things as individuals' utility for performing altruistic acts, fairness concerns, and pro-social behavior more generally (Camerer 2003; Organ, Podsakoff, and MacKenzie 2006).

Does the propensity to help absent the prospect of rewards depend on whether help includes knowledge sharing? Theory suggests it does. Even when help with and without knowledge sharing has the same financial consequences, theory suggests that individuals will perceive help as more costly when it requires them to share knowledge. Specifically, individuals perceive that their knowledge is an important part of their identity (Constant, Kiesler, and Sproull 1994; Pierce et al.

2001). Because they invest themselves in the knowledge they create by using their time, effort, skills and intellect, the knowledge becomes a representation of the self. As such, individuals feel a strong personal attachment to it (De Dreu, Nijstad, and van Knippenberg 2008; Raban and Rafaeli 2007). The more individuals invest themselves into the knowledge they create, the stronger these feelings get (Csikszentmihalyi and Rochberg-Halton 1981; Pierce et al. 2001). These feelings have important psychological and behavioral consequences. Specifically, they make individuals value their knowledge higher, which could increase their perceived cost of sharing it (Beggan 1992; Cress, Kimmerle, and Hesse 2006; De Dreu and van Knippenberg 2005; Wolfe and Loraas 2008). As a consequence, individuals would be less inclined to share their knowledge if they are not compensated for it (Bartol and Srivastava 2002; Constant et al. 1996; Davenport and Prusak 1998).

In summary, theory posits that individuals will perceive help that involves knowledge sharing as more costly than help that does not. As such, when individuals know that they cannot receive rewards, they will be less likely to help when it involves knowledge sharing. Accordingly, we state our first hypothesis as follows:

Hypothesis 1 *Absent the prospect of rewards, individuals provide less help when it involves knowledge sharing relative to when it does not involve knowledge sharing.*

1.2.3 The Effect of Knowledge Sharing on Help Motivated by Expected Rewards

In the reward condition, those who got help have the opportunity to give back none, some, or all of the tripled amount they receive from the help. While the provision of help in this condition could be intrinsically motivated as in the no reward condition, it can also be motivated by the expectation of receiving a reward in return for their help. Like Cox (2004) and Balakrishnan et al. (2011), we attribute any differences across these conditions to help motivated by expected reward.

Similar to our no-reward condition, assuming both helpers and recipients of help will exhibit purely self-interested, payoff-maximizing behavior, no help will be provided. Because payoffs of those who got help strictly decrease in the amount of reward provided to their helpers, wealth-maximizing recipients of help would retain all the benefits derived from the help. In anticipation, every unit of help strictly reduces helpers' payoffs. As such, purely payoff-maximizing helpers would provide no help.

Despite this self-interested, payoff-maximizing prediction, the results of Cox (2004) suggest that we will observe help that is motivated by expected rewards. In other words, helpers trust to receive a reward in return for their costly help. Similarly, employees often take costly actions to help (benefit) others in expec-

tations of rewards such as job security, promotions, salary increases and other reciprocal benefits (Milgrom and Roberts 1992). Furthermore, research across methodologies and domains illustrate the pervasiveness and efficacy of these relational, trust-based contracts (Camerer 2003; Ostrom and Walker 2003; Prendergast 1999).

Does the propensity to help, motivated by expected-reward, depend on whether the help involves knowledge sharing? While theory suggests that individuals would be less motivated to help when it involves knowledge sharing without expected rewards, it proposes an opposing, positive effect of knowledge sharing on help motivated by expected rewards (Hinds and Mortensen 2005; Ridings, Gefen, and Arinze 2002).

Individuals sharing their knowledge believe that they are in fact sharing an important part of their identities with others. Previous research shows that disclosing personal information and sharing valuable knowledge increases the psychological bond between the source and target of this knowledge (Abrams, Cross, Lesser, and Levin 2003; Ridings et al. 2002). As such, individuals could believe that sharing knowledge will enhance the extent to which the recipient of this knowledge identifies with them.

By enhancing this perceived psychological bond, sharing knowledge could increase trusting and reciprocal behaviors (Rousseau, Sitkin, Burt, and Camerer 1998). Indeed, prior research demonstrates that increasing shared identities among group members enhances cooperative behaviors when individual and group interests are at odds (Wit and Wilke 1992). As such, individuals would be inclined to be more trusting and reciprocal towards each other and would therefore expect that help today would be reciprocated with rewards or other benefits in the future (Hinds and Mortensen 2005).

To the extent this theory is descriptive, helpers would likely expect greater rewards from those they help when their help involves knowledge sharing. Insofar as helpers expect higher rewards for help involving knowledge sharing, we predict that help motivated by expected rewards is higher when the help includes knowledge sharing relative to when it does not. As such, we state our second hypothesis as follows:

Hypothesis 2 *Individuals provide more help motivated by expected rewards from recipients of this help when it involves knowledge sharing relative to when it does not involve knowledge sharing.*

Recall that we attribute the difference in help across our no reward and reward conditions as help motivated by expected reward. Thus, H2 predicts an interactive effect of knowledge sharing across our reward environments. Specifically, the increase in help when moving from the no reward condition to the reward condition should be greater when help involves knowledge sharing relative to when help does not involve knowledge sharing.

1.3 Method

1.3.1 Participants and Design

One-hundred and sixty eight undergraduate business students from a large Western European university participated in our computer-based laboratory experiment, which we conducted using z-Tree software (Fischbacher 2007).[5,6] We randomly paired participants and assigned them the role of either Group X or Group Y person. We use the neutral terminology to guard against extraneous influences from implied role playing (Haynes and Kachelmeier 1998).

We randomly assigned participant dyads to one of four experimental conditions, created by manipulating two factors in a between-subjects design. The first manipulated factor was whether or not the help contained knowledge sharing. The second manipulated factor was whether or not helpers could be rewarded by those they help.

1.3.2 Procedures and Task

We randomly assigned participants to a computer terminal situated in one of two rooms. Participants in one room are helpers, and participants in the other room are the recipients of help. As discussed below, the experiment consisted of two phases. Table 1.1 provides the sequence of steps.

First Task Phase

In the first phase of the experiment, all participants attempted to solve seven number series puzzles. Participants read through a set of instructions on their computer terminal that described number series puzzles and their objectives for this task phase. Number series puzzles provide a sequence of numbers that follow a discernable pattern or algorithm. We asked participants to provide the next two numbers in the sequence. For example, we provided participants with the following sequence: $0, 1, 1, 2, 3, 5, 8,$ ___, ___. To solve this puzzle, participants must realize that the numbers in the sequence are the sum of the preceding two numbers. So, the next two numbers in the sequence are $13(5 + 8)$ and $21(8 + 13)$.

After each participant response, the computer program provided instant feedback as to its correctness. When incorrect, the program prompted participants to provide another response. In addition, the program asked participants to describe in words the algorithm used to create and solve the puzzle. Participants had to correctly solve each puzzle and provide an algorithm description before

[5] However, we removed one helper-participant in our knowledge sharing / reward condition because he erroneously believed that he was not paired with a real person, as stated in his post-experimental questionnaire.

[6] Participants received a course credit and a show-up fee of €3 for their participation. As discussed below, they could earn additional compensation based on decisions made during the experimental session.

Table 1.1: Sequence of Steps for Experimental Conditions

First Task Phase	
1. All participants try solve seven number sequence puzzles by writing down the algorithm used to create the initial sequence of numbers and use this algorithm to complete the next two numbers in the series. One set of participants solves all puzzles, earning €1.5 per solved puzzle for a total of €10.5. Another set of participants is disadvantaged and is therefore not able to solve any of the puzzles, earning €0.	
Second Task Phase	
2. The set of participants who solved all puzzles choose how much help to provide the others, by selecting the number of puzzles for which the disadvantaged participants can continue working. Helpers incur a cost of €1.5 but provide a €4.5 benefit to those they help for each puzzle chosen. When help involves knowledge sharing, recipients of help can also see the helpers' algorithm descriptions while continuing to work on the selected puzzles.	
No Reward Environment	*Reward Environment*
3. All participants complete a post-experimental questionnaire.	3. Recipients of help can choose to reward their helper by giving back none, some, or all of the amount generated by the help. Before recipients of help learn how much help was actually provided, they *pre-commit* to how much of this amount they want to give back to their helper. They make this choice for each of the possible levels of help (i.e., between one and seven puzzles).
4. Recipients of help can continue to work on those puzzles for which they got help and receive the amount resulting from this help.*	4. All participants complete a post-experimental questionnaire.
	5. Recipients of help can continue to work on those puzzles for which they got help and receive the amount resulting from this help.* Helpers receive the pre-committed reward for the actual amount of help provided

* Payoffs do not depend on recipients of help ultimately solving the puzzles.

proceeding to the next puzzle. Participants received €1.5 for each puzzle they correctly solved.

Before proceeding to the next phase of the experiment, we ensured that one set of participants (i.e., the helpers) solved all seven puzzles, and hence earned €10.5 (i.e., 7 puzzles × €1.5 per puzzle). First, they could take as much time as needed to solve the puzzles. Second, they had two puzzles on the screen that followed an identical algorithm, giving them more information to identify the specific algorithm used to create both puzzles. So, for the puzzle above, they also solved the following puzzle at the same time: $2, 2, 4, 6, 10, 16, 26, \_\_\_, \_\_\_$. Again, we created this number sequence by ensuring that the numbers in the sequence are the sum of the preceding two numbers in the sequence. Thus, the next two numbers in the sequence are $42(16 + 26)$ and $68(26 + 42)$. Third, participants in this set could access up to two hints per puzzle by pressing buttons on the computer program labeled, "Hint 1" and "Hint 2". For example, pressing "Hint 1" on the screen with the two puzzles above would generate the following hint, "To get the next number in the sequence, you have to add the two preceding numbers." These hints were not immediately available to participants. The "Hint

1" button became visible after one minute of working on the specific puzzle, and the "Hint 2" button became visible two minutes after working on the puzzle. We asked participants to only press these hint buttons when they could absolutely not determine the solution on their own. While they could access up to 14 hints (two hints for each of the seven puzzles), the total numbers of hints requested was 1.15 out of 14 for an average helper participant.

The other set of participants (i.e., the recipients of help), on the other hand, did not solve any of the puzzles, and hence earned €0. We gave them a limited amount of time to solve the puzzles. Moreover, they did not have access to any hints. Finally, this set of participants only had one puzzle to solve for each algorithm. As discussed in more detail below, while the puzzles were different for the two sets of participants, each puzzle trio (i.e., two for helper participants, one for recipient participants) was created following the exact same algorithm.[7] We informed the disadvantaged set of participants upfront that they faced some difficulties in this task making it unlikely that they could solve any of the puzzles.[8] Table 1.2 contains the complete list of puzzles for both sets of participants, as well as the hints available to the helper participants.

Second Task Phase

In the second phase of the experiment, helper participants decide how much help to provide. All participants first read through a different set of instructions on their computer terminal and answered a set of quiz questions over information contained in this set of instructions.[9] In the second phase instructions, participants learn that every participant in the helper room has been randomly paired with a participant in the room of recipients of help. Participants then learn how many puzzles their paired partner solved. That is, recipients of help learned that their paired helper solved all seven puzzles, and helper participants learned that those they can help solved none of the puzzles. That said, we informed both participants of helpers' relative advantage when solving the puzzles (i.e., their time advantage, access to hints, and access to multiple puzzles for each algorithm).

Helper participants then had the opportunity to "help" their paired, disadvantaged partner. Specifically, helpers decided the number of puzzles (between 0 and 7) for which their paired partner could have additional time to solve.[10] Sim-

[7] By using a different puzzle following the same algorithm for everyone, the helper's algorithm could teach recipients of help how to solve the puzzle without merely providing them the answer.

[8] This design choice captures the common situation where some employees have the opportunity to acquire superior information about aspects of the firm because they are in closer proximity to and spend more time with particular markets, customers, production processes, etc. (Milgrom and Roberts 1992).

[9] If participants answered a question incorrectly, the computer program described why the chosen response was incorrect and asked for another response. Participants had to answer all quiz questions correctly before proceeding.

[10] Based on the number of puzzles selected by the helper participant, we randomly assigned the specific puzzles on which the recipient of help could work.

ilar to traditional social dilemma experiments, helpers incurred a cost of €1.5 and recipients of help received a benefit of €4.5 for every puzzle of help provided. Recipients of help received this benefit irrespective of whether they ultimately solved or even spent significant time trying to solve the puzzles for which they had additional time.

We manipulated whether help contained knowledge sharing by varying whether or not recipients of help could see the helpers' algorithm descriptions of the puzzles for which they could continue working. Recipients of help could have used these algorithm descriptions to assist them solve the puzzles if desired. It is important to highlight a couple important points about our knowledge sharing manipulation. First, because payoffs did not depend on recipients of help ultimately solving the puzzles, the presence or absence of knowledge sharing in help had no effect on monetary payoffs. As such, we isolate the behavioral consequences of knowledge sharing on helping behavior. Second, since helpers across both conditions recorded algorithm descriptions in the first task stage, knowledge sharing required no additional work from them. That is, we simply manipulated whether or not the computer program revealed helpers' algorithm descriptions.[11] Thus, we hold both the monetary cost and benefits of help as well as helper effort constant across our two conditions.

We also manipulated whether or not recipients of help could reward their helpers. In our no reward condition, recipients of help kept the entire benefit of the help (i.e., the €4.5 per puzzle of help provided). In our reward condition, recipients of help could give back none, some, or all of the benefit of the help. They made this decision before knowing how much help was provided. Specifically, we used a strategy method whereby participants pre-committed as to how much they would reward helpers for each possible level of help (i.e., between one and seven puzzles).[12] They could choose the same or different amount of rewards in response to each possible decision made by their helper. Helpers were not aware of these reward choices at the time they decided about the level of help to offer, but ultimately, the helper received the reward for which those they helped pre-committed based on the level of help actually offered.[13,14]

[11] To mitigate any concerns helpers had about the quality of their algorithm descriptions, the second task phase instructions informed them that they could edit any description that would be revealed to their dyad partner. Twenty percent of helpers edited at least one description.

[12] As such, recipients of help made this decision before observing any of the helper's algorithm description. Thus, we attribute any difference in reward behavior across our conditions to participants' anticipation of receiving knowledge.

[13] The strategy method allows us to examine how recipients of help reward each possible level of help. Prior research suggests that decisions using the strategy method are similar to decisions using a sequential protocol (Brandts and Charness 2000; Cason and Mui 1998; Oxoby and McLeish 2004).

[14] Participants completed an interactive example after reading the instructions but before making their decision. This example was identical to the main experiment with two exceptions. First, participants in the reward condition made decisions for both helper and recipient of help roles. Second, decisions made in the interactive example did not affect payoffs. The objective of this example was to ensure participants understood the impact of their decisions on their own and other's payoffs without using any potentially leading examples in the instructions.

Table 1.2: Puzzles, Solutions, and Hints for Phase One of the Experiment

	Helper (Advantaged set of participants)		**Recipient of help (Disadvantaged set of participants)**
	Puzzle 1	**Puzzle 2**	**Puzzle 1**
Set 1			
Puzzle	70, 41, 12, 82, 53, 24	01, 71, 42, 13, 83, 54	65, 36, 07, 77, 48
Solution	94, 65	25, 95	19, 89
Hint1	If you reverse the digits of each number in the sequence (e.g., 70 turns into 07), the pattern should become more apparent.		
Hint2	If you reverse the digits of each number in the sequence, the number sequence looks as follows: 07, 14, 21, 28, 35, 42. It should be more apparent now that every number in the sequence is 7 more than the preceding number. Hence, the next two numbers in the sequence are 49 (42+7) and 56 (49+7). If you reverse the digits of these numbers again, you find the solution, namely 94 and 65.		
Set 2			
Puzzle	1234567, 2134567, 2314567, 2341567	21480, 12480, 14280	369246, 639246, 693246, 692346
Solution	2345167, 2345617	14820, 14802	692436, 692463
Hint1	The first digit of the number moves one place to the right for every next number in the sequence.		
Hint2	You have to move the first digit of the number, i.e. 1, one place to the right for every next number in the sequence. This means that 1 is in the first position for the first number in the sequence, in the second position for the second number in the sequence, etc. **1**234567, 2**1**34567, 23**1**4567, 234**1**567. If you continue this pattern for the next two numbers, then 1 will be in the fifth and sixth position, respectively: 2345**1**67, 2345**6**1**7**.		
Set 3			
Puzzle	1, 40, 2, 35, 3, 30, 4, 25, 5, 20	67, 77, 68, 72, 69, 67, 70, 62, 71, 57	8, 54, 9, 49, 10, 44, 11, 39
Solution	6, 15	72, 52	12, 34
Hint1	The odd and even number positions in this sequence follow different patterns.		
Hint2	Every odd number in this sequence is 1 more than the preceding odd number. Hence, the next odd number in the sequence is 6 (5+1).Every even number in the sequence is 5 less than the number preceding it (40, 35, 30, 25, 20). Hence, the next even number in the sequence is 15 (20−5).		
Set 4			
Puzzle	0, 1, 1, 2, 3, 5, 8	2, 2, 4, 6, 10, 16, 26	2.1, 2.2, 4.3, 6.5
Solution	13, 21	42, 68	10.8, 17.3
Hint1	To get the next number in the sequence, you have to add the two preceding numbers.		
Hint2	The first two numbers in the sequence are 0 and 1. If you add these numbers, you get the next number in the sequence: 1 (0+1). The fourth number in the sequence is the sum of the two preceding numbers: 2 (1+1). If you continue this pattern, you get 3 (1+2), 5 (2+3), 8 (3+5) and the solution: 13 (5+8) and 21 (13+8).		
Set 5			
Puzzle	123, 456, 789, 101, 112, 131, 415	333, 435, 363, 738, 394, 041, 424	888, 990, 919, 293, 949, 596
Solution	161, 718	344, 454	979, 899
Hint1	By disregarding the placement of the commas, the pattern becomes more apparent.		
Hint2	If you disregard the placement of the commas, it should be more apparent that every number in the sequence is one more than the previous number (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15). Hence, the next two numbers in the sequence are 161 and 718 (they represent 16, 17, etc.)		

Table 1.2 continued.

	Puzzle 1	**Puzzle 2**	**Puzzle 1**
Set 6			
Puzzle	1440, 720, 360, 180	96, 48, 24,12	128, 64, 32, 16, 8
Solution	90, 45	6, 3	4, 2
Hint1	To get the next number; divide the previous number by 2.		
Hint2	The first number in the sequence is 1440. To get the next number in the sequence, you should divide the previous number by 2: 1440/2= 720. To get the third number in the sequence, you divide the second number (720) by 2: 720/2= 360. If you continue in this way, you find the solution: 90 (180/2) and 45 (90/2).		
Set 7			
Puzzle	1, 3, 7, 15, 31, 63	2, 5, 11, 23, 47, 95	4, 9, 19, 39, 79
Solution	127, 255	191, 383	159, 319
Hint1	To get the next number in the sequence, you should double the previous number and add 1 to the result.		
Hint2	This sequence starts with 1. If you double this number and add 1 to the result, you get the next number in the sequence: 3 ((1 $\times$ 2)+1). Now you double 3 and add 1 to the result to get 7 ((3 $\times$ 2)+1). If you continue this pattern, you find the solution 127 ((63 $\times$ 2)+1) and 255 ((127 $\times$ 2)+1).		

After finalizing all decisions but before learning the decisions of their dyad partners, all participants completed a post-experimental questionnaire. Afterwards, decisions were revealed and payoff calculated. The total average payout was €11.92, with an average of €12.10 for helpers and €11.74 for recipients of help. Finally, recipients of help could continue working on the puzzles for which they got help. Overall, the experiment lasted about one hour.

1.4 Results

Our primary dependent measure is the number of puzzles of help provided. Table 1.3 shows descriptive statistics for help across each of our four experimental conditions. Figure 1.1 provides a graphical depiction of our results. Figure 1.2 provides a histogram of the number of participants offering each level of help (i.e., between 0 and 7). Panel A provides this information for our entire sample. Panel B provides this information for the no-reward condition, with the number of participants at each help level segregated by our knowledge sharing environments. Panel C provides this same information for our reward condition.

Table 1.3: Descriptive Statistics for Help Provided by Experimental Condition

	No Reward		**Reward**	
	Knowledge Sharing (n=21)	**No Knowledge Sharing (n=21)**	**Knowledge Sharing (n=20)**	**No Knowledge Sharing (n=21)**
Help Provided	1.29 (1.76)	2.24 (2.41)	3.30 (2.05)	3.14 (2.71)

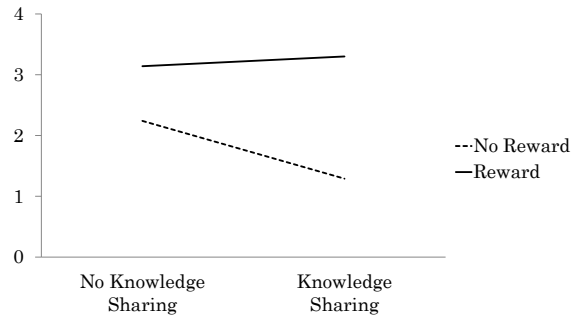
This table shows the means (standard deviations) of help provided across our experimental conditions. Help provided is the number of puzzles (between 0 and 7) for which the helper chose to assist.

As apparent by these histograms, help provided is not normally distributed which violates an important assumption of ANOVA.[15] In particular, 60 percent of individuals across our full sample helped with either no puzzles (25 percent), one puzzle (18 percent), or seven puzzles (17 percent), making the dependent variable for this analysis effectively a categorical variable. As such, we estimate an ordered logistic regression to provide the formal tests of our hypotheses. An ordered logistic regression is an appropriate test when the dependent measure is categorical and takes on values that have a natural order (Kennedy 2003).

To facilitate this analysis, we segregate help provided into the following four categories: (1) category 0 is for participants offering help on no puzzles, (2) category 1 is for participants offering help on one puzzle, (3) category 2 is for participants offering help on two to six puzzles (i.e., two, three, four, five, or six puzzles),

[15] Formal tests of normality, like the Shapiro-Wilk Test, also indicate the data significantly deviate from a normal distribution ($p<0.05$).

Figure 1.1: Effect of Knowledge Sharing Environment[a] and Reward Environment[b] on Help Provided[c]



[a] We manipulate Knowledge Sharing Environment as a between-subjects factor at two levels: No Knowledge Sharing and Knowledge Sharing. In the No-Knowledge Sharing condition helpers could allow recipients of their help to continue working on none, some or all of the puzzles. In the Knowledge Sharing condition, recipients of help could also see helpers' algorithm descriptions while continuing to work on the selected puzzles.
[b] We manipulate Reward Environment as a between-subjects factor at two levels: No Reward and Reward. In the No-Reward condition, recipients of help could not remunerate their helper for his/her helping behavior, whereas in the Reward condition, they could.
[c]Help Provided represents the average number of puzzles for which the helper decided to assist. This measure can range from 0 to 7.

and (4) category 3 is for participants offering help on seven puzzles.[16]

Using this categorization of help provided as our dependent measure, we run an ordinal logistic regression with the following three independent measures: (1) knowledge sharing environment coded "0" ("1") when help does not contain (contains) knowledge sharing, (2) reward environment coded "0" ("1") when the recipient of help cannot (can) reward the helper, and (3) the interaction of knowledge sharing and reward environments. This regression model fits the data well, as indicated by the fit indices (e.g., $Nagelkerke\ R^2 = 0.14$, Pearsons chi-square $p>0.05$). Figure 1.3 provides a graphical depiction of the resulting logits per experimental condition. We observe a knowledge sharing environment $\times$ reward environment interaction, which is significant according to the results provided in Panel A of Table 1.4 $(p = 0.05)$.[17] To follow-up on this interaction, Panel B of Table 1.4 presents the effect of knowledge sharing environment on our help categorization across the no reward and reward environment. We discuss the results from these analyses in the context of our hypotheses below.

[16] Collapsing categories of categorical variables is often desirable and frequently applied when these variables have more than three to five categories. Categories can be combined when there are very few people in a category (e.g., De Vaus 2013). Despite the specific categories we choose, using other reasonable four-category classifications does not change the inferences we make in the paper (e.g., category 0 is for participants offering no help, category 1 is for participants offering help on one puzzle, category 2 is for participants offering help on two through four puzzles, and category 3 is for participants offering help on five through seven puzzles).

[17] Given the directional predictions of the effects, the p-values are reported on a one-tailed basis.

Figure 1.2: Number of Helper Participants Providing Each Level of Help

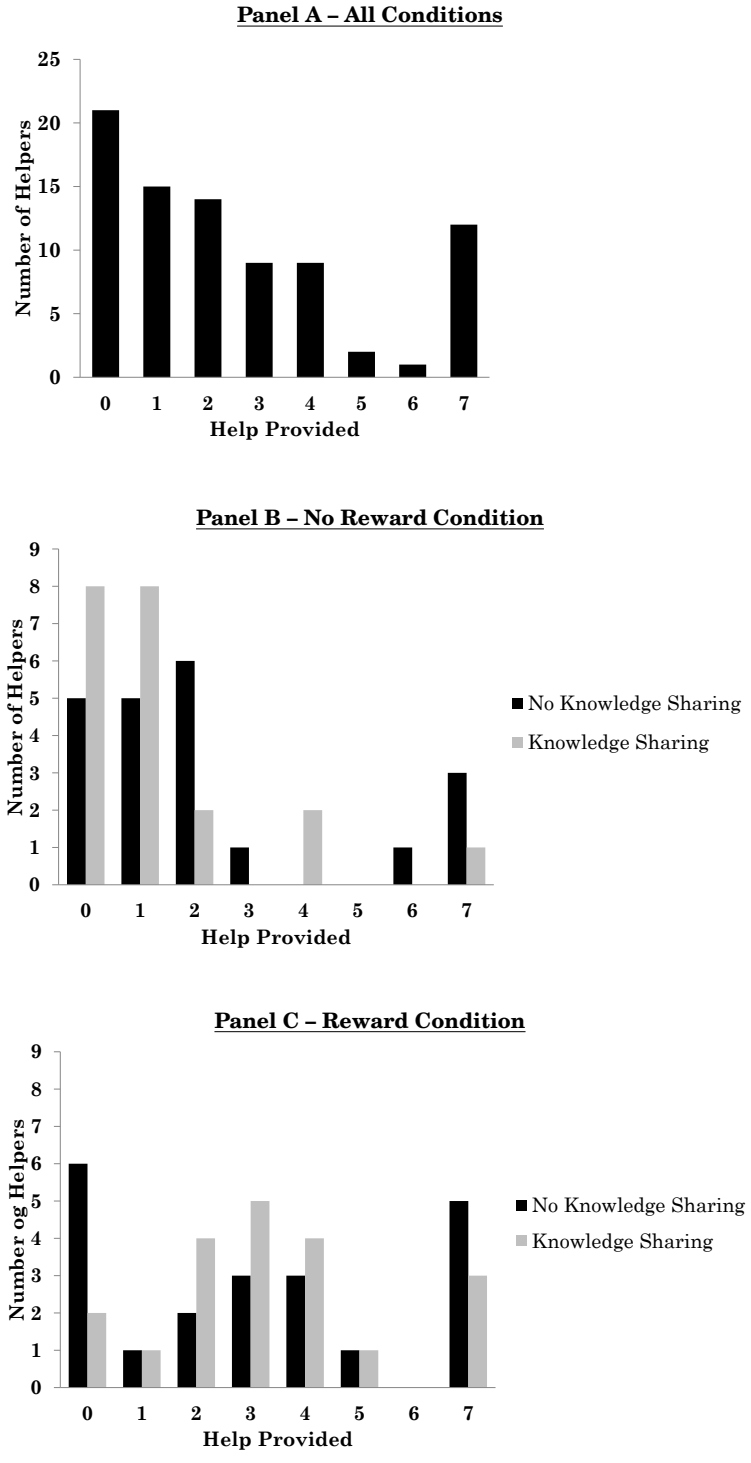
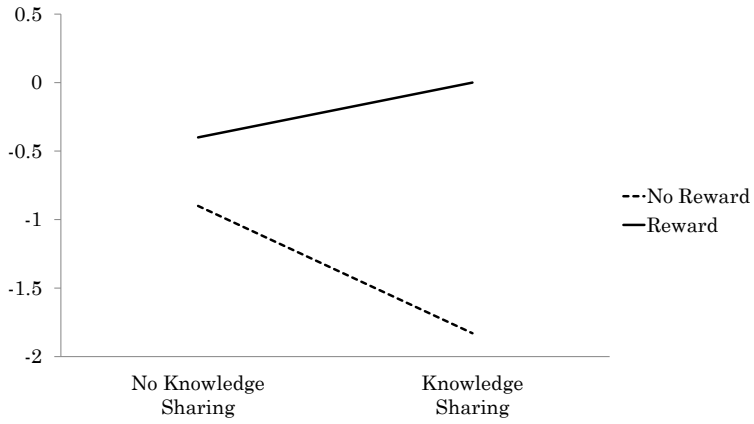


Figure 1.3: Ordinal Logistic Regression Results: Predicted Logit for Help Provided by Experimental Condition



1.4.1 Intrinsically Motivated Knowledge Sharing (H1)

H1 posits that individuals who cannot receive rewards for help provide less help when it involves knowledge sharing than when it does not involve knowledge sharing. To test this hypothesis, we compare the level of help in our no knowledge sharing and knowledge sharing conditions in our no reward environment. Panel B of Table 1.4 demonstrates that moving from our no knowledge sharing to our knowledge sharing condition had a significantly negative effect on help provided when participants could not receive rewards for their help ($p = 0.04$). Specifically, the coefficient estimate of 1 indicates that when no reward can be expected, participants in the no knowledge sharing condition are 2.72 (i.e., exp(1)) times as likely to end up in a higher category of help relative to participants in the knowledge sharing condition. This result is consistent with H1.[18]

1.4.2 Knowledge Sharing Motivated by Expected Rewards (H2)

H2 posits that individuals provide more help motivated by expected rewards from recipients of this help when it involves knowledge sharing relative to when

[18] Given our theory, we would expect that helpers identify more with their knowledge when they either spend *more* time solving the puzzles or use *less* of the available hints. Carrying this logic through, absent the prospect of reward, participants would help even less when it involves knowledge sharing if this knowledge was acquired in a more time-consuming and more independent (i.e., less hints) way. However, time spent on the task and the number of hints used by participants are positively correlated ($r = 0.35; p<0.01$), making clean analyses on these variables difficult. That said, when limiting our sample to the participants in the no reward condition who did not use any hints, a regression analysis demonstrates that participants who spent a longer time solving the puzzles in the first stage helped even less when it involved knowledge sharing ($p = 0.10$). This marginally significant result is consistent with our theory.

Table 1.4: Ordinal Logistic Regression of the Effects of Knowledge Sharing and Reward Environment on Help Provided[a]

Panel A – Results from Full Sample		
Independent Variable	**Estimate (Standard Error)**	**p–value***
Knowledge Sharing Environment (KSE)[b]	−0.40 (0.59)	0.50
Reward Environment (RE)[c]	−1.83 (0.61)	< 0.01
KSE × RE	1.33 (0.83)	**0.05**
Panel B – Results from Subsamples		
Independent Variable	**Estimate (Standard Error)**	**p–value***
No Reward Environment		
Knowledge Sharing Environment	1.00 (0.58)	**0.04**
Reward Environment		
Knowledge Sharing Environment	−0.34 (0.61)	0.58

[a] Help Provided is coded as 0 for no help (i.e. help with zero puzzles), 1 for help with one puzzle, 2 for help with two to six puzzles, and 3 for help with seven puzzles.
[b] Knowledge Sharing Environment is coded as 0 for the no knowledge sharing condition and as 1 for the knowledge sharing condition. The reference category is KSE $= 1$.
[c] Reward Environment is coded as 0 for the no reward condition and as 1 for the reward condition. The reference category is RE $= 1$.
[*] The p-values in bold are reported on a one-tailed basis, given the directional predictions for these effects.

it does not. Recall that help can be motivated by only intrinsic factors in our no reward condition but help can be motivated by both intrinsic factors *and* expected returns in our reward condition. Thus, to isolate help motivated by expect returns, we examine the difference in help across our no reward and reward conditions. Moreover, H2 implies an interaction such that the increase in the level of help when moving from the no reward to the reward condition will be greater when help involves knowledge sharing relative to when it does not.

As illustrated in Figure 1.3, the pattern of predicted logits across our four conditions is consistent with H2. The corresponding odds ratios are calculated in Table 1.5. These should be interpreted as follows: for example, relative to the reward × knowledge sharing condition, participants in the reward × no knowledge sharing condition are 33% (i.e., $1 - 0.67$) less likely to end up in a higher category of help. As our ordinal regression results in Panel A of Table 1.4 highlight, the reward environment × knowledge sharing environment interaction we observe in Figure 1.3 is statistically significant ($p = 0.05$). This result provides support for H2.

Results consistent with H2 imply that helpers expect greater rewards from recipients of their help when it involves knowledge sharing relative to when it does not involve knowledge sharing. We use post-experimental questionnaire data to assess whether this is the case. Specifically, helper participants in the reward condition predicted how much they would get back from their paired partner for every possible level of help that they could provide (i.e., one to seven puzzles). Helpers expected an average reward of €6.54 when help included knowledge sharing and an average reward of €5.77 when help did not include knowl-

edge sharing. To test whether reward expectations differ across conditions, we compare the number of participants who were below and above the median average expected reward across both samples. More participants expected a reward greater than the median when help involved knowledge sharing relative to when help did not involve knowledge sharing ($\chi^2 = 2.63; p = 0.05$).

To provide additional support for the theory underlying H2, we also examine whether participants providing help with knowledge sharing believe that recipients of their help will feel a stronger psychological bond with them. To assess this possibility, the post-experimental questionnaire provided helpers the following statement: "If I helped my partner a lot, then s/he would think I am a good teammate".[19] Participants responded using a seven-point Likert scale with "1" being "strongly disagree" and "7" being "strongly agree". Helpers believe that recipients of their help will feel a stronger psychological bond toward them when this help includes knowledge sharing relative to when it does not involve knowledge sharing (5.76 versus $5.08; t = 2.33; p = 0.01$).[20] Collectively, these results provide support for the theory underlying H2.

Table 1.5: Odds Ratio[a] per Experimental Condition

	No Reward		**Reward**	
	Knowledge Sharing (n=21)	**No Knowledge Sharing (n=21)**	**Knowledge Sharing (n=20)**	**No Knowledge Sharing (n=21)**
Odds ratio	0.16	0.41	1.00	0.67

[a] The odds ratio indicates the likelihood of offering more help (ending up in a higher category of help), relative to the reference category, which is the Reward $\times$ Knowledge Sharing condition. Odds ratios >1 indicate the likelihood to offer more help is higher relative to the reference category, whereas odds ratios <1 indicate this likelihood is smaller.

1.4.3 Reward from Recipients of Help to Helpers

We now assess whether helpers are correct to believe that those receiving help with knowledge sharing feel a stronger psychological bond with them and reward them more for their help relative to those receiving help without knowledge sharing. First, to assess the extent that recipients of help feel a bond with their paired helper, we asked them how much they agreed with the following statement: "I perceived myself to be a teammate of the person I was paired with." Recipients of help responded using a seven-point Likert scale with "1" being "strongly disagree" and "7" being "strongly agree." Consistent with helpers' expectations, those they helped did feel a stronger psychological bond with them in

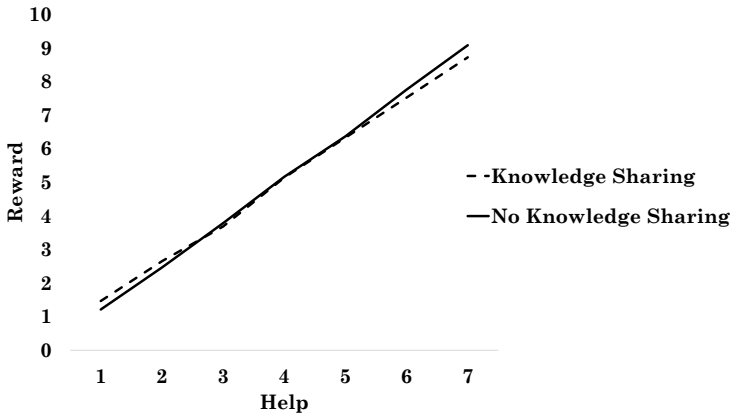
[19] Prior research in accounting uses this statement as a measure to assess the psychological bond among group members (e.g., Towry 2003).

[20] Moreover, this measure is positively correlated with helpers' reward expectations ($r = 0.39; p<0.01$).

the knowledge sharing condition relative to the no knowledge sharing condition (3.79 versus $2.81; t = 2.61; p<0.01$).

Next, we examine the effect of knowledge sharing on the extent to which recipients of help reward help. Recall, we utilized a strategy method such that recipients of help recorded how much they would reward each possible level of help provided (i.e., between 1 and 7 puzzles). Figure 1.4 summarizes the average rewards for each possible level of help across our knowledge sharing environments. As suggested by this figure, we observe no significant differences in rewards across our knowledge sharing conditions for any possible level of help (all $p's>0.50$).

Figure 1.4: Rewards from Recipients of Help in Return for each Possible Level of Help across Knowledge Sharing Environments



That said, the fact that we impose knowledge sharing on recipients of help who may or may not want this form of help could contribute to the lack of reward premium for help involving knowledge sharing. Specifically, a subset of those who got help reported that they enjoyed attempting to solve the puzzles and, thus, would seemingly not want help with the solutions. Thus, if recipients of help do, in fact, provide higher rewards for help involving knowledge sharing relative to help that does not, then we would more likely detect an effect in the subsample of participants who do not enjoy solving the puzzles.

To investigate this possibility, we examine the effect of knowledge sharing on rewards from recipients of help across the subsample of participants who most and least enjoyed solving the puzzles. We form these subsamples by performing a median split based on participants' response to the following post-experimental statement, "I enjoyed solving these number series puzzles." Participants responded using a seven-point Likert scale with "1" being "strongly disagree" and "7" being "strongly agree." When examining the effect of knowledge

sharing on rewards across these subsets, we both rank rewards for each level of help (i.e., from "1" for the participant providing the lowest average reward to "42" for the participant providing the highest average reward) and then average these ranks across each level of help.

Consistent with the above logic, we find that participants in the low puzzle-enjoyment subsample provide marginally greater rewards in return for help involving knowledge sharing relative to help that does not involve knowledge sharing (two-tailed $p = 0.08$). We observe no significant difference in rewards across our knowledge sharing environments for participants in the high puzzle-enjoyment subsample (two-tailed $p>0.10$).[21] Collectively, these results suggest that helpers' expectations for greater rewards for help involving knowledge sharing relative to help that does not are realized for at least the subset of recipients who do not enjoy solving the puzzles themselves. In practice, individuals would likely not ask for help on tasks they want to solve themselves. In that case, many helpers will likely be paired with individuals who provide greater rewards for knowledge sharing.

1.5 Conclusion

We examine how individuals' willingness to help others depends on whether or not this help involves knowledge sharing. We do so across environments that vary whether or not those providing help can receive rewards from the recipients of this help. In our experiment, one set of participants learns how to perform a task and decides how much help to provide another set of participants, where joint payoffs but also helpers' personal costs increase in the help provided. We manipulate whether or not help involves the sharing of task-relevant knowledge, holding the economic cost and benefit of help constant.

Results suggest that knowledge sharing's effect on helping behavior hinges on whether or not helpers can expect rewards in return from recipients of their help. Knowledge sharing decreases help in an environment where helpers cannot receive rewards from those they help, but increases help motivated by anticipated rewards. Our results are consistent with theory suggesting that individuals perceive knowledge as an important part of their identity, making it costly to freely share but facilitating greater trust that recipients of this knowledge will reciprocate with future rewards. Moreover, we identify an important subsample of recipients that do, in fact, provide greater rewards to helpers for help involving knowledge sharing.

Our findings suggest that the extensive body of research examining general helping and cooperative behavior that does not involve knowledge sharing will not likely generalize to knowledge sharing domains. Specifically, the impact of

[21] Consistent with the pattern of results suggested by these simple effects, ANOVA results find a significant knowledge sharing $\times$ task enjoyment subsample interaction (two-tailed $p = 0.03$).

knowledge sharing on helping behavior will depend on other aspects of the environment such as the perceived likelihood that recipients of help can reciprocate in some way. To the extent that prior research on general helping behavior does not generalize, additional research is needed to examine the impact of management accounting practices on this specific form of help.

By studying the incremental effect of knowledge sharing on helping behavior, we can contribute to a better understanding of practice. For example, our results contribute to a better understanding of why performance evaluation and reward systems specifically target knowledge sharing when cooperative behavior more generally is already rewarded (Hackett 2000). Moreover, our results suggest that requesting knowledge from employees can actually increase the efficacy of trust-based, implicit contracts where they share their knowledge today in the hopes for future rewards in return (e.g., Miller and O'leary 1987; Sprinkle and Williamson 2004).

That said, limitations of our study provide opportunities for future research. For example, we use a stark, single-period setting to isolate the behavioral impact of knowledge sharing on helping behavior. Future research can examine how adding important contextual variables such as hierarchies, face-to-face interactions, and multiple period relations potentially impacts our findings. For example, while we operationalize the potential benefits of helping behavior using money, knowledge sharing could also potentially increase the efficacy of other, less tangible benefits such as recognition. Specifically, in an environment where the veil of anonymity is removed, future research can examine whether individuals share knowledge to receive the respect and admiration of others, independent of any monetary rewards it provides.

Chapter 2

Status Differences and Knowledge Sharing: The Effect of Incentives

Abstract
We examine how incentive systems influence knowledge transfer between individuals with equal or different status. In our experiment, dyad members receive group or individual incentives, while status is manipulated by assigning job titles with corresponding role descriptions. Our results suggest that significantly more knowledge is shared under group incentives relative to individual incentives when status differences are present, whereas the amount of knowledge shared does not differ for equal-status dyads across these incentive manipulations. These findings are in line with theory suggesting that group incentives can induce cooperative behavior, mitigating the negative effects of status differences on knowledge sharing. In contrast, for equal-status groups, individual incentives can provide sufficient economic motive to share knowledge. We contribute to the literature and practice by showing that the effect of incentives depends on the social context.

2.1 Introduction

Differences in status emerge in almost every organization and affect how individuals interact with each other (Bales 1950; Bol et al. 2010; Bunderson and Reagans 2011).[1] For example, high status individuals often ignore contributions of low status individuals because they feel superior, whereas low status individuals often do not speak up because they feel less valuable. Consequently, status differences are likely to impact the extent of knowledge sharing,[2] which is an important factor for organizational success (Ditillo 2004; Vera-Muñoz et al. 2006).

Researchers often argue that the way in which status differences affect an interaction depends on the personal characteristics of the individuals involved (e.g., Anderson et al. 2001; Anderson and Kilduff 2009). In this paper we investigate whether the impact of status differences on knowledge sharing can also be influenced by management control systems, and in particular, incentives. A growing literature studies how incentives affect knowledge sharing and suggests that existing relationships within groups may influence knowledge sharing and moderate the effect of incentives (e.g., Kelly 2010; Quigley et al. 2007). Building on this insight, we take the social context into account by examining how incentive systems impact knowledge sharing and performance between individuals with equal or different status.

Existing literature indicates that status differences generally have a negative effect on knowledge sharing (e.g., Bunderson and Reagans 2011). Since group incentives create a cooperative goal orientation, they can positively influence knowledge sharing in groups with or without status differences (Deutsch 1949; Vera-Muñoz et al. 2006). However, the beneficial effect of group incentives may be more pronounced in groups with status differences. A cooperative goal can lead group members to interact more constructively, increasing their motivation to exchange information (Bartol and Srivastava 2002; Drake et al. 1999), and can minimize distinctions between group members, reducing barriers to interaction that otherwise would impede discussion (Edmondson 2002). Although individual incentives have also been shown to induce knowledge sharing, as group members realize that not only the group's performance but also their own performance will increase when they share knowledge (e.g., Siemsen et al. 2007), such incentives do not necessarily lead to shared goals (Deutsch 1949; Siemsen et al. 2007). In the absence of a shared goal, behaviors will be less constructive and more formal, which will work against knowledge sharing, especially for group members with unequal status as they need a cooperative goal orientation to overcome the negative effect of their status differences (Tjosvold 1985). We thus expect the positive effect of group incentives compared to individual incentives on knowledge

[1] Status is the extent to which an individual is respected or admired by others (Magee and Galinsky 2008).

[2] We define knowledge sharing in organizations as individuals sharing organizationally relevant information, ideas, suggestions, and expertise with one another (Bartol and Srivastava 2002).

sharing to be greater for groups with status differences than for groups without status differences.

We also investigate the effect of knowledge sharing on group performance. Although previous research argues that more knowledge sharing leads to higher performance (e.g., Quigley et al. 2007), this relationship has not been directly tested in a context with status differences. The effect of knowledge sharing on performance is not clear in this context. Indeed, performance could actually decrease when group members with different status interact (Anderson and Brown 2010; Chen, Trotman, and Zhou 2014), for instance, if high status individuals disregard the knowledge shared by lower status individuals (Nembhard and Edmondson 2006). Thus, whether knowledge sharing also leads to higher performance in a context with status differences is an empirical question.

To address the above questions, we conduct a 2×2 experiment in which we manipulate (1) status differences (status difference versus no status difference) and (2) incentive systems (group incentives versus individual incentives). We ask participants to work in dyads on a spreadsheet error detection task; the experiment's 168 participants thus correspond to 84 dyads. While all participants receive information that is helpful to identifying and correcting mistakes in the spreadsheet, dyad members receive different, incomplete sets of information, with error detection designed to be higher if the two sets of information are used together.[3] Dyad members can communicate with each other via an instant messaging system. The conversations are coded by independent coders to construct our measure of the extent of knowledge sharing. As explained below, we manipulate status differences by randomly assigning job titles and corresponding role descriptions to participants. In addition, we manipulate incentive systems such that greater error detection at the individual (dyad) level leads to higher individual (group) pay.

Unlike many previous studies, we isolate status differences from potentially confounding factors such as power, experience, expertise, skills, or intelligence by randomly assigning job titles and corresponding role descriptions to create dyads with and without status differences. Although there exists a consensus that status and power are distinct constructs with different antecedents and consequences (Magee and Galinsky 2008), scholars often take social hierarchies as encompassing both power and status (e.g., Bunderson and Reagans 2011). Also, "real" status assignments (e.g., assigning the highest status to the best performer on a task) are sometimes used in experiments to investigate status differences (e.g., Eckel and Wilson 2007), but this makes it hard to attribute variation in

[3] We recognize that in practice high and low status individuals will not always work on the exact same task. Still, they often have to work together as a team where they each bring in different perspectives and contribute relevant, complementary knowledge (for example, audit and consulting teams, research teams, etc.). Even when there is a formal, centralized structure, team decision making is very common (e.g., Hollenbeck, Ilgen, LePine, Colquitt, and Hedlund 1998; Vroom and Yetton 1973).

behavior solely to status differences.[4] By distinguishing status from power, intelligence, or experience, we can better understand the underlying construct.

Our results indicate that significantly less knowledge is shared in dyads with status differences under individual incentives relative to group incentives, whereas dyads without status differences do not differ significantly in terms of the amount of knowledge shared under the two incentive systems. Furthermore, the results show that knowledge sharing positively influences group performance, and that group behavior mediates the effect of status differences and incentives on knowledge sharing and performance. In particular, compared to dyads with status differences that receive individual incentives, dyads with status differences that receive group incentives interact in a more constructive and less formal way, positively affecting the extent of knowledge transfer. In additional analyses conducted at the individual level rather than the dyad level, we find that both high and low status members under group incentives show less of the behavior typically linked to their status that negatively affects knowledge sharing. For example, compared to individual incentives, group incentives lead higher status individuals to pay more attention to the input of lower status individuals and lead lower status individuals to speak up more.

This paper contributes to the literature and practice in several ways. First, we show that social context influences the effectiveness of management control systems. More specifically, we find that the effect of incentives on knowledge sharing depends on the presence or absence of status differences. This finding can shed light on why management control systems do not always have the intended outcomes and why scholars do not always reach the same conclusions when studying the effects of such systems.[5] Second, we show that the behavior associated with status differences can be managed, as status differences matter less under group incentives than under individual incentives. This finding extends prior research that attributes the effect of status differences on organizational interactions to the personal characteristics of the individuals involved. Third, we show that in groups with status differences, the behavior of not only high status individuals but also low status individuals can affect the degree of knowledge sharing. This finding provides evidence on the role of lower-ranked individuals in group interactions, a question that has received little attention in the literature to date (Bunderson and Reagans 2011). Finally, we find that job titles can formalize status differences and thus have unintended effects: even absent differences in power or in characteristics such as experience, job titles can create status-based expectations and affect behavior accordingly. Overall, our results suggest that steps taken to mitigate the negative consequences of so-

[4] In particular, it is hard to determine whether an individual is behaving in a certain way because of higher status, intelligence, experience, or a combination of these factors. Although status, intelligence, and experience might be correlated, this will not always be the case.

[5] For example, researchers have found positive (Davenport and Prusak 1998), negative (Bock et al. 2005), and no effects (Lin 2007a) of incentives on knowledge sharing.

cial hierarchies may not result in the predicted outcomes unless they take status differences into account.[6]

In the next section, we discuss related literature and develop our hypotheses. In Section III we present the experimental design. Results are reported in Section IV. Section V concludes.

2.2 Literature and Hypotheses

2.2.1 Status Differences and Knowledge Sharing

Differences in status frequently emerge in organizations and affect how individuals interact with each other (Bales 1950; Bol et al. 2010; Bunderson and Reagans 2011). Status differences might develop because of a centralized organizational structure, but can just as well arise in decentralized teams due to differences in experience, expertise, gender, race, etc. (Bunderson and Reagans 2011). In the context of knowledge sharing, most authors find negative effects of status differences. For instance, lower status individuals tend not to speak up in the presence of higher status individuals because they want to avoid conflict (Bol et al. 2010), they fear disapproval (Lee 1997), or they underestimate their own contribution (Anderson and Brown 2010; Nembhard and Edmondson 2006). This last factor in particular seems to be a common constraint to knowledge sharing. Chen et al.'s (2014) recent experiment using hierarchical audit teams provides a good example of this phenomenon. Auditors lower in the hierarchy participate less in group interactions because they think that their contribution to group performance is not valuable. High status individuals often do not help reverse this tendency, as they can act in an authoritarian and unsupportive way (Nembhard and Edmondson 2006). Moreover, even when lower status individuals do speak up in the presence of higher status individuals, their input is sometimes ignored by higher status individuals that feel superior. In summary, the contributions of higher status individuals are often given too much weight while those of lower status individuals are often overlooked (Bunderson and Reagans 2011).

Hollingshead (1996) shows that these phenomena can influence performance. In particular, she finds that groups with status differences make poorer decisions than equal-status groups, as the former do not pay enough attention to the critical information of lower status individuals. Chen et al. (2014) also find that hierarchical groups in which group members have to interact underperform those in which group members complete tasks individually, and that this result is driven by lower status individuals' tendency not to speak up during interactions. Not surprisingly, scholars often advise organizations to de-emphasize status differences to improve knowledge sharing (Hinds and Pfeffer 2003; Nonaka 1994).

[6] For example, adapting the tasks for which high power individuals are responsible, so they may focus on less organizational-centered areas of responsibility, as Overbeck and Park (2001) suggest may not be sufficient if it does not affect the perceived status differences.

Not all researchers come to this conclusion, however. According to Larson, Christensen, Franz, and Abbott (1998), individuals in a leadership role can facilitate information sharing by ensuring that different pieces of information are shared and acknowledged during interactions. A few other studies take a more nuanced view, arguing that how status differences affect group dynamics depends on how individuals with high status use such status (Bunderson and Boumgarden 2010). For example, a constructive response from high status individuals can help overcome the negative effects of status differences. In particular, by showing that they appreciate others' contribution, high status individuals can make lower status individuals feel safer in speaking up (Nembhard and Edmondson 2006).

2.2.2 Goals, Incentives, and Knowledge Sharing

While many researchers attribute the way in which individuals use their status to personality characteristics (e.g., Chen, Lee-Chai, and Bargh 2001; Keltner, Gruenfeld, and Anderson 2003), recent studies suggest that this relation can be impacted by external conditions (e.g., Van der Vegt, De Jong, Bunderson, and Molleman 2010). In this paper we focus on the role of management control systems. More specifically, we focus on monetary incentives, which Deutsch (1949) refers to as the primary determinant of group interactions.

Our predictions build on the goal interdependence theory of Deutsch (1949), which has been validated by a number of more recent studies such as Johnson (2003). This theory argues that individual's interactions are determined by the way in which their goals are structured. In line with this theory, we expect the negative effect of status differences on knowledge sharing to be less pronounced when individuals receive incentives based on group performance (Ferrin and Dirks 2003). Such incentives emphasize group members' shared identity and purpose (Vera-Muñoz et al. 2006) and hence increase constructive behaviors, even when group members are very different from each other (Van der Vegt and Bunderson 2005). Since the way in which a group interacts can affect the extent of knowledge sharing (Cooke and Szumal 1994; Hackman and Morris 1975), constructive behaviors are expected to increase knowledge sharing, especially in groups with status differences. For example, given more constructive interactions, low status individuals might feel less inhibited to speak up. Moreover, when status differences are present, individuals often interact in a formal way, which tends to impede the discussion (Edmondson 2002). A cooperative orientation minimizes distinctions between group members (Beersma, Hollenbeck, Humphrey, Moon, Conlon, and Ilgen 2003) and could therefore make them express these distinctions less (i.e., interact less formally), which in turn leads to more knowledge sharing.

In contrast, while individual incentives should encourage group members to

share knowledge with each other when it is mutually beneficial for them to do so (e.g., Siemsen et al. 2007), these incentives do not generate the same cooperative interactions as group incentives because group members do not work towards a shared goal. Moreover, individual incentives are likely to lead group members to focus on what differentiates them from others (e.g., status) and make the interaction more formal. Thus, individual incentives are likely to decrease group members' knowledge sharing, especially in groups with status differences.

To summarize, status differences can limit knowledge sharing as a consequence of negative behavior by both high and low status group members. Group incentives can overcome this effect by creating a cooperative orientation that leads to more constructive and less formal behaviors that facilitate knowledge sharing, while individual incentives do not create the same cooperative orientation and may even reinforce the negative effects of status differences because of their focus on the self. Equal-status groups, in contrast, face fewer barriers to communication and thus do not require group incentives to cooperate. This discussion leads to the following hypotheses:

Hypothesis 1 *The positive effect of group incentives compared to individual incentives on knowledge sharing is greater under status differences than under no status differences*

Hypothesis 2 *Constructive and formal behaviors mediate the effect of incentives and status differences on knowledge shared.*

2.2.3 The Effect of Knowledge Sharing on Performance with Status Differences

In addition, we investigate the effect of knowledge sharing on group performance. Although previous research shows a positive effect of knowledge sharing on performance (e.g., Quigley et al. 2007), the direction of this effect is not that clear in a context with status differences. For instance, as discussed above, even if low status individuals speak up, high status individuals might disregard the knowledge shared by the low status individuals (Bunderson and Reagans 2011; Larson et al. 1998), which could result in a decrease in performance. In line with this view, Anderson and Brown (2010) conclude that compared to mixed-status groups, equal-status groups observe better performance on tasks that benefit from the aggregation of information.

Given mixed prior evidence, the impact of knowledge sharing on performance is ultimately an empirical question. We examine whether the positive effect of knowledge sharing on performance holds for different social contexts and as such, we state our hypothesis as follows:

Hypothesis 3 *More knowledge sharing leads to higher performance.*

2.3 Method

To test our hypotheses, we conducted a computer-based experiment. We randomly sorted participants into dyads. We then manipulated status differences (status difference versus no status difference) and incentives (group incentives versus individual incentives) across dyads and measured the resulting knowledge sharing and performance. Participants comprised 168 undergraduate business students (60 women, 108 men) resulting in 84 dyads. Mean participant age was 22. Participants received course credit for participation and could earn up to €22 based on their performance.[7] The average payout was €9.05, with a standard deviation of €3.11.

2.3.1 Task

The task was the same for each participant: identify and correct as many mistakes as possible in a company's payroll expense spreadsheet (Howe and Simkin 2006; Taylor 2006). Participants received information that could help them identify mistakes in the spreadsheet.[8] This information was distributed such that dyad members received different but complementary sets of information that led to the greatest error detection when used together. Hence, to obtain the highest performance (i.e., the largest number of errors identified and corrected), dyad members had to share their information. Dyad members could communicate with each other via an instant messaging system.

2.3.2 Manipulations

We randomly assigned the 84 dyads to four conditions based on a 2×2 design where the manipulations consisted of status difference versus no status difference and group incentives versus individual incentives.[9] We discuss these two sets of manipulations in turn.

Status

In line with prior social psychology experiments (e.g., Fast, Halevy, and Galinsky 2012; Hristova, Grinberg, Georgieva, and Borisova 2013), we manipulated status by randomly assigning job titles and corresponding role descriptions across dyad members, as differences in job titles have been shown to be associated with differences in status (Lount and Pettit 2012) even when there is no real difference in job task (Baron and Bielby 1986; Smith, Hornsby, Benson, and Wesolowski

[7] Approval for the experiment was granted by the institution where the experiment took place.

[8] See the Appendix for a reproduction of the spreadsheet and examples of the information that participants received.

[9] Initially, 86 dyads participated in the experiment. We removed two from the analysis because the post-experiment questionnaire revealed that they did not understand the instructions. We obtain similar results, however, when we include these two dyads in the analysis.

1989). In the status difference condition, one student in a dyad was assigned the role of a manager of the head office while the other student was assigned the role of a recently hired junior assistant of a regional office. In the no status difference condition, both students were assigned the same role of employee. We note that an advantage of using this approach is that differences in power, experience, expertise, skills, or intelligence do not affect our manipulation.[10] If these characteristics were to play a role, it would be hard to determine whether an individual is behaving in a certain way because of, for example, higher status, higher intelligence, or a combination of both.[11] In addition, it does not matter if the way in which dyad participants interacted with each other was driven by the motive to justify the existing status structure, as prior work shows that this is what people tend to do in real life (e.g., Fiske, Cuddy, Glick, and Xu 2002).

To test whether the status manipulation had the desired effect , we conducted a manipulation check. On a scale from 0 (role of my partner) to 100 (own role), participants assigned the managerial role indicated that their own status was more admired (mean: 82.62) and respected (mean: 81.90) than that of their dyad partner, and participants assigned the junior assistant role indicated that their status was less admired (mean: 17.57) and respected (mean: 20.69) than that of their dyad partner. Employees, in contrast, felt there was no difference between themself and their dyad partner with regard to admiration and respect (means of 51.79 and 52.54, respectively). These scores on admiration and respect are statistically significant across roles (all $p<0.01$, two-tailed), and thus we conclude that the status difference manipulation had the desired effect.[12]

Goal Interdependence: Incentives

In the group incentives condition, the dyad received €1 for every error a dyad member detected and corrected. At the end of the experiment, the total earned by the dyad was equally divided between the dyad members. Thus, in this condition dyad members received the same reward, which was based on the error detection and correction performance of both dyad members. In the individual incentives condition, each participant received €1 for every error he or she detected and corrected. At the end of the experiment, each participant kept their own earnings. Thus, in this condition dyad partners could receive a different monetary reward, which was based entirely on one's error detection and correc-

[10] These characteristics would affect our manipulation if we had assigned the highest status to the best performing students on a pre-experiment task, for example.

[11] Although status and intelligence might be correlated, this need not be the case. Indeed, organizations often fail to select the right (e.g., most competent) individuals for leadership positions (Anderson and Brown 2010).

[12] When we run ANOVA's with job title and incentives as independent variables and the amount of admiration and respect as dependent variables, we do not find a main or interaction effect of incentives. Hence, our incentive manipulation did not affect the perceived presence of status differences between dyad members.

tion performance.

In a check of the goal interdependence manipulation, participants that received individual incentives scored the statement "It was important to find and correct as many errors as possible together with my partner" significantly lower than participants that received group incentives ($p<0.01$, two-tailed).[13]

2.3.3 Procedure

The experiment was conducted in different sessions in a computer lab with networked computers. On average, eight dyads performed the experiment during one session. Participants first answered some demographic questions and read the instructions. They then worked on the error detection and correction task over a twenty-minute period. Finally, they completed a post-experiment questionnaire. Overall, each session lasted about 45 minutes.

The instructions urged participants to read everything carefully. Job titles and corresponding role descriptions were provided, as well as information about their incentive scheme. Moreover, dyad members were given distinct but complementary "knowledge units", that is, pieces of information that could be used to identify and correct errors, and were told that their dyad partner could have different knowledge relevant to completing the task.

The spreadsheet, which was identical for every participant, was not complicated and did not require advanced spreadsheet skills, domain-specific knowledge, or task-specific experience. Participants could individually examine the spreadsheet for five minutes. Over the next fifteen minutes they could communicate with their dyad partner about the task via an instant messaging system while continuing to examine the spreadsheet and filling in a table in which they identified cells that contained an error and entered their correction. Throughout this process, time remaining was displayed on participants' screens. Because some participants might know each other, we required that dyads work together anonymously (i.e., they were not allowed to exchange personal information).

The post-experiment questionnaire included manipulation checks and questions about the perceived behavior of dyad partners, among other things. Most of the responses were on a Likert scale ranging from 0, "I totally disagree", to 100, "I totally agree".

[13] Just as our status manipulation does not seem to be affected by our incentive manipulation, we only find a main effect of incentives for this statement when we run an ANOVA with incentives and status differences as independent variables. The main effect of status differences and the interaction effect of status differences and incentives are insignificant. This indicates that our status manipulation did not affect the extent to which dyad members perceived the task as a group versus individual task, which increases confidence that our status manipulation solely affected admiration and respect, rather than also affecting team identity.

2.3.4 Measures

Our main dependent variable of interest captures the extent of knowledge sharing between members of a dyad, *Knowledge shared*. To quantify knowledge sharing, four trained students coded the communication between dyad members. The coders were not aware of the goal of the experiment and were blind to dyad participants' identity. After individually coding participants' electronic messages, coders compared their work and jointly reviewed messages to resolve disagreements. Using the coded communications, we construct *Knowledge shared* as the number of knowledge units shared that could help a dyad member identify and correct errors. Those helpful knowledge units could be parts of the information we provided participants with, but also elements participants' figured out on their own, like mathematical errors. Cronbach's alpha for interrater reliability of *Knowledge shared* is 0.94. Other dependent variables of interest are *Group performance*, which we measure as the number of mistakes corrected by a dyad, and in additional analysis, *Group performance without own knowledge*, which we measure as the number of mistakes corrected by a dyad specifically as a result of knowledge sharing.

To test whether the extent of cooperative and formal behavior influences the effect of incentives and status differences on knowledge sharing, we again rely on the coded conversations. *Constructive behavior* takes a score between 0 and 2. A score of 2 was assigned if a dyad's communications were generally constructive, for instance, if they showed appreciation (e.g., "thank you for your help", "that is a very good remark!", "we are the best"), encouragement (e.g., "no problem" after someone made a mistake or asked for more time before starting the discussion), and regard for each other's information ("I believe you"), a score of 1 was assigned if the communications were generally neutral in tone, and a score of 0 was assigned if the communications were generally destructive, for example, if dyad members criticized each other for making a mistake or working too slowly, or if they expressed doubts about the value of each other's information. Similarly, Formal behavior is scored between 0 and 2. If dyad members started the conversation with a formal greeting, addressed each other using official titles, employed formal pronouns, or talked in a subservient or elevated way, *Formal behavior* was coded a 2.[14] If such communication was present to a limited extent then this measure was coded a 1, while a 0 was assigned if the interaction was generally informal. Cronbach's alpha for interrater reliability is 0.74 for *Constructive behavior* and 0.84 for *Formal behavior*.

[14] Note that participant's behavior was never inconsistent with their status role. Although coders occasionally also found evidence of employees talking in a more elevated or subservient way, when they encountered this behavior in the dyads with status differences, it was always the manager who spoke in an elevated manner and the junior assistant who spoke in a subservient manner, rather than the other way around.

2.4 Results

2.4.1 Descriptive Statistics

Panel A of Table 2.1 reports descriptive statistics for the above variables. As we can see, *Knowledge shared* is highest for dyads with a status difference and group incentives (13.76), while dyads with a status difference and individual incentives share remarkably less knowledge (8.24) than the other three dyad types. Figure 2.1 presents this evidence graphically. In Figure 2.2, we find a similar pattern if we alternatively measure the extent of knowledge sharing using the number of lines, words, and interactions (i.e., the number of times the conversation jumped from one dyad member to the other) in a dyad's communications. Each of these variables is strongly positively correlated with *Knowledge shared* (all $r>0.6, p<0.01$, two-tailed), providing some assurance that our main dependent variable is coded objectively.

Table 2.1: Descriptive Statistics

Panel A – Means and Standard Deviations

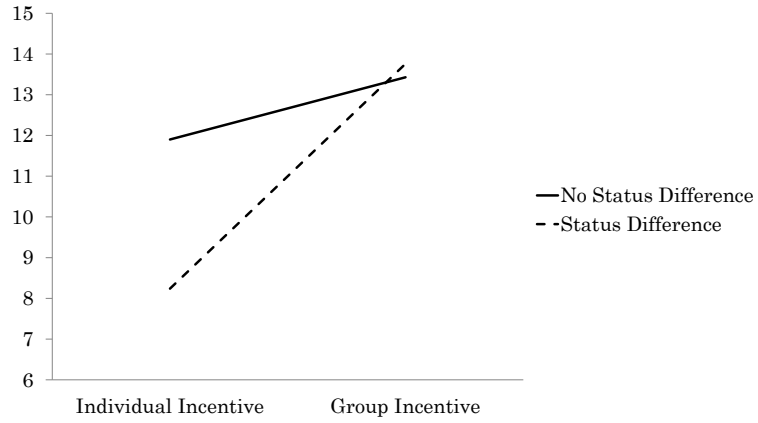
	Status Difference		**No Status Difference**	
	Individual Incentive (n=21)	**Group Incentive (n=21)**	**Individual Incentive (n=21)**	**Individual Incentive (n=21)**
Knowledge shared[a]	8.24 (5.37)	13.76 (5.25)	11.90 (6.50)	13.43 (4.92)
Group performance[b] (GP)	17.62 (4.80)	18.10 (6.69)	18.71 (6.59)	18.00 (4.54)
GP without own knowledge[c]	4.90 (2.30)	6.81 (4.08)	6.57 (4.25)	6.86 (3.99)
Constructive behavior[d]	0.95 (0.59)	1.29 (0.46)	1.14 (0.66)	1.00 (0.45)
Formal behavior[e]	0.86 (0.85)	0.29 (0.64)	0.00 (0.00)	0.10 (0.26)

Panel B – Pearson Correlation Matrix (n = 84 dyads)

	Variable	**1**	**2**	**3**	**4**	**5**
1	Knowledge shared	1				
2	Group performance (GP)	0.52***	1			
3	GP without own knowledge	0.71***	0.80***	1		
4	Constructive behavior	0.38***	0.25**	0.34***	1	
5	Formal behavior	-0.36***	-0.21*	-0.31***	-0.05	1

*, **, *** indicate significance at the 10 percent, 5 percent, and 1 percent levels (two-tailed).
In Panel A, we report means for the main variables of interest, with standard deviations in parentheses, and in Panel B we report Pearson correlations for these variables. The variables are based on dyads' electronic communications.
[a] Knowledge shared comes from the chat communications and is equal to the number of knowledge units shared within a dyad.
[b] Group performance is equal to the number of mistakes identified and corrected by a dyad.
[c] Group performance without own knowledge is equal to the number of mistakes identified and corrected as a result of knowledge shared by a dyad partner.
[d] Constructive behavior comes from the chat communications and measures whether dyad members interacted in a constructive way (e.g., thanked each other after sharing information). Scores range between 0 and 2, with a higher score indicating that the interaction was more constructive.
[e] Formal behavior comes from the chat communications and indicates whether dyad members communicated in a formal way (e.g., employed formal pronouns). Scores range between 0 and 2, with a higher score indicating that the interaction was more formal.

Figure 2.1: The Effect of Status Differences[a] and Incentives[b] on Knowledge Shared[c]

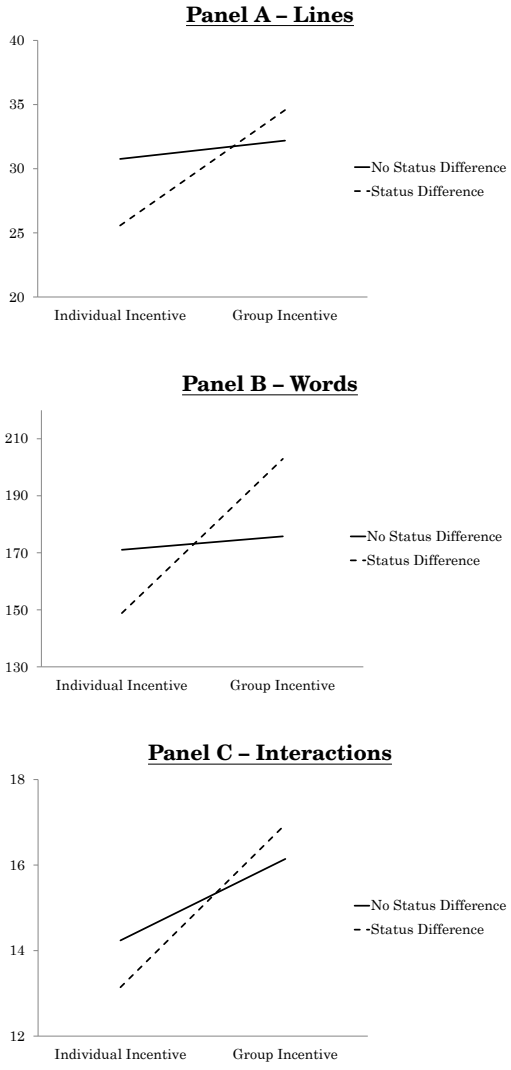


[a] *Status differences* are manipulated on a between-subjects basis by randomly assigning different job titles and corresponding role descriptions to dyad members. Under the status difference condition, a dyad consists of an experienced manager of the head office and a recently hired junior assistant of a regional office. Under the no status difference condition, a dyad consists of two equal employees.
[b] *Incentives* are also manipulated on a between-subjects basis. Under the group incentives condition, participants received a reward based on the performance of their dyad as a whole. Under the individual incentives condition, participants received a reward based on their own performance only.
[c] *Knowledge shared* comes from the chat communications and is equal to the number of knowledge units shared within a dyad.

Turning to descriptive statistics on dyad behavior, Table 2.1 shows that group incentives increase constructive behavior under the status difference condition (from 0.95 with individual incentives to 1.29 with group incentives), but decrease constructive behavior under the no status difference condition (from 1.14 with individual incentives to 1.00 with group incentives) – see also Figure 2.3. In addition, most formal behavior occurs in groups with individual incentives and status differences (0.86). Finally, group performance is highest in dyads without status differences and individual incentives (18.71), closely followed by dyads with group incentives (18.10 with a status difference and 18.00 with no status difference). Dyads with a status difference and individual incentives perform worst (17.62).

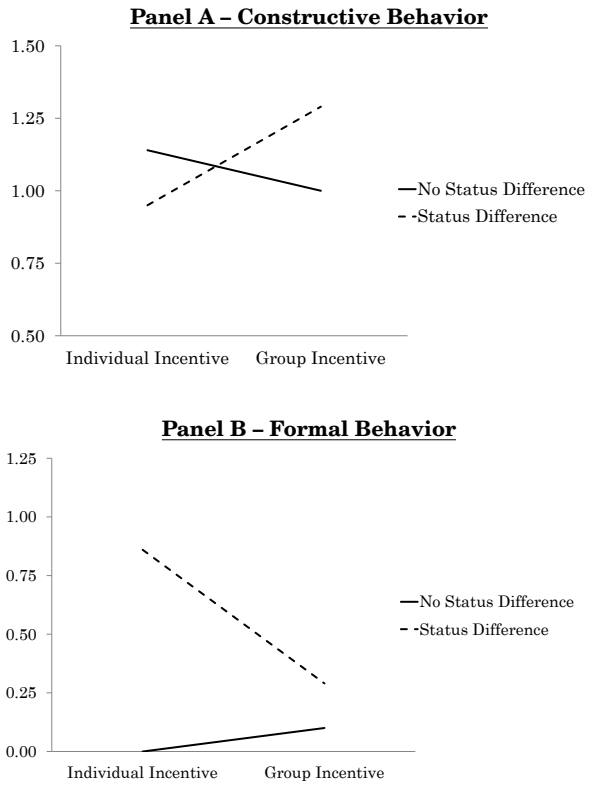
Panel B of Table 2.1 reports the correlation matrix for the above variables. We find that *Group performance* is significantly positively correlated with *Knowledge shared* ($r = 0.52, p<0.01$, two-tailed), indicating that more knowledge sharing leads to higher group performance. We also find a positive and significant correlation between *Knowledge shared* and *Constructive behavior* ($r = 0.38, p<0.01$, two-tailed), while *Formal behavior* seems to mitigate knowledge sharing, as it is significantly negatively correlated with *Knowledge shared* ($r = -0.36, p<0.01$, two-tailed).

Figure 2.2: The Effect of Status Differences[a] and Incentives[b] on Lines[c], Words[d], and Interactions[e]



[a] *Status differences* are manipulated on a between-subjects basis by randomly assigning different job titles and corresponding role descriptions to dyad members. Under the status difference condition, a dyad consists of an experienced manager of the head office and a recently hired junior assistant of a regional office. Under the no status difference condition, a dyad consists of two equal employees.
[b] *Incentives* are also manipulated on a between-subjects basis. Under the group incentives condition, participants received a reward based on the performance of their dyad as a whole. Under the individual incentives condition, participants received a reward based on their own performance only.
[c] *Lines* counts the average number of lines in a dyad's communications.
[d] *Words* counts the average number of words in a dyad's communications.
[e] *Interactions* counts the average number of interactions in in a dyad's communications. (i.e., the number of times the conversation jumped from one dyad member to the other).

Figure 2.3: The Effect of Status Differences[a] and Incentives[b] on Constructive[c] and Formal Behaviors[d]



[a] *Status differences* are manipulated on a between-subjects basis by randomly assigning different job titles and corresponding role descriptions to dyad members. Under the status difference condition, a dyad consists of an experienced manager of the head office and a recently hired junior assistant of a regional office. Under the no status difference condition, a dyad consists of two equal employees.

[b] *Incentives* are also manipulated on a between-subjects basis. Under the group incentives condition, participants received a reward based on the performance of their dyad as a whole. Under the individual incentives condition, participants received a reward based on their own performance only.

[c] *Constructive behavior* comes from the chat communications and measures whether dyad members interacted in a constructive way (e.g., thanking each other after sharing information). A dyad's communications were assigned a 2 if they were largely constructive, 1 if they were generally neutral, and 0 if they were destructive.

[d] *Formal behavior* comes from the chat communications and measures whether dyad members communicated in a formal way, for example, by addressing each other using official job titles. A score of 2 indicates that the communications were generally formal, while a 1 indicates that formalities were present to a limited extent and a 0 indicates that the communications were generally informal.

2.4.2 Hypothesis Tests

Recall that H1 predicts that the positive effect of group incentives compared to individual incentives on knowledge sharing is greater with status differences than without status differences. To test this hypothesis, we perform an analysis of variance (ANOVA) test with *Knowledge shared* as the dependent variable and the incentives and status difference measures as the independent variables. Table 2.2, Panel A reports the results. We find that there is a significant interaction effect ($p = 0.05$).[15] To interpret this result, we examine the simple effects. We find that without status differences, there is no significant effect of incentives on knowledge sharing. In contrast, there is significantly more knowledge sharing under group incentives than individual incentives with status differences ($p<0.01$). These results support our first hypothesis. When we examine the simple effects from the incentives perspective, we find that status differences play an important role under individual incentives, while they are less important under group incentives. In particular, under individual incentives, knowledge sharing is significantly lower with status differences than without ($p = 0.02$). We therefore conclude that status differences matter less under group incentives than under individual incentives.[16]

H2 predicts that constructive and formal behaviors mediate the effect of incentives and status differences on knowledge shared. We first run ANOVA tests on the effect of the status differences and incentives measures on *Constructive behavior* and *Formal behavior* respectively (see Table 2.2, Panels B and C). Panel B shows a significant interaction effect of status differences and incentives on constructive behavior ($p = 0.02$). As before, we interpret this interaction effect by examining the simple effects. We find that dyads with a status difference demonstrate more constructive behavior under group incentives than individual incentives ($p = 0.03$), while incentives do not have a significant effect on constructive behavior in dyads without a status difference.[17] Turning to Panel C, we find a significant interaction effect of status differences and incentives on formal behavior ($p<0.01$). When we look at the simple effects, we find that for dyads without a status difference, the effect of incentives is not significant, while for dyads with a status difference, behavior is significantly less formal under group

[15] Unless stated otherwise, p-values are reported on a one-tailed basis, given the directional effect of our hypotheses.

[16] Recall that Knowledge shared consists of different types of knowledge, such as the knowledge we provided participants with, but also elements they figured out on their own, like mathematical errors. We examine whether the patterns for these different types of knowledge are similar across conditions. For each subtype, results are consistent with the analysis of our overall knowledge shared variable.

[17] Simple effects within the incentives conditions show that under group incentives, communication is significantly more constructive with status differences than without status differences ($p = 0.05$), while under individual incentives, we do not find an effect of status differences.

Table 2.2: Hypothesis Tests

Panel A – ANOVA on Knowledge Shared				
Factor	**Sum of Squares**	**df**	**F**	**p-value***
Incentives (I)	260.76	1	8.49	$<$ 0.01
Status differences (SD)	58.33	1	1.90	0.09
(I) $\times$ (SD)	84.00	1	2.74	0.05
Error	2456.57	80		
Simple Effects				
Effect of incentives within SD	320.38	1	10.43	$<$ 0.01
Effect of incentives within no SD	24.38	1	0.79	0.19
Effect of SD within group incentive	1.17	1	0.04	0.42
Effect of SD within individual incentive	141.17	1	4.60	0.02
Panel B – ANOVA on Constructive Behavior				
Factor	**Sum of Squares**	**df**	**F**	**p-value***
Incentives (I)	0.19	1	0.64	0.21
Status differences (SD)	0.05	1	0.16	0.35
(I) $\times$ (SD)	1.19	1	4.00	0.02
Error	23.81	80		
Simple effects				
Effect of incentives within SD	1.17	1	4.15	0.03
Effect of incentives within no SD	0.21	1	0.68	0.20
Effect of SD within group incentive	0.86	1	2.88	0.05
Effect of SD within individual incentive	0.38	1	1.28	0.13
Panel C – ANOVA on Formal Behavior				
Factor	**Sum of Squares**	**df**	**F**	**p-value***
Incentives (I)	1.19	1	3.94	0.03
Status differences (SD)	5.76	1	19.07	$<$ 0.01
(I) $\times$ (SD)	2.33	1	7.72	$<$ 0.01
Error		80		
Simple effects				
Effect of incentives within SD	3.43	1	6.00	$<$ 0.01
Effect of incentives within no SD	0.10	1	2.91	0.29
Effect of SD within group incentive	1.52	1	1.26	0.13
Effect of SD within individual incentive	30.86	1	25.54	$<$ 0.01

* p-values are reported on a one-tailed basis, given the directional predictions for the effects.

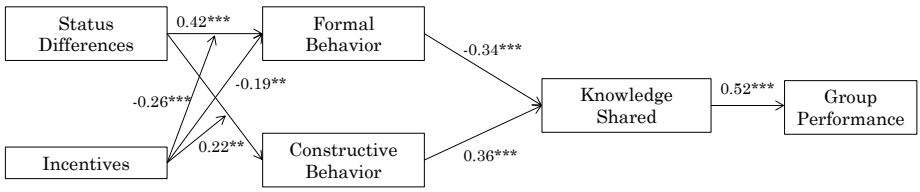
incentives than under individual incentives $(p<0.01)$.[18]

To test the mediating effect of constructive and formal behavior as predicted in H2, we perform path analysis (Christ, Sedatole, and Towry 2012; Masschelein, Cardinaels, and Van den Abbeele 2012; Tafkov 2013). We code incentives as 1 for the group incentives condition and -1 for the individual incentives condition, and we code status as 1 for the status difference condition and -1 for the no status difference condition. Figure 2.4 presents the path model with path coefficients significant at the 10% level or better (two-tailed). We conduct several goodness of fit tests to assess the suitability of the model. The Chi-squared test indicates

[18] From the perspective of incentives, we find that under individual incentives, behavior is significantly more formal with status differences than without status differences $(p<0.01)$, while under group incentives, we do not find an effect of status differences.

that the difference between the observed and model covariance matrix is small ($\chi^2 = 10.62, p = 0.30$). Similarly, the Comparative Fit Index (CFI) shows that the improvement of our model over the null model is satisfactory, as its value of 0.98 is above the recommended minimum value of 0.95 (Byrne 2010), as does the Incremental Fit Index (0.98, above the norm of 0.95).

Figure 2.4: Path Analysis



The standardized path coefficients and corresponding significance levels are shown (for path coefficients significant at the two-tailed 10% level or better, where *,**, and *** indicates significance at the 10 percent, 5 percent, and 1 percent levels). Goodness of fit is measured through the Goodness of Fit Index (0.97), which is above the generally accepted minimum value of 0.95 (Byrne 2010), the Comparative Fit Index (0.98), which is above the generally accepted minimum value of 0.95 (Byrne 2010), an overall Goodness of Fit test ($\chi^2 = 10.62, p = 0.30$), the Incremental Fit Index (0.98), and the Root Mean Square Error of Approximation (0.047).

Status Differences is manipulated on a between-subjects basis by randomly assigning job titles and corresponding role descriptions to dyad members. Under the status difference condition, dyads consist of an experienced manager of the head office and a recently hired junior assistant of a regional office. Under the no status difference condition, a dyad consists of two equal employees. Status is coded 1 for a status difference and -1 for no status difference.

Incentives is manipulated on a between-subjects basis. Under the group incentives condition, participants received a reward based on the performance of their dyad as a whole. Under the individual incentives condition, participants received a reward based on their own performance only. Incentives are coded 1 for group incentives and -1 for individual incentives.

Constructive behavior comes from the chat communications and measures whether dyad members interacted in a constructive way (e.g., thanking each other after sharing information). A dyad's communications were assigned a 2 if they were largely constructive, 1 if they were generally neutral, and 0 if they were destructive.

Formal behavior comes from the chat communications and measures whether dyad members communicated in a formal way, for example, by employing formal pronouns. A score of 2 indicates that the communications were generally formal, while a 1 indicates that formalities were present to a limited extent and a 0 indicates that the communications were generally informal.

Knowledge shared comes from the chat communications and is equal to the number of knowledge units shared within a dyad.

Group performance is the number of mistakes corrected by a dyad.

Consistent with the ANOVA results, the path analysis shows that status differences lead to more formal behaviors than no status differences $(0.42, p<0.01)$, while group incentives lead to less formal behaviors than individual incentives

$(-0.19, p<0.05)$. The model also shows significant interaction effects of status differences and incentives on both formal behavior $(-0.26, p<0.01)$ and constructive behavior $(0.22, p<0.05)$. Further, we find highly significant links between the behavior variables and knowledge sharing: more formal behavior leads to less knowledge sharing $(-0.34, p<0.01)$ while more constructive behavior leads to more knowledge sharing $(0.36, p<0.01)$.

When running a bootstrapping analysis (Preacher and Hayes 2008), we find that the direct effect of our status difference $\times$ incentives interaction on knowledge sharing becomes insignificant (two-tailed $p = 0.81$), while the indirect effect from the interaction on the mediators and the mediators on our dependent variable are all significant under the 5% level (two-tailed). Thus, in line with H2, these results show that our behavior variables mediate the effect of incentives and status differences on knowledge sharing.

The path analysis also provides initial evidence on performance effects. In line with H3, which predicts that more knowledge sharing leads to higher performance, the path from knowledge sharing to group performance is significantly positive $(0.52, p<0.01)$.

2.4.3 Additional Analyses

Status Difference: Effect on Knowledge Shared

In Table 2.3, Panels A and B, we examine the dyads with a status difference in more detail. We note that the extent of knowledge sharing is similar between managers and junior assistants. Under group incentives, managers and junior assistants share on average 6.76 and 7.00 knowledge units, respectively. Similarly, under individual incentives, managers and junior assistants share 3.86 and 4.38 knowledge units. Within an incentive condition, the extent of knowledge sharing does not differ significantly across job titles ($p = 0.59$, two-tailed), nor do job titles interact with incentives ($p = 0.84$, two-tailed). In contrast, differences across group versus individual incentives are significant within a job title ($p<0.01$ for manager, $p = 0.03$ for junior assistant, two-tailed). This result suggests that high and low status individuals are similarly influenced by a given set of incentives, as both sets of individuals have a lower (higher) tendency to share knowledge under individual (group) incentives.

Status Difference: Effect on Behavior

Above, we argued that both high and low status individuals can behave in ways that either inhibit or facilitate knowledge sharing. For example, higher status individuals can stimulate (reduce) knowledge sharing by showing appreciation for (ignoring) lower status individuals. Accordingly, we investigate what type of behavior managers and junior assistants demonstrate under the individual

and group incentive conditions. Since we predict more knowledge sharing in the presence of status differences under group incentives than under individual incentives, we expect more (less) behavior that positively (negatively) affects knowledge sharing under group incentives compared to individual incentives.

Table 2.3: Individual Behavior of Managers and Junior Assistants

Means and Standard Deviations		
Panel A – Managers		
	Individual Incentive (n=21)	**Group Incentive (n=21)**
Knowledge shared[a]	3.86 (2.73)	6.76 (2.43)
Showing appreciation[b]	0.10 (0.30)	0.14 (0.36)
Acting authoritarian[c]	0.67 (0.80)	0.29 (0.56)
Panel B – Junior Assistants		
	Individual Incentive (n=21)	**Group Incentive (n=21)**
Knowledge shared[a]	4.38 (3.58)	7.00 (3.99)
Perceived attention[d]	64.95 (30.92)	76.00 (19.51)
Own contribution[e]	65.91 (18.69)	79.52 (12.82)
Equivalent knowledge[f]	30.62 (26.56)	46.91 (29.15)
Spontaneous knowledge shared[g]	0.71 (0.90)	1.43 (0.87)
Speak up[h]	0.43 (0.75)	0.91 (0.89)

This table reports means and standard deviations (in parentheses) for managers and junior assistants.
[a] Knowledge shared comes from the chat communications and is equal to the number of knowledge units shared within a dyad.
[b] Showing appreciation comes from the chat communications and measures whether an individual showed appreciation for the other dyad members contributions (1) or not (0). For example: "Well done".
[c] Acting authoritarian comes from the chat communications and measures whether an individual showed no (0), moderate (1), or strong (2) authoritarian behavior. For example: "We will discuss this further later".
[d] Perceived attention comes from the post-experiment questionnaire. Participants indicated on a scale from 0 ("I totally disagree") to 100 ("I totally agree") the extent to which they agreed with the following statement: "The manager paid attention to my information".
[e] Own contribution comes from the post-experimental questionnaire. Participants indicated on a scale from 0 ("I totally disagree") to 100 ("I totally agree") the extent to which they agreed with the following statement: "I contributed a lot to finding errors".
[f] Equivalent knowledge comes from the post-experiment questionnaire. Participants indicated on a scale from 0 ("I totally disagree") to 100 ("I totally agree") the extent to which they agreed with the following statement: "I had equivalent knowledge to the manager to find errors".
[g] Spontaneous knowledge shared measures whether an individual shared his/her knowledge spontaneously (i.e., without being asked to do so). A code of 0 indicates that no knowledge was shared spontaneously, a code of 1 means that some knowledge was shared in this way, and a code of 2 indicates that knowledge was consistently shared in this way.
[h] Speak up comes from the chat communications and measures whether individuals questioned their dyad partner. A code of 0 means they never questioned their dyad partner, a code of 1 indicates that they did do once, and a code of 2 means they did so more than once. For example: "How do you know that?"

According to the coded conversations, managers showed appreciation for junior assistants' contributions (e.g., "That is already a first good remark", "Well done", "Perfect", "Classy" and "Thank you") more under group incentives than

under individual incentives, but the difference is not significant. In contrast, managers acted authoritarian (e.g., "We will discuss this further later" and "Give me five minutes before we start") to a greater extent under individual incentives compared to group incentives ($p<0.05$), which is likely to have made the status difference more salient.

To determine whether individuals with lower status believe they can make a valuable contribution, we first examine junior assistants' responses to several statements in the post-experiment questionnaire, where responses were scored on a Likert scale from 0 to 100, with 0 indicating strong disagreement and 100 indicating strong agreement. We find that junior assistants under group incentives believed that managers paid more attention to their information than those under individual incentives. This result is marginally significant ($p = 0.09$). We also find that junior assistants under group incentives agreed with the statements "I contributed a lot to finding errors" and "I had equivalent knowledge to the manager to find errors" to a greater extent than those under individual incentives, with the results significant for both statements ($p<0.01$ and $p = 0.03$, respectively). When we turn to the coded communications, we find that junior assistants under group incentives shared significantly more knowledge *spontaneously* (without being asked to do so by the manager) than those under individual incentives ($p<0.01$). These results suggest that under group incentives, lower status individuals share more knowledge because they have increased confidence in their own contribution.[19]

To assess the extent to which junior assistants are willing to speak up, we examine whether they asked for more information or explanation after the manager made a remark (e.g., "Why is this the case?", "How do you know that?", "Are you sure?"). We find that junior assistants demonstrated significantly more of this behavior under group relative to individual incentives ($p = 0.03$).

In sum, we find that relative to individual incentives, group incentives reduce negative behavior such as a tendency for lower status individuals not to speak up, which can help explain why we observe more knowledge sharing under group incentives.

Performance: Mistakes Found with Shared Knowledge

Although the path analysis indicates that more shared knowledge leads to higher group performance, this group performance measure does not distinguish between errors identified based on an individual's own knowledge and errors identified based on knowledge shared by the dyad partner. In this section we sep-

[19] We conclude that lower status individuals share less knowledge under individual incentives due to diminished beliefs in their own ability, rather than to spite, as in the post-experiment questionnaire junior assistants' mean response to the statement "I lied to the manager" is equal to 3.52 (on a scale from 0 to 100), and their mean response to "I withheld relevant information from the manager" is equal to 15.14 (on a scale from 0 to 100).

arately examine these two sets of errors. In untabulated analysis, we find that the part of a dyad's performance that is based on an individual's own knowledge is not significantly different between our four conditions. In contrast, in Table 2.1, Panel A we find that the number of errors that were corrected based on a dyad partner's shared knowledge, measured by *Group performance without own knowledge*, follows the same pattern as for *Knowledge shared*: in the status difference condition, performance is marginally lower with individual incentives compared to group incentives ($p = 0.06$), while the effect of incentives is not significant in the no status difference condition ($p = 0.41$).

We also disentangle performance based on own and shared knowledge at the individual participant level (not tabulated). We find that under individual incentives, managers' performance excluding their own knowledge is lower than the performance of junior assistants and employees excluding their own knowledge. Under group incentives, however, this performance measure yields similar results across the three job titles. In particular, performance without own knowledge is marginally significantly lower for managers under individual relative to group incentives ($p<0.06$), while it does not differ significantly across incentive systems for junior assistants and employees. These results indicate that managers under individual incentives use less of a group's shared knowledge compared to junior assistants and employees, relative to managers under group incentives.

2.5 Conclusion

This paper examines the effect of status differences and incentives on knowledge sharing in an experimental setting. The results indicate that significantly more knowledge is shared under group incentives relative to individual incentives when status differences are present, whereas the amount of knowledge shared does not differ across incentive regimes for equal-status groups. Thus, the positive effect of group incentives compared to individual incentives on knowledge sharing is greater with status differences than without status differences. The results further point to a positive relationship between knowledge sharing and performance, and suggest that group behavior mediates these relationships, particularly constructive and formal behaviors. In additional analyses we separately examine the behavior of high and low status individuals and we examine that part of performance that is due specifically to knowledge sharing.

This study contributes to the literature in several ways. First, while status differences are known to affect organizational interactions such as knowledge transfers, prior research has had less to say about how these effects can be managed. We show that incentives can influence the extent to which status impacts knowledge sharing. In particular, status differences matter less under group incentives relative to individual incentives. Second, prior research finds mixed ev-

idence on the effect of incentives on cooperative behavior or knowledge sharing. For instance, Kelly (2010), Quigley et al. (2007), and Taylor (2006) conclude that group incentives lead to more knowledge sharing, while Rankin (2004) shows that team-based incentives might not lead to more cooperation than individual incentives when group members have information about others' contribution to the team. We shed light on this debate by providing evidence that social context matters for the effectiveness of management control systems. For example, we show that while different-status groups may need group incentives to demonstrate the cooperative behavior that leads to increased knowledge sharing and performance, equal-status groups may not need such incentives as they face lower barriers to cooperation in the first place. Third, while previous research only considers the role of higher status individuals in group interactions (Bunderson and Reagans 2011), we examine the behavior of both higher status individuals and lower status individuals. We show that the behavior of lower status individuals can also affect the extent of knowledge sharing. Fourth, we extend prior research by showing that more knowledge sharing leads to higher performance, even in the context of status differences where, according to previous research, high status individuals sometimes ignore the contributions of lower status individuals. Finally, we improve our understanding of the status construct by operationalizing it in a way that avoids confounding influences such as power. In particular, the way in which we manipulate status allows us to show that job titles (and their corresponding role descriptions) shape status-driven behavior. This result suggests that by formalizing status, job titles can have unintended consequences in terms of the way in which knowledge sharing and other cooperative behaviors are managed.

We note that this study is subject to several limitations. First, the decision to share or not to share knowledge might be more complex in a real organizational setting than in our experimental setting. For instance, there might be more risk involved in this decision. On the one hand, employees might be concerned about losing their knowledge monopoly if they share their knowledge; on the other hand, they might be concerned about getting fired if they do not share their knowledge.[20] Moreover, knowledge sharing can be laborious, time consuming, and difficult to the extent that knowledge is embedded in individuals, context, or location (Szulanski 1996). Although we try to capture some of this complexity by adding a time constraint to the experimental task, other factors can also play a role in real organizations. For example, the knowledge that had to be shared in the experimental task was very explicit. Future studies could investigate whether our results hold for more tacit knowledge. Finally, while we focus on the role of incentives in the relationship between status differences and knowledge sharing, incentives are only one of many control instruments that

[20] Note that in many situations, it is not known which knowledge individuals have, which would make this concern less relevant.

management has at its disposal. Researchers could investigate other management control devices that can affect the relationship between status and knowledge sharing, as well as other contexts that could influence the tendency to share knowledge.

Chapter 3

Great Effort, Some Concern. How Making Effort to Acquire Information Influences Managerial Reporting

Abstract
I investigate if managers' tendency to report opportunistically depends on whether they made effort to acquire the information they need to report. Theory suggests that making effort to acquire information can make opportunistic behavior more justifiable, but can also enhance feelings of responsibility when honesty concerns are sufficiently triggered. I argue that the reporting mode can be an important variable explaining which effect will dominate and when making effort to acquire information may have a detrimental impact on opportunistic reporting. In my 2×2 experiment, managers are either endowed with the information they need to report, or they make an intellectual effort to earn this information. I also manipulate the mode of reporting by varying whether or not managers make a factual assertion about the information they need to report. Results show that when no factual assertion is required, managers report more opportunistically with earned relative to endowed information. However, when managers are required to make a factual assertion about the information, their honesty concerns are triggered and the negative effect of earned information on opportunistic reporting is alleviated. These results have strong implications for practice by showing when acquiring information has a detrimental impact on reporting behavior in firms.

3.1 Introduction

Acquiring and reporting information are crucial aspects of managers' jobs (e.g., Bruns and McKinnon 1993; Church, Hannan, and Kuang 2012). For example, managers acquire information to report to upper management (e.g., Evans, Hannan, Krishnan, and Moser 2001), communicate to the audit committee (e.g., Caskey, Nagar, and Petacchi 2010), provide to analysts and investors (e.g., Bens, Goodman, and Neamtiu 2012), and disclose to tax authorities (e.g., Omer and Yetman 2007). Although the accounting literature acknowledges the importance of both these managerial tasks, it often treats them as distinct responsibilities (e.g., Brown et al. 2009; Schneider et al. 2015). However, the duties of acquiring and reporting information are logically linked and could therefore also impact each other. I contribute to the managerial accounting literature by investigating whether the process of acquiring information influences managers' opportunistic reporting of this information.

Although managers often are in a better position to acquire information about particular aspects of the organization (e.g., because they spend a lot of time with and are in close proximity to local markets, customers and production processes), the ease with which they can obtain this information will vary widely in practice (e.g., Huber 1991; Inkpen 2000; Li, Poppo, and Zhou 2010; Smith, Tayler, and Prawitt 2015). Indeed, obtaining information can be quite effortful; requiring multiple analyses or syntheses from a variety of sources, but sometimes information can also be gained more easily. In this paper, I test theory suggesting that making effort to acquire information can influence the extent of opportunistic reporting (e.g., Church et al. 2014; Nelson and Tayler 2007; Smith et al. 2015).

Since managers' objectives are not always aligned with those of the parties they report to, they regularly have incentives to report their information in an opportunistic way (e.g., Caskey et al. 2010; Evans et al. 2001). Nevertheless, the behavioral literature identified two variables that are able to mitigate opportunisic reporting: other-regarding preferences (i.e., preferences over one's own and other's payoffs) and honesty preferences (i.e., preferences for making truthful disclosures) (e.g., Fehr and Schmidt 2006; Luft 1997; Maas and Van Rinsum 2013; Mittendorf 2006; Rankin, Schwartz, and Young 2008; Sprinkle 2003).[1] However, the theory I test suggests that acquiring information in a more effortful way decreases the role of other-regarding preferences but enhances the role of honesty in mitigating opportunistic reporting. On the one hand, I expect individuals to consider their other-regarding preferences less if they make more effort to earn the information they need to report. Because individuals invest time, effort and skills to gain their information, they can more easily justify serving their

[1] If individuals' other-regarding preferences are high, they are not only concerned about their own outcome, but also concerned for the well-being of others. Since reporting decisions usually do not only affect the reporter's outcome, but also that of other parties, individuals may report less opportunistically or selfishly when they have higher other-regarding preferences.

own interests by reporting opportunistically (Hsee 1996; Pierce et al. 2001). On the other hand, honesty preferences are likely to be considered more when information is acquired in an effortful way. Indeed, individuals might feel more personally responsible for their earned information (Nonaka 1994), which can discourage unethical actions (Detert, Treviño, and Sweitzer 2008).

Which of the two effects will dominate might depend on whether the reporting context triggers concerns for honesty. Indeed, organizations can influence the saliency of other-regarding and honesty preferences by adapting the reporting context. I expect that contexts that do not trigger sufficient concerns for honesty will lead to more opportunistic reporting with effortful relative to effortless information acquisition, while contexts that trigger sufficient concerns for honesty will decrease opportunistic reporting to a larger extent when individuals make effort to acquire information.

I examine information acquisition's effect on managerial reporting via a budget reporting experiment. Managers had to implement a project, but only they knew the project's implementation cost, and therefore they had to communicate a budget report to their owner. Opportunistic reporting increased (decreased) the monetary payoff for managers (owners). In this experimental setting, I manipulated the acquisition of information (endowed versus earned information) and the mode of reporting (factual assertion versus no factual assertion). In the endowed information condition, managers could just read the project's implementation cost from their computer screen. In the earned information condition, managers had to perform intellectual effort to learn the project's implementation cost. Particularly, they had to solve a number sequence puzzle in every period (based on Haesebrouck, Van den Abbeele, and Williamson (2015b)), where the solution to the puzzle equaled the project's implementation cost for that period. By including the possibility to request hints in case managers experienced difficulties solving the puzzle, I ensured they all knew the actual implementation cost before they made their reporting decision.

To identify how the reporting context influences the effect of earned and endowed information on opportunistic reporting, I use the mode of reporting manipulation as employed by Rankin et al. (2008) and Douthit and Stevens (2015). Managers either report an allocation of the project's profit to their owner (no factual assertion condition), or they report the project's implementation cost to their owner (factual assertion condition). In both conditions, more opportunistic reporting (i.e., allocating a smaller portion of the profit to the owner or reporting higher cost to the owner) increases the manager's payoff but decreases the owner's payoff. Hence, to the extent managers care about the owners payoff, their other-regarding preferences should decrease opportunistic reporting in both the factual and the no factual assertion condition. However, the motivation to report honestly should only be salient in the factual assertion condition, because only in this condition it is possible to make an untrue representation of facts.

Indeed, when no factual assertion of the project's cost is required, managers just divide the project's profit and cannot make an untrue statement. When a factual assertion of the cost is required (i.e., managers have to tell owners what the project's cost is), managers who misreport the project's cost are explicitly lying to their owner. Thus, in this condition, honesty preferences are salient in mitigating opportunistic reporting, on top of other-regarding preferences. Accordingly, I capture the effect of other-regarding preferences by studying the no factual assertion condition, and the effect of honesty preferences by studying *the difference* between the factual and no factual assertion condition.[2]

Consistent with theory, results of the experiment show that managers report more opportunistically with earned relative to endowed information when no factual assertion is required. Hence, managers take into account their other-regarding preferences less when information is earned. When moving from the no factual to the factual assertion condition, the incremental effect of honesty causes opportunistic reporting to decrease. However, the acquisition of information interacts with the mode of reporting, such that opportunistic reporting decreases to a greater extent with earned information. This indicates that when the reporting environment allows for honesty concerns, managers take these concerns into account more with earned information. Supplemental analyses provide some additional insights into individual's perceptions with regard to what is fair and honest with earned relative to endowed information. Furthermore, I study the earned information conditions in more detail to investigate how characteristics of earning information affect the tendency to report opportunistically.

These results are important for several reasons. First, I contribute to the literature on managerial reporting by taking into account the fundamental phase of acquiring the information that needs to be reported. I explicitly recognize that managers often have to make effort to gather relevant information and show that this can impact their reporting behavior. Whether or not this impact is detrimental depends on the reporting mode.

In that way, my findings also have important implications for practice. Other-regarding preferences and honesty preferences can be made more or less salient by organizations by adapting the mode of reporting (Rankin et al. 2008). As such, my results indicate it might be better to give managers less discretion in reporting results (e.g., let them report unprocessed numbers rather than measures that can be more easily manipulated) when it takes a lot of effort to acquire information. Moreover, organizations have several other means at their disposal to impact other-regarding and honesty preferences. They could for example change the span of control (Dierynck 2012), alter the transparency of payoffs (Douthit

[2] Since I need to study *the difference* between the no factual and factual assertion condition to capture the effect of honesty, I have to analyze the interaction effect between information acquisition and the mode of reporting to test whether the impact of honesty preferences on opportunistic reporting is equal for endowed and earned information.

and Stevens 2015), install an organizational culture that values honesty (Trevino 1986), and adopt a code of ethics with public certification (Davidson and Stevens 2013). However, these design choices do not come without a cost. My results identify when it is more or less beneficial to invest in such changes. For example, in complex business settings where it takes a lot of effort to gain information, it can be more beneficial to increase the saliency of honesty relative to environments where information is acquired more easily.

Next, the acquisition of information is a crucial aspect of various accounting settings like auditing, budgeting, financial statements and tax (e.g., Balakrishnan 1991; Einhorn and Ziv 2007; Nelson and Tayler 2007; Sansing 1993), but the ease with which the relevant information can be acquired varies widely in practice for all these settings. There exists a limited amount of research that studies the effortful acquisition of information in financial accounting (i.e., Nelson and Tayler (2007)), but calls have been made to investigate how this aspect affects decision making in various other accounting settings (e.g., Smith et al. 2015). I answer this call and find that acquiring information in a more versus less effortful way influences preferences and decisions in the context of managerial reporting. Particularly, by showing that earning information has opposing effects on the tendency to report opportunistically through factors like other-regarding preferences and honesty concerns, I contribute to a better understanding of information acquisition in accounting systems.

Finally, since reporting can be considered as a type of information sharing, I also contribute to the emerging literature on this theme (e.g., Berger, Fiolleau, and MacTavish 2015; Bol and Leiby 2015; Haesebrouck, Cools, and Van den Abbeele 2015a; Haesebrouck et al. 2015b; Hwang et al. 2009). Haesebrouck et al. (2015b) shows that sharing laboriously acquired information is perceived as a particularly costly activity for which the sharers feel like they should be rewarded in return. This is consistent with the results I find here, since individuals believe they deserve a higher payoff, and hence report more opportunistically, when they acquired their information in an effortful way. However, in this study, I also demonstrate that making honesty preferences salient can alleviate the need to be compensated for sharing laboriously acquired information.

In the next section, I discuss the relevant literature and develop the hypotheses. Section III presents the experimental design, followed by the results in section IV. Section V provides the conclusion and discussion.

3.2 Theory and Hypotheses

I examine if individuals' tendency to report opportunistically depends on whether they made effort to acquire the information they need to report. I do so by investigating how information acquisition affects the impact of the two variables previously identified to be able to mitigate opportunistic reporting: other-

regarding preferences and honesty preferences (e.g., Maas and Van Rinsum 2013; Sheremeta and Shields 2013).

When managers are requested to report information, they have to collect raw data and turn it into relevant information by for example editing, correcting, analyzing and summarizing it (Davenport and Prusak 1998; Schneider et al. 2015). During this process, they frequently rely on observations, personal contacts and informal reports (Bruns and McKinnon 1993). Although the accounting literature acknowledges the importance of the information acquisition task (e.g., Ewusi-Mensah 1981; Schneider et al. 2015), it only briefly recognizes individuals might act upon the way in which they acquired their information. Indeed, not only the information per se, but also the process of acquiring information can affect subsequent behavior or decision making. For example, Nelson and Tayler (2007) investigate whether making financial statements users perform a transformational analysis themselves, rather than just providing them the results of this analysis, impacts their judgements. The authors find that when the results are acquired in an effortful way, they affect financial statements users' judgements to a greater extent, since this increases individuals' perception of how well they are informed. Calls have been made to investigate how effortful information acquisition influences behavior and decision making in various other accounting settings (e.g., Smith et al. 2015). I answer this call by studying the effect of effortful information acquisition on managerial reporting.

In the context of managerial reporting, the tasks of acquiring and reporting information are logically bound up. Managers are asked to report information, exactly because they usually are in a better position to acquire it. Indeed, since they spend a lot of time with particular aspects of the organization (e.g., local markets, customers, production processes), they often have the opportunity to acquire superior information about these organizational areas (Milgrom and Roberts 1992). Nevertheless, the ease with which they can obtain this information will vary widely in practice (e.g., Huber 1991; Inkpen 2000; Li et al. 2010; Smith et al. 2015). Sometimes it can be rather straightforward to acquire the relevant information, but it might also require quite some effort, for example when managers have to combine different pieces of information from a variety of sources or perform several analyses. This could impact their tendency to report opportunistically.

But why would a manager choose to (not) report opportunistically in the first place? In the next section, I discuss the determinants of reporting behavior as identified by the behavioral literature.

3.2.1 Determinants of Reporting Behavior

Since managers' objectives are not always aligned with those of the parties they report to, they can have self-serving incentives to report their private informa-

tion opportunistically (Webb 2002). For example, managers might report inflated results to their upper manager in order to receive a higher bonus (Jensen 2001) or they might report a lower stock price to investors if they are secretly contemplating a management buyout (Caskey et al. 2010). Although agency theorists predict that managers will always misrepresent their information if they can serve their own interest (Christensen and Feltham 2006), behavioral studies in managerial accounting suggest this is not the case (e.g., Evans et al. 2001; Hannan, Rankin, and Towry 2006; Rankin et al. 2008). The two main reasons why individuals forgo the self-serving benefits from opportunistic reporting are other-regarding preferences and honesty concerns (e.g., Gneezy 2005; Luft 1997; Maas and Van Rinsum 2013; Rankin et al. 2008; Sheremeta and Shields 2013).

Other-regarding preferences are preferences over one's own and other's outcomes and can be driven by different motives, such as altruism, fairness concerns and inequality aversion (Cox 2004; Dana, Weber, and Kuang 2007; Fehr and Schmidt 2006). Since reporting decisions usually do not only affect the reporter's outcome, but also that of other parties, these preferences can influence reporting behavior (Cox 2004; Dierynck 2012; Maas and Van Rinsum 2013). In fact, when managers report opportunistically by focusing on their self-serving benefits, they often harm other parties in doing so.[3] For example, if managers inflate results when reporting to upper management in order to receive a higher bonus, the profit of owners and shareholders will ultimately decrease. As such, to the extent individuals not only care about their own benefits from reporting opportunistically, but are also sensitive to the harm this may cause the other parties involved, they will not behave fully opportunistically (e.g., Gneezy 2005; Rankin et al. 2008; Sheremeta and Shields 2013). In that way, other-regarding preferences can decrease opportunistic reporting.

Honesty preferences are preferences for making truthful statements (Mittendorf 2006). These preferences can also be driven by several motives, such as social conditioning, moral reasoning and the desire to preserve a favorable view of the self (Mazar, Amir, and Ariely 2008; Rankin et al. 2008). Many people experience a disutility from making explicit misrepresentations of facts (e.g., Evans et al. 2001). In that way, an aversion to lying makes individuals report less opportunistically (Sen 1997). Whereas some researcher questioned the role of honesty in mitigating opportunistic reporting (e.g., Salterio and Webb 2006), recent studies like Rankin et al. (2008), Sheremeta and Shields (2013), and Douthit and Stevens (2015) are able to distinguish honesty concerns from other-regarding preferences. As such, they show that honesty has an incremental, diminishing effect on opportunistic reporting, on top of other-regarding preferences.

In sum, previous research indicates both other-regarding preferences and honesty preferences can play a role in mitigating opportunistic reporting (e.g., Douthit and Stevens 2015; Rankin et al. 2008; Sheremeta and Shields 2013). As

[3] This seems to be relevant assumption for many economic events (Gneezy 2005).

Fehr and Schmidt (2006) indicate, the question is no longer *whether* many people have other-regarding preferences, since much evidence already demonstrates that, but *under which conditions* these preferences have important economic and social effects. Theory suggests effortful information acquisition might lead to opposing effects on these preferences. While earning information by making effort may lead other-regarding preferences to matter less, it could lead to higher honesty concerns.

3.2.2 The Effect of Information Acquisition on Other-regarding Preferences

Other-regarding preferences are motivated by many aspects of the decision environment and the context of interactions (Oxoby and Spraggon 2008). Theory suggests these preferences can also be impacted by the way in which information is acquired. When information is acquired by making more effort, individuals' decision making might be affected less (more) by their other-regarding (self-serving) preferences and as a consequence, they will report more opportunistically.

When individuals have to make decisions, they try to maintain a sense of accountability (Church et al. 2012; Hsee 1996; Schweitzer and Hsee 2002). As such, they are more likely to take decisions in their best interest if they can construct seemingly reasonable justifications for taking them (Kunda 1990). One important way in which selfish decision making can be justified is individuals' feeling of deservingness. Cherry (2001) and Oxoby and Spraggon (2008) find in a dictator game that individuals who earn the money they have to divide between themselves and a receiver perceive themselves as more deserving of it than those who are endowed with the money. As a consequence, individuals who earned the money take into account their other-regarding preferences less and make more selfish decisions (i.e., they keep more money for themselves and offer less to the receiver). Similarly, two recent working papers that study experiments in a reporting context conclude that feelings of deservingness lead to more opportunistic reporting because they make it easier to justify this behavior (Brown, Chan, Choi, Evans, and Moser 2016; Douthit and Majerczyk 2015).

In a similar vein, individuals who make effort to earn information can more easily justify their opportunistic reporting by claiming they deserve the higher payoff. Indeed, when individuals earn information, they invest their time, effort, skills and intellect (De Dreu et al. 2008; Pierce et al. 2001; Zárraga and Bonache 2005). Because of these investments, they can justify they deserve more self-serving benefits (Adams 1965; Hoffman and Spitzer 1985). In the context of managerial reporting, they can allocate these benefits to themselves by reporting more opportunistically and they will feel as if this is a fair thing to do (Dana et al. 2007). This rationalization for opportunistic reporting would not be possible with effortless information acquisition.

3.2.3 The Effect of Information Acquisition on Honesty Preferences

As explained above, individuals have preferences for honesty because they experience a disutility from lying (e.g., Evans et al. 2001). Hence, when honesty considerations come into play, there will be a decrease in opportunistic reporting (e.g., Douthit and Stevens 2015). However, theory suggests individuals will consider their preferences for honesty more with information acquired in an effortful way, leading to a larger decrease in opportunistic reporting.

Most individuals value honesty and prefer to view themselves as being honest. Dishonest behavior requires these individuals to negatively update their view about themselves. Even when it requires investments of effort or loss of financial payoffs, they will try to keep their own positive view by being honest (Mazar et al. 2008). When individuals acquire information, they invested their time, effort and skills in it and as such, the information starts to feel like it represents themselves (Pierce et al. 2001). Indeed, their self-acquired information becomes intimately bound up with their egos (Davenport and Prusak 1998). As a consequence, individuals might feel more personally responsible for and committed to this information (Nonaka 1994). Lying about the effortfully earned information could therefore also impact their view about themselves to a larger (more negative) extent (Bandura 1999; Detert et al. 2008; Mazar et al. 2008; Schwartz 1968). In that way, managers might care more about honesty when information is acquired effortful relative to effortless and as such, making effort to acquire information can discourage unethical actions (opportunistic reporting) more.

3.2.4 The Reporting Context

From the discussions above, it follows that information acquisition might have opposing effects on the impact of other-regarding preferences and honesty preferences. One the one hand, managers will consider their other-regarding preferences less with effortful relative to effortless information acquisition. As a consequence, they will report more opportunistically when information is acquired by making more effort. On the other hand, managers might care more about honesty when information is acquired in an effortful way. As such, making effort to acquire information can lead to less opportunistic reporting. Which of these two effects will dominate might depend on the reporting environment. Indeed, honesty preferences will only reduce opportunistic reporting if the context triggers sufficient concerns for honesty. The reporting mode can provide such context (e.g., Rankin et al. 2008). When the reporting environment does not allow for honesty concerns, mainly other-regarding preferences impact the reporting decision and as such, opportunistic reporting will be higher with effortful relative to effortless information acquisition. Hence, I predict the following effect:

Hypothesis 1 *When the reporting environment does not allow for honesty concerns, opportunistic reporting will be higher with effortful relative to effortless information acquisition.*

When the reporting environment allows for honesty concerns, honesty preferences come into play, on top of other-regarding preferences. Consequently, there will be a decrease in opportunistic reporting caused by the incremental effect of honesty.

Hypothesis 2 *When the reporting environment allows for honesty concerns, opportunistic reporting will decrease.*

However, the theory above posits that this decrease in opportunistic reporting may be larger for information that is earned in a more effortful way since individuals care more about honesty in this case. As such, I predict an interaction effect:

Hypothesis 3 *The decrease in opportunistic reporting associated with a reporting environment that allows for honesty concerns will be larger for effortful relative to effortless information acquisition.*

3.3 Method

3.3.1 Participants and Design

I examine information acquisition's effect on managerial reporting via a budget reporting experiment. To test my hypotheses, I conducted a computer-based 2×2 experiment with z-Tree as software package (Fischbacher 2007) In total, 164 undergraduate business students from a large European university participated in the experiment (36% female, mean age about 22 years).[4] The experiment was conducted in eight sessions, with 20 or 22 participants per session. A session lasted about 55 minutes on average. Participants received a course credit and earned on average €8.89 for their participation. Their total payoff was calculated as the sum of their payoffs in the eight decision rounds of the experiment.

The research design for this study is based on a basic setting typically used in budgeting experiments (e.g., Douthit and Stevens 2015; Evans et al. 2001; Hannan et al. 2006; Rankin et al. 2008). Participants are randomly assigned to the role of manager or owner. Managers have private information and need to submit a budget report regarding this information to their owner. The budget report is automatically accepted by the owner. Payoff functions are structured in such a way that managers have a monetary incentive to report opportunistically (i.e., build in slack into the budget report). Indeed, the more opportunistically they report, the higher their payoff gets. However, opportunistic reporting

[4] One participant was removed from the analyses, because s/he indicated s/he did not believe the instructions.

also decreases the owner's payoff. As such, managers who only care about their own payoff will report as opportunistically as possible, while managers who take into account their other-regarding and honesty preferences will report less opportunistically.

In my experiment, participants were randomly assigned to the role of owner or manager and they stayed in that same role during the entire task. The task consisted of eight decision rounds. Every manager was paired with an owner and was re-matched with a different owner after every decision round. No one ever learned the identity of the person with whom s/he was paired. In every decision round, managers had to implement a project. The costs of implementing the eight projects were randomly determined upfront and were the same for every session. Both manager and owner knew that the implementation cost of the project would fall within a range of 0 to 200, with a uniform distribution of $[0, 1, 2, 3, 4, 5, \ldots, 199, 200]$. The numbers represented euro cents; hence a cost of 100 equaled €1.00. Managers and owners also knew every project yielded revenue of 200 (€2.00), but only managers could find out the actual implementation costs. All participants were informed about these specifics in the experimental instructions. In this setting, I manipulated the acquisition of information (endowed information versus earned information) and the mode of reporting (no factual assertion versus factual assertion) between participants.

In the endowed information condition, managers received a private cost form in every decision round. This cost form informed them about the project's actual implementation cost.[5] In the earned information condition, managers had to perform effort to learn the actual cost. More particularly, they had to solve a number series puzzle in every decision round (based on Haesebrouck et al. (2015b)) to find out the project's implementation cost. The solution to the puzzle was the actual cost for that period. Number series puzzles provide a sequence of numbers that follow a discernable pattern. Managers had to recognize the pattern to provide the next number in the sequence. An example of a number series puzzle used in one of the decision rounds is: $69, 75, 76, 80, 83, 85, 90, 90, \_\_\_$. In this example, the odd and even number positions follow different patterns. For the numbers in the odd positions ($69, 76, 83,$ etc.), the pattern is to add 7 to the previous number to find the next number. For the numbers in the even positions ($75, 80, 85,$ etc.), the pattern is to add 5 to the previous number to find the next number. The number we are looking for in the overall sequence is in the odd position, so therefore the solution is $97 (90 + 7)$. Accordingly, the actual implementation cost of the project is 97 in this decision round.

Because these number series puzzles could be difficult to solve, managers who had trouble solving a puzzle were able to request hints after working on it for several minutes. In that way, all managers were able to find out the project's

[5] Note that in a typical budgeting experiment, this is the way in which managers are informed about their private information (e.g., Douthit and Stevens 2015; Rankin et al. 2008).

actual implementation cost.[6] First, a button labeled "Hint 1" appeared, followed several minutes later by a button labeled "Hint 2". If managers pressed these buttons, information that would help them solve the puzzle was provided. Even when the hints became available, I asked managers to try their best to solve the number series puzzle without them. However, they could press the "Hint 1" button if they became stuck. Further, I asked them to only press the "Hint 2" button if the first hint still did not allow them to solve the puzzle. In total, sixteen hints could be requested (two hints per number series puzzle, one number series puzzle for each of the eight rounds). Summed up over the eight rounds, the average participant requested 1.88 out of 16 hints (with a standard deviation of 1.25). With the help of the hints, participants were always able to solve the puzzles.

In sum, at the start of each decision round, both manager and owner knew the actual implementation cost would fall within a range of 0 to 200. Next, managers found out the actual implementation cost, either from their private cost form (endowed information condition), or by solving a number series puzzle (earned information condition). Managers always learned this cost, while owners would never learn it. All participants were aware of this information asymmetry.

Next, I use the mode of reporting manipulation of Rankin et al. (2008) to distinguish the effect of other-regarding preferences from honesty preferences in mitigating opportunistic reporting. In that way, I can test the theory explained above that suggests opposing effects of endowed relative to earned information for these two preferences and explore whether the reporting environment can clarify which effect will dominate. I manipulate the mode of reporting by varying whether a factual assertion of costs is required when communicating the budget report. More particularly, managers either had to (1) report (allocate) a portion of the project's profit to the owner (no factual assertion condition), or (2) report the project's cost to the owner (factual assertion condition). As explained below, the allocated profit / reported cost determined the payoffs of managers and owners in such a way that more budgetary slack (i.e., allocating less profit / reporting a higher cost) would lead to a higher (lower) payoff for managers (owners). Managers also received a fixed salary of 100.[7]

In the no factual assertion condition, managers report a portion of the profit to be returned to the owner. Managers could allocate any portion of the project's profit between 0 and the total profit ($200-$ project's actual cost) to the owner. The allocated amount was the owner's payoff. The payoff to the manager was the remainder of the profit (total profit $-$ portion allocated to owner), and the fixed payment of 100.

[6] It was not an option to not solve a puzzle (participants could not continue in a decision round as long as they did not solve the puzzle of that round).

[7] Previous research also provides managers with a fixed salary to make sure there is no extreme tension between their payoff and their preferences to report honestly (e.g., Rankin et al. 2008). Without a fixed salary, managers who report honestly would always have a payoff of zero.

In the factual assertion condition, managers reported the project's cost to their owner and could keep any difference between the actual and reported cost. Hence, the payoff to the managers was, next to the 100 fixed salary, the reported cost minus the actual cost to implement the project. The payoff to the owner was 200 (i.e., the revenue of the project) minus the reported cost. Table 3.1 gives an overview of the payoffs of managers and owners across the mode of reporting conditions.

Table 3.1: Payoff Structure for Managers and Owners across the Mode of Reporting

	Manager	**Owner**
No Factual Assertion	100+ project's total profit − portion allocated to owner	portion allocated by manager
Factual Assertion	100+ reported cost − actual cost	200− reported cost

In both the factual and the no factual assertion condition, more opportunistic reporting (i.e., reporting a smaller profit allocation or a higher cost) increases the manager's payoff but decreases the owner's payoff. As such, to the extent managers care about the owners' payoff, their other-regarding preferences should decrease opportunistic reporting in both conditions. However, the motivation to report honestly should only be salient in the factual assertion condition, because only in this condition it is possible to make an untrue representation of facts. Particularly, since managers in the no factual assertion condition are just asked to divide the profit and report the portion they allocate to the owner, they cannot lie, even if they induce slack. Indeed, this condition induces managers to frame the budgeting task as merely an allocation of the profit. In the factual assertion condition however, preferences for honesty can influence managers' reporting decision, on top of other-regarding preferences, because managers who report an untrue cost are explicitly lying to their owner. Hence, I capture the effect of other-regarding preference by studying the amount of slack in the no factual assertion condition, and the incremental effect of honesty by studying the difference in slack between the condition with factual assertion and without factual assertion.[8]

At the end of the instructions, there was a short quiz to ensure participants understood their role, task and payoff structure. They could only move on to the next question when the current question was answered correctly. In addition, there was a "practice tool" before managers had to make their real decision, to make sure they were aware of the consequences of their decisions. In this tool, they could calculate what the impact on their own and their owners' payoff would be for the allocated profit / reported cost of their choice. After the eight decision

[8] Hence, to compare the effect of honesty for the earned and endowed information condition, I should study the interaction effect (i.e., test whether the decrease when moving from no factual to factual assertion is equal for endowed versus earned information).

rounds, participants were asked to fill in the post-experimental questionnaire. This questionnaire included questions on the factors influencing managers' decisions, demographics and participant's personality traits.

3.4 Results

My first hypothesis (H1) posits that when the reporting environment does not allow for honesty concerns, opportunistic reporting will be higher with effortful relative to effortless information acquisition. In the second hypothesis (H2), I suggested that when the reporting environment allows for honesty concerns, opportunistic reporting will decrease. Finally, the third hypothesis (H3) predicts that the decrease in opportunistic reporting associated with a reporting environment that allows for honesty concerns will be larger for effortful relative to effortless information acquisition. In the experiment, these hypotheses are supported if managers in the no factual assertion condition report more opportunistically when information is earned relative to endowed (H1), when there is a decrease in opportunistic reporting when moving from the no factual to the factual assertion condition (H2) and when this decrease is larger with earned relative to endowed information (H3). I show the descriptive statistics of the main dependent variable, "Average Slack", in Panel A of Table 3.2 and its graphical depiction in Figure 3.1. This measure is calculated as the eight-period mean of slack claimed over slack available.[9] A higher value for average slack indicates the manager reported more opportunistically. From the descriptive statistics, it is apparent that average slack is higher for earned than for endowed information when no factual assertion is required. However, when moving from the no factual assertion to the factual assertion condition, average slack decreases. This decrease seems to be larger for earned than for endowed information, indicating that the effect of honesty is more important for earned information. This is consistent with my three hypotheses. In the following section, I formally test these hypotheses.

3.4.1 Hypothesis Tests

To test my hypotheses, I run an ANCOVA with Average Slack as the dependent variable, and Information Acquisition and Mode of Reporting as the independent variables.[10] In addition, I control for Dark Triad in all my hypotheses tests and supplemental analyses. As I elaborate on at the end of this result section, Dark Triad is a personality trait that affects the tendency to report opportunistically.

[9] Note that the maximum slack available is equal across conditions, since the cost in a specific period was the same for every participant. More particularly, the cost sequence for the eight periods was $159, 97, 62, 17, 4, 145, 104$ and 34. Hence, if a manager reported for example a cost of 179 in the first period, s/he claimed 20 of the available slack of $41 (= 200 - 159)$. Consequently, the slack claimed over slack available of this manager equals $49\% (= 20/41)$ in the first period.

[10] I also ran a repeated-measure ANCOVA, to test for period effects. However, there is no significant effect from period.

Table 3.2: Manager Descriptive Statistics

Panel A – Means and (Standard Deviations)

	No Factual Assertion		Factual Assertion	
	Endowed Information (n=20)	**Earned Information (n=21)**	**Endowed Information (n=20)**	**Earned Information (n=20)**
Average Slack[a]	0.63 (0.20)	0.74 (0.22)	0.52 (0.30)	0.50 (0.24)
Adjusted Average Slack[b]	0.62 (0.05)	0.74 (0.05)	0.54 (0.05)	0.49 (0.05)
Dark Triad[c]	3.76 (0.75)	3.57 (0.87)	3.37 (0.85)	3.76 (1.03)

Panel B – Pearson Correlation Matrix (n= 81)

Variable	**1**	**2**
1 Average Slack	1	
2 Dark Triad	0.24 **	1

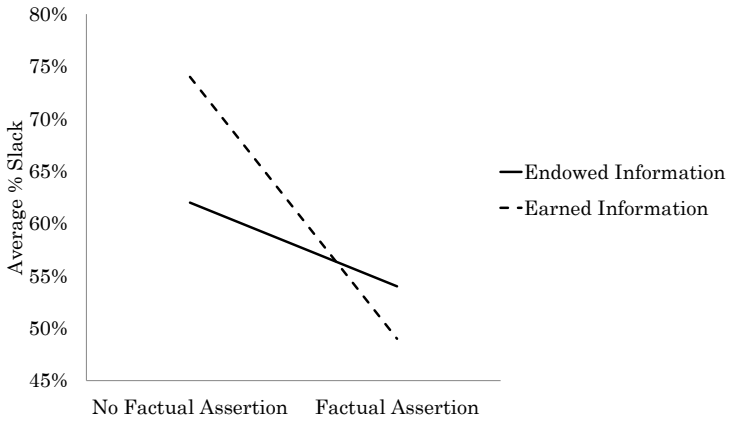
[a] Average Slack is the ratio of the eight-period mean of slack claimed over slack available. This measure ranges from 0 to 1. The higher this ratio, the more opportunistically managers reported.
[b] Adjusted Average Slack is Average Slack adjusted for Dark Triad.
[c] Dark Triad is the mean of 12 items measured on a Likert scale from "1" ("totally disagree") to "7" ("totally agree"). This scale is designed by Jonason and Webster (2010). Individuals who score high on the Dark Triad measure are characterized by elevated concerns for self-advancement and poor concerns for maintaining positive relationships.
*,**,*** Indicate significance at the 10 percent, 5 percent, and 1 percent levels (two-tailed).

Panel A of Table 3.3 reports the main and interaction effects, whereas panel B of Table 3.3 shows the simple effects.[11] Recall that H1 predicts that managers in the no factual assertion condition report more opportunistically when information is earned relative to endowed. Descriptive statistics reported earlier confirmed slack is higher for earned than endowed information when no factual assertion of the cost was required (see Panel A of Table 3.2). To formally test whether this difference is significant, I examine the effect of information acquisition within the no factual assertion condition. Consistent with H1, Panel B of Table 3.3 shows slack is significantly higher for earned than for endowed information when no factual assertion is required ($p = 0.05$). Hence, when managers trade-off preferences for wealth maximization and other-regarding preferences, the latter component has a smaller effect when information is earned relative to endowed, leading to more budgetary slack (opportunistic reporting) with earned information.

Hypothesis 2 posits that there will be a decrease in opportunistic reporting when moving from the no factual to the factual assertion condition. To test this hypothesis, I study the main effect of the mode of reporting in Panel A of Table 3.3. As indicated by the small p-value ($p<0.01$), the mode of reporting has a

[11] To test whether Dark Triad is not interacting with one of my main variables of interest, I run a regression analysis with Average Slack as dependent variable and the main effects, two- and three-way interaction effects of Dark Triad, Information Acquisition and Mode of Reporting as independent variables. In this regression, the two- and three-way interaction effects with Dark Triad are not significant (not tabulated).

Figure 3.1: Average Budgetary Slack across Experimental Conditions adjusted for Dark Triad



highly significant effect on budgetary slack. Descriptive statistics in panel A of Table 3.2 and the graphical depiction in Figure 3.1 show the effect also follows the direction I expected.

Hypothesis 3 predicts that when moving from the no factual assertion to the factual assertion condition, the decrease in slack should be larger with earned than endowed information. Hence, this hypothesis predicts an interaction effect. From Figure 3.1, it is apparent the decrease in slack is larger for earned information. To formally test whether this effect is significant, I investigate the interaction effect of the ANCOVA (see Panel A of Table 3.3. The p-value at the five percent level provides support for H2 ($p = 0.05$)). Since the decrease in slack when moving from no factual assertion to factual assertion is larger for earned than for endowed information, it seems like honesty concerns have a larger effect in mitigating slack for earned than for endowed information.

3.4.2 Motivation

In the post-experimental questionnaire, I included several questions to gain a better understanding of managers' motivation when they made their reporting choices. I focus on managers' motivation to treat the owner fairly, an important aspect of other-regarding preferences, and their motivation to be honest. All questions are presented on a Likert scale with "1" "strongly disagree" and "7" "strongly agree" and in all analysis, I control again for Dark Triad.

First, I investigate managers' fairness motivation by looking into the question "I wanted to treat the owner fairly". This measure does not differ significantly across the four conditions (not tabulated). Within the no factual assertion condition, the mean is 4.05 for endowed information, while it is 3.71 for earned

Table 3.3: H1, H2 and H3 Results – ANCOVA on Average Slack[a]

Panel A – Main and Interaction Effects				
Factor	**df**	**Mean Square**	**F**	**p-value***
Independent variables				
Information Acquisition[b]	1	0.03	0.51	0.48
Mode of Reporting[c]	1	0.57	10.04	**< 0.01**
Information Acquisition × Mode of Reporting	1	0.16	2.74	**0.05**
Covariate				
Dark Triad[d]	1	0.32	5.59	0.02
Error	76	0.06		
Panel B – Simple Effects				
Information Acquisition within No Factual assertion			2.89	**0.05**
Information Acquisition within Factual assertion			0.45	0.51
Mode of Reporting within Endowed Information			1.08	0.30
Mode of Reporting within Earned information			11.84	< 0.01

[a] Average Slack is the ratio of the eight-period mean of slack claimed over slack available. This measure ranges from 0 to 1. The higher this ratio, the more opportunistically managers reported.
[b] Information Acquisition is manipulated at two levels: earned information (0) versus endowed information (1).
[c] Mode of Reporting is manipulated at two levels: no factual assertion (0) versus factual assertion (1).
[d] Dark Triad is the mean of 12 items measured on a Likert scale from "1" ("totally disagree") to "7" ("totally agree"). This scale is designed by Jonason and Webster (2010). Individuals who score high on the Dark Triad measure are characterized by elevated concerns for self-advancement and poor concerns for maintaining positive relationships.
*p-values are reported on a two-tailed basis, except the ones in bold, who are reported on a one-tailed basis given the directional effects of the hypothesis

information (two-tailed $p = 0.50$). Recall that managers induced more slack with earned relative to endowed information when no factual assertion was required. Hence, the fact that this fairness measure is rather similar across conditions indicates that managers who earn information do not feel as if they treat the owner unfairly by claiming more slack. In other words, when a tradeoff between wealth maximization and others' payoffs is made, they might feel as if it is justified to maximize their wealth to a higher extent with earned information. The relatively high average (5.48) of the question "Since I performed effort to find out the actual cost, I feel like I deserve a higher payoff" for participants in the earned information condition without factual assertion condition provides some additional support for this claim. The average on this question for participants who earned information in the factual assertion condition equals 4.40, which is significantly lower (two-tailed $p = 0.01$), consistent with what theory suggests.

Second, when I ask participants whether it is unethical to report a cost *(factual assertion condition)* / allocate a portion of the profit *(no factual assertion condition)* that results in a significantly higher payoff for managers than for owners, managers with earned versus endowed information evaluate this question differently (untabulated). There is a main effect of the mode of reporting (one-tailed $p = 0.01$), in the sense that managers in the factual assertion condition agree with this statement more than managers in the no factual assertion condition.

Since the mode of reporting manipulation is supposed to increase the salience of honesty when a factual assertion is required, this result is in line with expectations. When I study the factual assertion condition more in depth however, the average is marginally significantly higher for earned than for endowed information (4.80 for earned information versus 4.15 for endowed information, one-tailed $p = 0.07$). Thus, I find some evidence that ethical concerns are triggered more with earned information, which is consistent with theory.

3.4.3 Earned Information: Perceived Task Difficulty and Stress

Finally, I study two aspects related to earning information in more detail: perceived task difficulty and stress. Task difficulty refers to the amount of attention and mental effort required for successful performance (Ashton 1990; Kahneman 1973). Hence, I expect that the more difficult the task was perceived, the more managers would feel like they made effort to earn their information. Similarly, stress is an important indicator of effort (Bonner and Sprinkle 2002; Shields, Deng, and Kato 2000). Consequently, the more stressful it was for managers to solve the puzzles, the more they would feel like they performed effort to earn their information. Given the theory, these feelings in turn should be reflected in the amount of opportunistic reporting; i.e., feeling more like information was earned in an effortful way should lead to more opportunistic reporting in the no factual assertion condition, but decrease opportunistic reporting to a higher extent when moving to the factual assertion condition.

To test this, I run some additional analyses on the earned information sample. In the post-experimental questionnaire, I included the following statement to measure the perceived task-difficulty "Solving these number series puzzles was difficult". Managers responded using a 7-point Likert scale with "1" "strongly disagree" and "7" "strongly agree". I split managers into low and high difficulty subsamples and use this dichotomous measure as an independent variable in an ANCOVA, together with the mode of reporting. Furthermore, I include Average Slack as the dependent variable and Dark Triad as covariate.[12] When no factual assertion is required, slack is higher when the task is perceived more difficult (0.71 for low difficulty versus 0.79 for high difficulty). In contrast, slack is lower when the task is perceived more relative to less difficult with a factual assertion (0.56 for low difficulty versus 0.42 for high difficulty). This interaction effect is significant (one-tailed $p = 0.06$). To follow up on this interaction, I study the simple effects. When no factual assertion is required, the difference in slack is

[12] I expect that a higher amount of hints used when solving the puzzle leads less to the feeling information was earned, while a higher perceived task difficulty leads more to the feeling information was earned. The number of hints used is rather low (on average 1.88 out of 16 hints were requested), but nevertheless, the variable "Task Difficulty" is significantly correlated with the amount of hints used ($r = 0.53$, two-tailed $p< 0.01$). Hence, the number of hints used and the perceived task difficulty are positively correlated but will influence slack in opposing directions. When I control for the number of used hints in the reported ANCOVA, all effects remain significant at the same level.

not significant. However, when a factual assertion is required, managers induce marginally significantly less slack when they perceive the task as more difficult (two-tailed $p = 0.08$).

Similar results are obtained for the level of stress participants felt when solving the puzzles. The more stress managers felt when solving these puzzles, the more likely they should feel like they performed effort to acquire their information. Managers indicated on a 7-point Likert response scale with "1" "strongly disagree" and "7" "strongly agree" how much they agreed with the following statement: "I felt stressed while solving these number sequence puzzles". I split managers into lowly and highly stressed subsamples and use this measure and the mode of reporting as independent variables, Dark Triad as covariate and average slack as dependent variable in an ANCOVA.[13] Untabulated results show there is a marginally significant interaction between stress and mode of reporting (one-tailed $p = 0.08$). In the no factual assertion condition, managers induced more slack when they were more stressed (0.69 for low stress versus 0.80 for high stress, one-tailed $p = 0.08$). In the factual assertion condition, managers induce less slack when they were more stressed (0.53 for low stress versus 0.46 for high stress), although the latter result is not significant.

In sum, these results indicate that feeling more like information is earned in an effortful way influences the creation of slack in a consistent manner. When managers felt more like they made effort to earn information (measured by higher perceived task difficulty and more stress), they reported more opportunistically when no factual assertion was required, indicating that there was a smaller effect of other-regarding preferences. However, the decrease in opportunistic reporting was larger when moving to the factual assertion condition, which indicates honesty considerations are stronger for managers who feel more like their information was earned in an effortful way.

3.4.4 Dark Triad as Covariate

In all the analyses reported above, I controlled for the personality trait "Dark Triad". I measured participants' score on this trait after the experimental task, by using the 12-item Dark Triad questionnaire developed by Jonason and Webster (2010). Individuals who score high on the Dark Triad measure are characterized by elevated concerns for self-advancement and poor concerns for maintaining positive relationships (Jonason and Webster 2010). Not surprisingly, individuals with these characteristics tend to report more opportunistically (e.g., D'Souza and Lima 2015; Majors 2016). Consistent with earlier research, the Dark Triad measure is positively correlated with Average Slack (see Table 3.2 Panel B) and in all reported analyses, the covariate is statistically significant.

[13] The stress variable used in this analysis is marginally significantly correlated with the number of hints used ($r = -0.26$, two-tailed $p = 0.10$). When I include the number of hints used as a covariate, all p-values remain at the same significance level.

Including Dark Triad as a covariate in my analyses allows me to increase the power of my statistical tests by removing variance that is unrelated to my research question. Note that an ANOVA with Dark Triad as dependent variable and information acquisition as well as mode of reporting as independent variables reveals no significant main or interaction effects.

3.5 Discussion

This paper investigates whether individuals' tendency to report opportunistically depends on how they acquired the information they need to report. Theory suggests there might be opposing effects from information acquisition on the two variables previously identified to be able to mitigate opportunistic reporting: other-regarding and honesty preferences. By manipulating the mode of reporting in an experiment, I can examine when each effect will dominate. I also manipulate whether participants are endowed with their information, or have to make an intellectual effort to earn it. Results indicate that other-regarding preferences are considered less when information is earned relative to endowed, resulting in more opportunistic reporting with earned information. However, when the reporting mode allows honesty considerations to come into play, the negative effect of earned information on opportunistic reporting is alleviated, since managers care more about honesty with earned than endowed information.

These findings contribute to a better understanding of information acquisition, a crucial aspect of various accounting settings like auditing, budgeting, financial statements and tax (e.g., Balakrishnan 1991; Einhorn and Ziv 2007; Nelson and Tayler 2007; Sansing 1993). Although the effortful information acquisition received some attention in the financial statements literature (Nelson and Tayler 2007), studying this factor in other domains can provide valuable additional insights. Indeed, whereas Nelson and Tayler (2007) investigate how effortful information acquisition affects perceived importance and weighting of this information, I focus on how it influences perceptions of fairness and honesty, and subsequent reporting decisions. In that way, my findings also have important implications for practice. For example, in complex business environments where information acquisition is labor intensive, it might be more beneficial to make honesty concerns more salient (e.g., by incorporate honesty into the design of the budgeting process or adapting the organizational culture) relative to environments where information is acquired more easily.

My results also add to the study of Church et al. (2014), who find that deliberately avoiding to acquire information provides individuals the means to justify distorting this information. My findings indicate that also without the choice in whether to acquire information, individuals can easily justify their misreporting behavior if they performed effort to acquire information. In addition, I add to a recent study of Brown et al. (2016) that investigates how managers' operational

effort affects their subsequent reporting behavior. In line with my results, Brown et al. (2016) find that providing greater effort increases managers' sense of deservingness, which in turn leads to more opportunistic reporting. However, while the authors are surprised that higher effort leads to less opportunistic reporting after removing the effect of deservingness, this result makes perfect sense in light of my study. Rather than a consequence of personality traits as the authors suggest (i.e., consistently wanting to do the right thing: chose to work hard and chose to not report opportunistically), my findings show it is merely the act of performing effort that can trigger honesty concerns.

Finally, I also make a methodological contribution to the budgeting literature by taking a crucial real-life aspect into account. In previous experiments, participants were usually endowed with the information they had to report, but I recognize that acquiring information requires effort. In that way, I can show effortful information acquisition has opposing effects on the impact of other-regarding preferences and honesty preferences in mitigating opportunistic reporting.

Nevertheless, this study is subject to a number of limitations which provide opportunities for future research. For example, since owners never learn the project's actual implementation cost, managers cannot show they acquire and report the right information. Hence, impression management cannot play a role, which might be especially important for earned information. Future research can examine how impression management affects opportunistic reporting with earned information. In addition, I did not allow discretion in the earned information condition (i.e., managers did not have the choice to earn or not earn information). Although discretion in effortless information acquisition is already investigated in earlier research (e.g., Church et al. 2014), it could be interesting to examine whether discretion in costly information acquisition impacts managerial reporting. Finally, I deliberately focused on cognitive effort in my experiment, since in today's business environment, this seems to be the type of effort that is often necessary to acquire information. However, future research might investigate whether different types of effort to acquire information (cognitive, mechanical, etc.) affect decisions and judgements in a similar way.

General Conclusion

In this general conclusion, I first describe the dissertation's main contributions to the literature. Next, I focus on the managerial implications of the three studies. Finally, I list the most important limitations and opportunities for future research.

Contribution to the Literature

This dissertation studies the effect of management control on knowledge sharing and makes several contributions to the literature in doing so. Despite its importance, knowledge sharing is understudied from a management control perspective. Indeed, most of the knowledge sharing studies tend to focus on the characteristics of the knowledge and the units involved in the transfer instead of the organizational choices that foster knowledge transfer. Recently, this domain has gained more research interest, as reflected by the emergence of quite some work in progress (e.g., Berger et al. 2015; Bol and Leiby 2015; Saiewitz and Kida 2016). We add to this upcoming literature stream with three experimental studies.

The first study explores whether research investigating the effect of management control systems on helping behavior can be generalized to knowledge sharing as a specific form of helping behavior. If we can do so, we would need limited research examining knowledge sharing from a management control perspective. However, our findings suggest that the extensive body of research examining general helping and cooperative behavior that does not involve knowledge sharing will not likely generalize to knowledge sharing domains. Specifically, the impact of knowledge sharing on helping behavior will depend on other aspects of the environment such as the perceived likelihood that recipients of help can reciprocate in some way. Hence, additional research studying the effect of management control on knowledge sharing is warranted.

Our second study examines how reward systems influence knowledge sharing between individuals with equal or different status. With this study, we contribute to the literature in several ways. First, we answer calls to adopt a more interactional perspective (e.g., Wang and Noe 2010) by taking into account the social context of the communication. While prior research finds mixed evidence on

the effect of rewards on knowledge sharing, we shed light on this debate by providing evidence that social context matters for the effectiveness of management control systems. For example, we show that while different-status groups may need group rewards to demonstrate the cooperative behavior that leads to increased knowledge sharing and performance, equal-status groups may not need such rewards as they face lower barriers to cooperation in the first place. Second, while status differences are known to affect organizational interactions such as knowledge transfers, prior research has had little to say about how these effects can be managed. We show that rewards can influence the extent to which status impacts knowledge sharing. In particular, status differences matter less under group rewards relative to individual rewards. Third, while previous research only considers the role of higher status individuals in group interactions (Bunderson and Reagans 2011), we examine the behavior of both higher status individuals and lower status individuals. We show that the behavior of lower status individuals can also affect the extent of knowledge sharing.

The third study investigates if managers' tendency to share or report knowledge opportunistically depends on whether they made effort to acquire the knowledge they need to report. With this study, I contribute to the reporting literature by taking into account the fundamental phase of acquiring the knowledge that needs to be reported. I find that making effort to acquire knowledge leads to more opportunistic reporting, unless honesty concerns are sufficiently triggered by the reporting environment. Since the acquisition of information or knowledge is a crucial aspect of various accounting settings, like auditing, budgeting, financial statements and tax (e.g., Einhorn and Ziv 2007; Nelson and Tayler 2007), I provide some useful insights for these settings as well. Finally, I also make a methodological contribution to the budgeting literature. Indeed, I perform a budgeting experiment, in which I take into account an effortful knowledge acquisition as a crucial real-life aspect. In previous budgeting experiments, participants were usually endowed with the knowledge they had to report, but I recognize that acquiring knowledge requires effort. In that way, I can show that making effort to acquire knowledge has opposing effects on the impact of managerial accounting systems in mitigating opportunistic reporting.

In summary, this disseration shows that sharing (laboriously acquired) knowledge is perceived as a particularly costly activity for which the sharers feel like they should be rewarded in return. However installing management control systems that make honesty concerns salient can alleviate this need for compensation. In addition, when individuals know they might be compensated for sharing knowledge, they are more willing to do so. Hence, it seems that knowledge sharing increases trust. Finally, in line with earlier research we find that status differences impede knowledge sharing, but we also show this can be overcome by the proper management control systems.

Managerial Implications

Given the importance of knowledge sharing for organizations' success and the observation that employees are not always prepared to share their knowledge, there is a practical need for management control systems that can encourage the transfer of knowledge. In this dissertation, we gain additional insights in this domain and contribute to a better understanding of practice.

For example, results of our first study contribute to a better understanding of how to design reward systems to promote knowledge sharing. In particular, without the prospect of rewards, individuals appear less willing to provide help that involves knowledge sharing relative to help that does not. Thus, to the extent organizations value knowledge sharing, they may need to specifically target this form of help. As such, we also contribute to a better understanding of why performance evaluation and reward systems specifically target knowledge sharing when cooperative behavior more generally is already rewarded, as is done by organizations such as PricewaterhouseCoopers for example (Hackett 2000). Additionally, given the finding that knowledge sharing enhances trust that help will result in future benefits, our results suggest that informal, implicit promises to reward knowledge sharing can be quite effective. That is, knowledge sharing can increase the efficacy of trust-based, implicit contracts where employees share knowledge today in the hopes, but no formal guarantees, to receive rewards for this help in the future.

An important implication of our second study is that job titles (and their corresponding role descriptions) shape status-driven behavior. This suggests that by formalizing status, job titles can have unintended consequences in terms of the way in which knowledge sharing and other cooperative behaviors are handled. However, we also find that these effects can be managed. Reward systems can influence the extent to which status impacts knowledge sharing. In particular, status differences matter less under group rewards relative to individual rewards.

In the third study, I find other-regarding and honesty concerns can be triggered by adapting the mode of reporting, which results in less opportunistic knowledge sharing. Specifically, my results indicate it might be better to give managers less discretion in reporting results (e.g., let them report unprocessed numbers rather than measures that can be more easily manipulated) when it takes a lot of effort to acquire knowledge. Moreover, organizations have several other means at their disposal to impact other-regarding and honesty concerns. They could for example change the span of control (Dierynck 2012), alter the transparency of payoffs (Douthit and Stevens 2015), install an organizational culture that values honesty (Trevino 1986), and adopt a code of ethics with public certification (Davidson and Stevens 2013). However, these design changes do not come without a cost. My results identify when it is more or less beneficial

to invest in such changes. For example, in complex business settings where it takes a lot of effort to gain knowledge, it can be more beneficial to invest in a system that triggers honesty concerns relative to environments where information is acquired more easily.

Limitations and Opportunities for Future Research

Although this dissertation provides several contributions to the literature and practice, it also has some inevitable limitations. However, these limitations provide interesting opportunities for future research. In this section, I elaborate on the limitations and discuss some of the avenues for future research.

Firstly, the decision to share or not to share knowledge might be more complex in a real organizational setting than in our experimental settings. For instance, there might be more risk involved in this decision. On the one hand, employees might be concerned about losing their knowledge monopoly if they share their knowledge; on the other hand, they might be concerned about getting fired if they do not share their knowledge.[14]

Similarly, the context of the interaction might be more complex in reality. In that vein, future research can examine how adding important contextual variables such as face-to-face interactions and multiple period relations potentially impacts our findings. For example, while we focus on monetary rewards to stimulate knowledge sharing, investigating other, less tangible benefits such as recognition can provide useful additional insights. Specifically, in an environment where the veil of anonymity is removed, future research can examine whether individuals share knowledge to receive the respect and admiration of others, independent of any monetary rewards it provides. Likewise, less tangible factors such as the desire to gain a favorable impression could influence the decision to share or not share knowledge opportunistically.

As another example, the knowledge that had to be shared in all of our experimental tasks was relatively explicit. Future studies could investigate whether our results hold for different types of knowledge, such as more tacit knowledge, and whether the content of the knowledge matters. For example, are employees equally likely to share knowledge about innovative versus productive tasks and should we use similar management control systems to encourage this? Analogously, it would be interesting to study other types of knowledge sharing, such as vicarious learning (i.e., "watch and learn" or learning by observation) (Huber 1991).

Finally, in order to complement our findings, it could be interesting to use other research methods to study knowledge sharing from a management control perspective (Luft 2016). While experiments have their advantages, like the abil-

[14] Note that in many situations, it is not known which knowledge individuals have, which would make this concern less relevant.

ity to provide evidence of how and why causal relations occur, they also face some concerns, such as the generalizability of the results to the "real world". Archival and survey studies can provide large-sample evidence that causal relations actually exist (or do not exist) between management control systems and organizational performance. In addition, several interesting research questions can be answered better by archival, survey or case studies. For example, companies are increasingly adding knowledge related positions to their organizational structure, such as Chief Knowledge Officers (CKO) who have to oversee the knowledge management. It would be interesting to find out whether installing such a person is enhancing organization's innovativeness and success.

Bibliography

ABRAMS, L. C., R. CROSS, E. LESSER, AND D. Z. LEVIN (2003): "Nurturing interpersonal trust in knowledge-sharing networks," *The Academy of Management Executive*, 17, 64–77.

ADAMS, J. S. (1965): *Advances in experimental social psychology*, New York: Academic Press, vol. 2, chap. Inequity in social exchange, 267–299.

ANDERSON, C. AND C. E. BROWN (2010): "The functions and dysfunctions of hierarchy," *Research in Organizational Behavior*, 30, 55–89.

ANDERSON, C., O. P. JOHN, J. D. KELTNER, AND A. M. KRING (2001): "Who attains social status? Effects of personality and physical attractiveness in social groups," *Journal of Personality and Social Psychology*, 81, 116–132.

ANDERSON, C. AND G. KILDUFF (2009): "Why dominant personalities attain influence in groups? A competence-signaling account of personality dominance," *Journal of Personality and Social Psychology*, 96, 491–503.

ARGOTE, L. AND P. INGRAM (2000): "Knowledge transfer: A basis for competitive advantage in firms," *Organizational Behavior and Human Decision Processes*, 82, 150–169.

ARNOLD, P. (1998): "The limits of postmodernism in accounting history: The Decatur experience," *Accounting, Organizations and Society*, 23, 665–684.

ARYA, A., J. FELLINGHAM, AND J. GLOVER (1997): "Teams, repeated tasks, and implicit incentives," *Journal of Accounting and Economics*, 23, 7–30.

ASHTON, R. H. (1990): "Pressure and performance in accounting decision settings: Paradoxical effects of incentives, feedback, and justification," *Journal of Accounting Research*, 28, 148–180.

BABCOCK, P. (2004): "Shedding light on knowledge management," *HR magazine*, 49, 46–51.

BALAKRISHNAN, R. (1991): "Information acquisition and resource allocation decisions," *The Accounting Review*, 66, 120–139.

BALAKRISHNAN, R., G. B. SPRINKLE, AND M. G. WILLIAMSON (2011): "Contracting benefits of corporate giving: An experimental investigation," *The Accounting Review*, 86, 1887–1907.

BALES, R. F. (1950): *Interaction process analysis: A method for the study of small groups*, Reading, Massachusetts: Addison-Wesley.

BANDURA, A. (1999): "Moral disengagement in the perpetration of inhumanities," *Personality and Social Psychology Review*, 3, 193–209.

BARON, J. N. AND W. T. BIELBY (1986): "The proliferation of job titles in organizations," *Adminstrative Science Quarterly*, 31, 561–586.

BARTOL, K. M. AND A. SRIVASTAVA (2002): "Encouraging knowledge sharing: The role of organizational reward systems." *Journal of Leadership and Organization Studies*, 9, 64–76.

BAUM, J. A. AND P. INGRAM (1998): "Survival-enhancing learning in the Manhattan hotel industry, 1898–1980," *Management Science*, 44, 996–1016.

BEERSMA, B., J. R. HOLLENBECK, S. E. HUMPHREY, H. MOON, D. E. CONLON, AND D. R. ILGEN (2003): "Cooperation, competition, and team performance: Toward a contingency approach." *Academy of Management Journal*, 46, 572–590.

BEGGAN, J. K. (1992): "On the social nature of nonsocial perception: The mere ownership effect." *Journal of Personality and Social Psychology*, 62, 229–237.

BENS, D. A., T. H. GOODMAN, AND M. NEAMTIU (2012): "Does investment-related pressure lead to misreporting? An analysis of reporting following M&A transactions," *The Accounting Review*, 87, 839–865.

BERGER, L., K. FIOLLEAU, AND C. MACTAVISH (2015): "I know something you don't know: How relative performance and pay for performance affect employee decisions to share information with other employees," Working paper.

BJÖRKMAN, I., W. BARNER-RASMUSSEN, AND L. LI (2004): "Managing knowledge transfer in MNCs: The impact of headquarters control mechanisms," *Journal of International Business Studies*, 35, 443–455.

BOCK, G.-W., R. W. ZMUD, Y.-G. KIM, AND J.-N. LEE (2005): "Behavioral intention formation in knowledge sharing: Examining the roles of extrinsic motivators, social-psychological forces, and organizational climate," *MIS Quarterly*, 29, 87–111.

BOL, J. C., T. M. KEUNE, E. M. MATSUMURA, AND J. Y. SHIN (2010): "Supervisor discretion in target setting: An empirical investigation," *The Accounting Review*, 85, 1861–1886.

BOL, J. C. AND J. LEIBY (2015): "Status motives and agent-to-agent information sharing: How evolutionary psychology shapes agents' responses to control system design," SSRN Working Paper, http://ssrn.com/abstract=2645804.

BONNER, S. E. AND G. B. SPRINKLE (2002): "The effects of monetary incentives on effort and task performance: Theories, evidence, and a framework for research," *Accounting, Organizations and Society*, 27, 303–345.

BRANDTS, J. AND G. CHARNESS (2000): "Hot vs. cold: Sequential responses and preference stability in experimental games," *Experimental Economics*, 2, 227–238.

BROWN, J., E. CHAN, J. CHOI, H. EVANS, AND D. MOSER (2016): "Can working harder lead managers to misreport more often?" Working paper.

BROWN, J. L., J. H. EVANS III, AND D. V. MOSER (2009): "Agency theory and participative budgeting experiments," *Journal of Management Accounting Research*, 21, 317–345.

BRUNS, J. W. AND S. M. MCKINNON (1993): "Information and managers: A field study," *Journal of Management Accounting Research*, 5, 84–108.

BUNDERSON, J. S. AND P. BOUMGARDEN (2010): "Structure and learning in self-managed teams: Why bureaucratic teams can be better learners," *Organization Science*, 21, 609–624.

BUNDERSON, J. S. AND R. E. REAGANS (2011): "Power, status, and learning in organizations," *Organization Science*, 22, 1182–1194.

BURGESS, D. (2005): "What motivates employees to transfer knowledge outside their work unit?" *Journal of Business Communication*, 42, 324–348.

BYRNE, B. M. (2010): *Structural equation modeling with AMOS: Basic concepts, applications, and programming*, Routledge.

CABRERA, A. AND E. F. CABRERA (2002): "Knowledge-sharing dilemmas," *Organization Studies*, 23, 687–710.

——— (2005): "Fostering knowledge sharing through people management practices," *The International Journal of Human Resource Management*, 16, 720–735.

CAMERER, C. (2003): *Behavioral game theory: Experiments in strategic interaction*, Princeton, NJ: Princeton University Press.

CASKEY, J., V. NAGAR, AND P. PETACCHI (2010): "Reporting bias with an audit committee," *The Accounting Review*, 85, 447–481.

CASON, T. N. AND V.-L. MUI (1998): "Social influence in the sequential dictator game," *Journal of Mathematical Psychology*, 42, 248–265.

CHEN, C. X., K. T. TROTMAN, AND F. ZHOU (2014): "Nominal versus interacting electronic fraud brainstorming in hierarchical audit teams," *The Accounting Review*, 90, 175–198.

CHEN, S., A. Y. LEE-CHAI, AND J. A. BARGH (2001): "Relationship orientation as a moderator of the effects of social power." *Journal of Personality and Social Psychology*, 80, 173–187.

CHENG, M. M. AND R. COYTE (2014): "The effects of incentive subjectivity and strategy communication on knowledge-sharing and extra-role behaviours," *Management Accounting Research*, 25, 119–130.

CHERRY, T. L. (2001): "Mental accounting and other-regarding behavior: Evidence from the lab," *Journal of Economic Psychology*, 22, 605–615.

CHRIST, M. H., K. L. SEDATOLE, AND K. L. TOWRY (2012): "Sticks and carrots: The effect of contract frame on effort in incomplete contracts," *The Accounting Review*, 87, 1913–1938.

CHRISTENSEN, P. O. AND G. FELTHAM (2006): *Economics of accounting: Performance evaluation*, vol. 2, Springer Science & Business Media.

CHURCH, B. K., R. L. HANNAN, AND X. J. KUANG (2012): "Shared interest and honesty in budget reporting," *Accounting, Organizations and Society*, 37, 155–167.

CHURCH, B. K., R. LYNN HANNAN, AND X. J. KUANG (2014): "Information acquisition and opportunistic behavior in managerial reporting," *Contemporary Accounting Research*, 31, 398–419.

CONSTANT, D., S. KIESLER, AND L. SPROULL (1994): "What's mine is ours, or is it? A study of attitudes about information sharing," *Information Systems Research*, 5, 400–421.

CONSTANT, D., L. SPROULL, AND S. KIESLER (1996): "The kindness of strangers: The usefulness of electronic weak ties for technical advice," *Organization Science*, 7, 119–135.

COOKE, R. A. AND J. L. SZUMAL (1994): "The impact of group interaction styles on problem-solving effectiveness," *The Journal of Applied Behavioral Science*, 30, 415–437.

COX, J. C. (2004): "How to identify trust and reciprocity," *Games and Economic Behavior*, 46, 260–281.

CRESS, U., J. KIMMERLE, AND F. W. HESSE (2006): "Information exchange with shared databases as a social dilemma: The effect of metaknowledge, bonus systems, and costs," *Communication Research*, 33, 370–390.

CSIKSZENTMIHALYI, M. AND E. ROCHBERG-HALTON (1981): *The meaning of things: Domestic symbols and the self*, London: Cambridge University Press.

CUMMINGS, J. N. (2004): "Work groups, structural diversity, and knowledge sharing in a global organization," *Management Science*, 50, 352–364.

DANA, J., R. A. WEBER, AND J. X. KUANG (2007): "Exploiting moral wiggle room: Experiments demonstrating an illusory preference for fairness," *Economic Theory*, 33, 67–80.

DARR, E. D., L. ARGOTE, AND D. EPPLE (1995): "The acquisition, transfer, and depreciation of knowledge in service organizations: Productivity in franchises," *Management Science*, 41, 1750–1762.

DAVENPORT, T. H. AND L. PRUSAK (1998): *Working knowledge: How organizations manage what they know*, Boston: Harvard Business Press.

DAVIDSON, B. I. AND D. E. STEVENS (2013): "Can a code of ethics improve manager behavior and investor confidence? An experimental study," *The Accounting Review*, 88, 51–74.

DE DREU, C. K., B. A. NIJSTAD, AND D. VAN KNIPPENBERG (2008): "Motivated information processing in group judgment and decision making," *Personality and Social Psychology Review*, 12, 22–49.

DE DREU, C. K. AND D. VAN KNIPPENBERG (2005): "The possessive self as a barrier to conflict resolution: Effects of mere ownership, process accountability, and self-concept clarity on competitive cognitions and behavior." *Journal of Personality and Social Psychology*, 89, 345–357.

DE VAUS, D. (2013): *Surveys in social research*, Routledge.

DELONG, D. W. AND L. FAHEY (2000): "Diagnosing cultural barriers to knowledge management," *The Academy of Management Executive*, 14, 113–127.

DETERT, J. R., L. K. TREVIÑO, AND V. L. SWEITZER (2008): "Moral disengagement in ethical decision making: A study of antecedents and outcomes." *Journal of Applied Psychology*, 93, 374–391.

DEUTSCH, M. (1949): "A theory of cooperation and competition," *Human Relations*, 2, 129–152.

DIERYNCK, B. (2012): "Do you fear your (heterogeneous) peers? An experimental investigation about peer-induced fairness concerns in a capital budgeting setting," SSRN Working paper, http://dx.doi.org/10.2139/ssrn.1909808.

DITILLO, A. (2004): "Dealing with uncertainty in knowledge-intensive firms: The role of management control systems as knowledge integration mechanisms," *Accounting, Organizations and Society*, 29, 401–421.

DIXON, N. M. (2000): *Common knowledge: How companies thrive by sharing what they know*, Harvard Business School Press.

DOUTHIT, J. AND M. MAJERCZYK (2015): "Experimental role assignment and the effect of the perceived legitimacy of the superiors position on budgetary reporting," Working paper.

DOUTHIT, J. D. AND D. E. STEVENS (2015): "The robustness of honesty effects on budget proposals when the superior has rejection authority," *The Accounting Review*, 90, 467–493.

DRAKE, A. R., S. F. HAKA, AND S. P. RAVENSCROFT (1999): "Cost system and incentive structure effects on innovation, efficiency and profitability in teams," *The Accounting Review*, 74, 323–345.

D'SOUZA, M. F. AND G. A. S. F. D. LIMA (2015): "The dark side of power: The dark triad in opportunistic decision-making," *Advances in Scientific and Applied Accounting*, 8, 135–156.

ECKEL, C. C. AND P. J. GROSSMAN (1996): "Altruism in anonymous dictator games," *Games and Economic Behavior*, 16, 181–191.

ECKEL, C. C. AND R. K. WILSON (2007): "Social learning in coordination games: Does status matter?" *Experimental Economics*, 10, 317–329.

EDMONDSON, A. C. (2002): "The local and variegated nature of learning in organizations: A group-level perspective," *Organization Science*, 13, 128–146.

EINHORN, E. AND A. ZIV (2007): "Unbalanced information and the interaction between information acquisition, operating activities, and voluntary disclosure," *The Accounting Review*, 82, 1171–1194.

EVANS, J. H., R. L. HANNAN, R. KRISHNAN, AND D. V. MOSER (2001): "Honesty in managerial reporting," *The Accounting Review*, 76, 537–559.

EWUSI-MENSAH, K. (1981): "The external organizational environment and its impact on management information systems," *Accounting, Organizations and Society*, 6, 301–316.

FAST, N. J., N. HALEVY, AND A. D. GALINSKY (2012): "The destructive nature of power without status," *Journal of Experimental Social Psychology*, 48, 391–394.

FEHR, E. AND K. M. SCHMIDT (2006): *Handbook of the Economics of Giving, Altruism and Reciprocity*, Elsevier, vol. 1, chap. The economics of fairness, reciprocity and altruism–experimental evidence and new theories, 615–691.

FERRIN, D. L. AND K. T. DIRKS (2003): "The use of rewards to increase and decrease trust: Mediating processes and differential effects," *Organization Science*, 14, 18–31.

FISCHBACHER, U. (2007): "z-Tree: Zurich toolbox for ready-made economic experiments," *Experimental Economics*, 10, 171–178.

FISKE, S. T., A. J. CUDDY, P. GLICK, AND J. XU (2002): "A model of (often mixed) stereotype content: Competence and warmth respectively follow from perceived status and competition." *Journal of Personality and Social Psychology*, 82, 878–902.

FOSS, N. J. AND T. PEDERSEN (2002): "Transferring knowledge in MNCs: The role of sources of subsidiary knowledge and organizational context," *Journal of International Management*, 8, 49–67.

GNEEZY, U. (2005): "Deception: The role of consequences," *The American Economic Review*, 95, 384–394.

GRANT, R. M. (1996): "Toward a knowledge-based theory of the firm," *Strategic Management Journal*, 17, 109–122.

GUPTA, A. K. AND V. GOVINDARAJAN (2000): "Knowledge management's social dimension: Lessons from Nucor Steel," *MIT Sloan Management Review*, 42, 71–80.

HACKETT, B. (2000): "Beyond knowledge management: New ways to work and learn," `http://www.providersedge.com/docs/km_articles/beyond_km_-_new_ways_to_work_and_learn.pdf`.

HACKMAN, J. R. AND C. G. MORRIS (1975): "Group tasks, group interaction process, and group performance effectiveness: A review and proposed integration." *Advances in Experimental Social Psychology*, 8, 45–99.

HAESEBROUCK, K., M. COOLS, AND A. VAN DEN ABBEELE (2012): "Kennisoverdracht in organisaties: Welke invloed heeft management control?" *Management Control & Accounting*, 16, 34–39.

——— (2015a): "Status differences and knowledge transfer: The effect of incentives," SSRN Working paper `http://ssrn.com/abstract=2660888`.

HAESEBROUCK, K., A. VAN DEN ABBEELE, AND M. G. WILLIAMSON (2015b): "The effects of knowledge sharing on helping behavior: Implications for reward system design," SSRN Working paper, http://ssrn.com/abstract=2648298.

HANNAN, R. L., F. W. RANKIN, AND K. L. TOWRY (2006): "The effect of information systems on honesty in managerial reporting: A behavioral perspective," *Contemporary Accounting Research*, 23, 885–918.

HANSEN, M. T. (2002): "Knowledge networks: Explaining effective knowledge sharing in multiunit companies," *Organization Science*, 13, 232–248.

HAYNES, C. M. AND S. J. KACHELMEIER (1998): "The effects of accounting contexts on accounting decisions: A synthesis of cognitive and economic perspectives in accounting experimentation," *Journal of Accounting Literature*, 17, 97–136.

HINDS, P. J. AND M. MORTENSEN (2005): "Understanding conflict in geographically distributed teams: The moderating effects of shared identity, shared context, and spontaneous communication," *Organization Science*, 16, 290–307.

HINDS, P. J. AND J. PFEFFER (2003): *Sharing expertise: Beyond knowledge management*, MIT Press, Cambridge, MA, chap. Why organizations don't know what they know: Cognitive and motivational factors affecting the transfer of expertise, 3–26.

HOFFMAN, E. AND M. L. SPITZER (1985): "Entitlements, rights, and fairness: An experimental examination of subjects' concepts of distributive justice," *The Journal of Legal Studies*, 14, 259–297.

HOLLENBECK, J. R., D. R. ILGEN, J. A. LEPINE, J. A. COLQUITT, AND J. HEDLUND (1998): "Extending the multilevel theory of team decision making: Effects of feedback and experience in hierarchical teams," *Academy of Management Journal*, 41, 269–282.

HOLLINGSHEAD, A. B. (1996): "Information suppression and status persistence in group decision making: The effects of communication media," *Human Communication Research*, 23, 193–219.

HOWE, H. AND M. G. SIMKIN (2006): "Factors affecting the ability to detect spreadsheet errors," *Decision Sciences Journal of Innovative Education*, 4, 101–122.

HRISTOVA, E., M. GRINBERG, I. GEORGIEVA, AND M. BORISOVA (2013): "Cooperation in prisoners dilemma game: Influence of players social roles," in *Proceedings of the 35th Annual Meeting of the Cognitive Science Society*, 2578–2583.

HSEE, C. K. (1996): "Elastic justification: How unjustifiable factors influence judgments," *Organizational Behavior and Human Decision Processes*, 66, 122–129.

HUBER, G. P. (1991): "Organizational learning: The contributing processes and the literatures," *Organization Science*, 2, 88–115.

HUYSMAN, M. AND D. DE WIT (2003): *Sharing expertise: Beyond knowledge management*, The MIT Press, chap. A critical evaluation of knowledge management practices, 27–56.

HWANG, Y., D. H. ERKENS, AND J. H. EVANS III (2009): "Knowledge sharing and incentive design in production environments: Theory and evidence," *The Accounting Review*, 84, 1145–1170.

IDC (2014): "The knowledge quotient: Unlocking the hidden value of information using search and content analytics." `http://www.coveo.com/~/media/Files/WhitePapers/Coveo_IDC_Knowledge_Quotient_June2014.ashx`.

INKPEN, A. C. (2000): "Learning through joint ventures: A framework of knowledge acquisition," *Journal of Management Studies*, 37, 1019–1044.

IPE, M. (2003): "Knowledge sharing in organizations: A conceptual framework," *Human Resource Development Review*, 2, 337–359.

JENSEN, M. C. (2001): "Corporate budgeting is broken, let's fix it," *Harvard Business Review*, 79, 94–101.

JENSEN, M. C. AND W. H. MECKLING (1992): "Specific and general knowledge and organizational structure," *Journal of Applied Corporate Finance*, 8, 4–18.

JOHANNESSON, M. AND B. PERSSON (2000): "Non-reciprocal altruism in dictator games," *Economics Letters*, 69, 137–142.

JOHNSON, D. W. (2003): "Social interdependence: Interrelationships among theory, research, and practice." *American Psychologist*, 58, 934–945.

JONASON, P. K. AND G. D. WEBSTER (2010): "The dirty dozen: A concise measure of the dark triad." *Psychological Assessment*, 22, 420–432.

KACHELMEIER, S. J. AND R. R. KING (2002): "Using laboratory experiments to evaluate accounting policy issues," *Accounting Horizons*, 16, 219–232.

KAHNEMAN, D. (1973): *Attention and effort*, Englewood Cliffs, New Jersey: Prentice-Hall.

KANKANHALLI, A., B. C. TAN, AND K.-K. WEI (2005): "Contributing knowledge to electronic knowledge repositories: An empirical investigation," *MIS Quarterly*, 29, 113–143.

KELLY, K. (2010): "The effects of incentives on information exchange and decision quality in groups," *Behavioral Research in Accounting*, 22, 43–65.

KELTNER, D., D. H. GRUENFELD, AND C. ANDERSON (2003): "Power, approach, and inhibition." *Psychological Review*, 110, 265–284.

KENNEDY, P. (2003): *A guide to econometrics*, Malden, Mass: Blackwell Publishing.

KIM, S. AND H. LEE (2006): "The impact of organizational context and information technology on employee knowledge-sharing capabilities," *Public Administration Review*, 66, 370–385.

KIM, S. L. AND S. YUN (2015): "The effect of coworker knowledge sharing on performance and its boundary conditions: An interactional perspective." *Journal of Applied Psychology*, 100, 575–582.

KUNDA, Z. (1990): "The case for motivated reasoning." *Psychological Bulletin*, 108, 480–498.

LARSON, J. R., C. CHRISTENSEN, A. S. ABBOTT, AND T. M. FRANZ (1996): "Diagnosing groups: Charting the flow of information in medical decision-making teams," *Journal of Personality and Social Psychology*, 71, 315–330.

LARSON, J. R., C. CHRISTENSEN, T. M. FRANZ, AND A. S. ABBOTT (1998): "Diagnosing groups: The pooling, management, and impact of shared and unshared case information in team-based medical decision making," *Journal of Personality and Social Psychology*, 75, 93–108.

LEE, F. (1997): "When the going gets tough, do the tough ask for help? Help seeking and power motivation in organizations," *Organizational Behavior and Human Decision Processes*, 72, 336–363.

LEE, J.-H., Y.-G. KIM, AND M.-Y. KIM (2006): "Effects of managerial drivers and climate maturity on knowledge management performance: Empirical validation," *Information Resources Management Journal*, 19, 48–60.

LEONARD, D. AND S. SENSIPER (1998): "The role of tacit knowledge in group innovation," *California Management Review*, 40, 112–132.

LEVINE, S. S. AND M. J. PRIETULA (2012): "How knowledge transfer impacts performance: A multilevel model of benefits and liabilities," *Organization Science*, 23, 1748–1766.

LI, J. J., L. POPPO, AND K. Z. ZHOU (2010): "Relational mechanisms, formal contracts, and local knowledge acquisition by international subsidiaries," *Strategic Management Journal*, 31, 349–370.

LIN, H.-F. (2007a): "Effects of extrinsic and intrinsic motivation on employee knowledge sharing intentions," *Journal of Information Science*, 33, 135–149.

——— (2007b): "Knowledge sharing and firm innovation capability: An empirical study," *International Journal of Manpower*, 28, 315–332.

LOUNT, R. B. AND N. C. PETTIT (2012): "The social context of trust: The role of status," *Organizational Behavior and Human Decision Processes*, 117, 15–23.

LUFT, J. (2016): "Cooperation and competition among employees: Experimental evidence on the role of management control systems," Forthcoming in Management Accounting Research.

LUFT, J. L. (1997): "Fairness, ethics and the effect of management accounting on transaction costs," *Journal of Management Accounting Research*, 9, 199–216.

MAAS, V. S. AND M. VAN RINSUM (2013): "How control system design influences performance misreporting," *Journal of Accounting Research*, 51, 1159–1186.

MACCORMACK, A., S. VOELPEL, AND H. KERRY (2002): *Siemens sharenet: Building a knowledge network*, Boston, MA: Harvard Business School Boston.

MAGEE, J. C. AND A. D. GALINSKY (2008): "Social hierarchy: The self-reinforcing nature of power and status," *The Academy of Management Annals*, 2, 351–398.

MAJORS, T. M. (2016): "The interaction of communicating measurement uncertainty and the dark triad on managers reporting decisions," *The Accounting Review*, 91, 973–992.

MASSCHELEIN, S., E. CARDINAELS, AND A. VAN DEN ABBEELE (2012): "ABC information, fairness perceptions, and interfirm negotiations," *The Accounting Review*, 87, 951–973.

MAZAR, N., O. AMIR, AND D. ARIELY (2008): "The dishonesty of honest people: A theory of self-concept maintenance," *Journal of Marketing Research*, 45, 633–644.

MERCHANT, K. A. AND W. A. VAN DER STEDE (2007): *Management control systems: Performance measurement, evaluation and incentives*, Pearson Education.

MILGROM, P. R. AND J. D. ROBERTS (1992): *Economics, Organization and Management*, Prentice-Hall.

MILLER, P. AND T. O'LEARY (1987): "Accounting and the construction of the governable person," *Accounting, Organizations and Society*, 12, 235–265.

MITTENDORF, B. (2006): "Capital budgeting when managers value both honesty and perquisites," *Journal of Management Accounting Research*, 18, 77–95.

MONGE, P. R., J. FULK, M. E. KALMAN, A. J. FLANAGIN, C. PARNASSA, AND S. RUMSEY (1998): "Production of collective action in alliance-based interorganizational communication and information systems," *Organization Science*, 9, 411–433.

NAHAPIET, J. AND S. GHOSHAL (1998): "Social capital, intellectual capital, and the organizational advantage," *Academy of Management Review*, 23, 242–266.

NELSON, M. W. AND W. B. TAYLER (2007): "Information pursuit in financial statement analysis: Effects of choice, effort, and reconciliation," *The Accounting Review*, 82, 731–758.

NEMBHARD, I. M. AND A. C. EDMONDSON (2006): "Making it safe: The effects of leader inclusiveness and professional status on psychological safety and improvement efforts in health care teams," *Journal of Organizational Behavior*, 27, 941–966.

NONAKA, I. (1994): "A dynamic theory of organizational knowledge creation," *Organization Science*, 5, 14–37.

O'DELL, C. AND C. J. GRAYSON (1998): "If only we knew what we know: Identification and transfer of internal best practices," *California Management Review*, 40, 154–174.

OMER, T. C. AND R. J. YETMAN (2007): "Tax misreporting and avoidance by nonprofit organizations," *Journal of the American Taxation Association*, 29, 61–86.

ORGAN, D. W. (1990): *Research in organizational behavior*, JAI Press, vol. 12, chap. The motivational basis of organizational citizenship behavior, 43–72.

ORGAN, D. W., P. M. PODSAKOFF, AND S. B. MACKENZIE (2006): *Organizational citizenship behavior: Its nature, antecedents, and consequences*, Sage Publications.

OSTERLOH, M. AND B. S. FREY (2000): "Motivation, knowledge transfer, and organizational forms," *Organization Science*, 11, 538–550.

OSTROM, E. AND J. WALKER (2003): *Trust and reciprocity: Interdisciplinary lessons for experimental research*, Russell Sage Foundation.

OUCHI, W. G. (1979): "A conceptual framework for the design of organizational control mechanisms," *Management Science*, 15, 833–848.

OVERBECK, J. R. AND B. PARK (2001): "When power does not corrupt: Superior individuation processes among powerful perceivers," *Journal of Personality and Social Psychology*, 81, 549–565.

OXOBY, R. J. AND K. N. MCLEISH (2004): "Sequential decision and strategy vector methods in ultimatum bargaining: Evidence on the strength of other-regarding behavior," *Economics Letters*, 84, 399–405.

OXOBY, R. J. AND J. SPRAGGON (2008): "Mine and yours: Property rights in dictator games," *Journal of Economic Behavior & Organization*, 65, 703–713.

PEECHER, M. E. AND I. SOLOMON (2001): "Theory and experimentation in studies of audit judgments and decisions: Avoiding common research traps," *International Journal of Auditing*, 5, 193–203.

PERSSON, M. (2006): "The impact of operational structure, lateral integrative mechanisms and control mechanisms on intra-MNE knowledge transfer," *International Business Review*, 15, 547–569.

PIERCE, J. L., T. KOSTOVA, AND K. T. DIRKS (2001): "Toward a theory of psychological ownership in organizations," *Academy of Management Review*, 26, 298–310.

PODSAKOFF, P. M., S. B. MACKENZIE, J. B. PAINE, AND D. G. BACHRACH (2000): "Organizational citizenship behaviors: A critical review of the theoretical and empirical literature and suggestions for future research," *Journal of Management*, 26, 513–563.

PREACHER, K. J. AND A. F. HAYES (2008): "Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models," *Behavior Research Methods*, 40, 879–891.

PRENDERGAST, C. (1999): "The provision of incentives in firms," *Journal of Economic Literature*, 37, 7–63.

PRESTON, J. (2015): "In turnabout, Disney cancels tech worker layoffs," New York Times.

PWC (2016): PWC Canada web site, `http://www.pwc.com/ca/en/corporate-responsibility/recognition-and-rewards.jhtml`, last accessed April 19, 2016.

QUIGLEY, N. R., P. E. TESLUK, E. A. LOCKE, AND K. M. BARTOL (2007): "A multilevel investigation of the motivational mechanisms underlying knowledge sharing and performance," *Organization Science*, 18, 71–88.

RABAN, D. R. AND S. RAFAELI (2007): "Investigating ownership and the willingness to share information online," *Computers in Human Behavior*, 23, 2367–2382.

RANKIN, F. W. (2004): "Coordinating effort under team-based and individual incentives: An experimental analysis," *Contemporary Accounting Research*, 21, 191–222.

RANKIN, F. W., S. T. SCHWARTZ, AND R. A. YOUNG (2008): "The effect of honesty and superior authority on budget proposals," *The Accounting Review*, 83, 1083–1099.

RIDINGS, C. M., D. GEFEN, AND B. ARINZE (2002): "Some antecedents and effects of trust in virtual communities," *The Journal of Strategic Information Systems*, 11, 271–295.

ROUSSEAU, D. M., S. B. SITKIN, R. S. BURT, AND C. CAMERER (1998): "Not so different after all: A cross-discipline view of trust," *Academy of Management Review*, 23, 393–404.

RUDDY, T. (2000): "Taking knowledge from heads and putting it into hands," *Knowledge and Process Management*, 7, 37–40.

SAIEWITZ, A. AND T. KIDA (2016): "The effects of an auditor's communication mode and professional tone on client responses to audit inquiries," Working paper.

SALTERIO, S. AND A. WEBB (2006): "Honesty in accounting & control: A discussion of Hannan, Rankin and Towry (2006)," *Contemporary Accounting Research*, 23, 919–932.

SANSING, R. C. (1993): "Information acquisition in a tax compliance game," *The Accounting Review*, 68, 874–884.

SCHNEIDER, G. P., J. DAI, D. J. JANVRIN, K. AJAYI, AND R. L. RASCHKE (2015): "Infer, predict, and assure: Accounting opportunities in data analytics," *Accounting Horizons*, 29, 719–742.

SCHWARTZ, S. H. (1968): "Words, deeds and the perception of consequences and responsibility in action situations." *Journal of Personality and Social Psychology*, 10, 232–242.

SCHWEITZER, M. E. AND C. K. HSEE (2002): "Stretching the truth: Elastic justification and motivated communication of uncertain information," *Journal of Risk and Uncertainty*, 25, 185–201.

SEN, A. (1997): "Maximization and the act of choice," *Econometrica: Journal of the Econometric Society*, 65, 745–780.

SHEREMETA, R. M. AND T. W. SHIELDS (2013): "Do liars believe? Beliefs and other-regarding preferences in sender–receiver games," *Journal of Economic Behavior & Organization*, 94, 268–277.

SHIELDS, M. D., F. J. DENG, AND Y. KATO (2000): "The design and effects of control systems: Tests of direct-and indirect-effects models," *Accounting, Organizations and Society*, 25, 185–202.

SIEMSEN, E., S. BALASUBRAMANIAN, AND A. V. ROTH (2007): "Incentives that induce task-related effort, helping, and knowledge sharing in workgroups," *Management Science*, 53, 1533–1550.

SMITH, B. N., J. S. HORNSBY, P. G. BENSON, AND M. WESOLOWSKI (1989): "What is in a name: The impact of job titles on job evaluation results," *Journal of Business and Psychology*, 3, 341–351.

SMITH, C., D. W. ORGAN, AND J. P. NEAR (1983): "Organizational citizenship behavior: Its nature and antecedents." *Journal of Applied Psychology*, 68, 655–663.

SMITH, S. D., W. B. TAYLER, AND D. F. PRAWITT (2015): "The effect of information choice on auditors' judgments and confidence," SSRN Working paper, http://dx.doi.org/10.2139/ssrn.1872387.

SPRINKLE, G. B. (2003): "Perspectives on experimental research in managerial accounting," *Accounting, Organizations and Society*, 28, 287–318.

SPRINKLE, G. B. AND M. G. WILLIAMSON (2004): "The evolution from Taylorism to employee gainsharing: A case study examining John Deere's continuous improvement pay plan," *Issues in Accounting Education*, 19, 487–503.

——— (2007): *Handbook of Management Accounting Research*, Elsevier, vol. 1, chap. Experimental research in managerial accounting, 415–444.

SWIERINGA, R. J. AND K. E. WEICK (1982): "An assessment of laboratory experiments in accounting," *Journal of Accounting Research*, 20, 56–101.

SZULANSKI, G. (1996): "Exploring internal stickiness: Impediments to the transfer of best practice within the firm," *Strategic Management Journal*, 17, 27–43.

TAFKOV, I. D. (2013): "Private and public relative performance information under different compensation contracts," *The Accounting Review*, 88, 327–350.

TAYLOR, E. Z. (2006): "The effect of incentives on knowledge sharing in computer-mediated communication: An experimental investigation," *Journal of Information Systems*, 20, 103–116.

TJOSVOLD, D. (1985): "Power and social context in superior-subordinate interaction," *Organizational Behavior and Human Decision Processes*, 35, 281–293.

TOWRY, K. L. (2003): "Control in a teamwork environment-The impact of social ties on the effectiveness of mutual monitoring contracts," *The Accounting Review*, 78, 1069–1095.

TREVINO, L. K. (1986): "Ethical decision making in organizations: A person-situation interactionist model," *Academy of Management Review*, 11, 601–617.

TSAI, W. (2002): "Social structure of coopetition within a multiunit organization: Coordination, competition, and intraorganizational knowledge sharing," *Organization Science*, 13, 179–190.

TURNER, K. L. AND M. V. MAKHIJA (2006): "The role of organizational controls in managing knowledge," *Academy of Management Review*, 31, 197–217.

VAN DER VEGT, G. S. AND J. S. BUNDERSON (2005): "Learning and performance in multidisciplinary teams: The importance of collective team identification," *The Academy of Management Journal*, 48, 532–547.

VAN DER VEGT, G. S., S. B. DE JONG, J. S. BUNDERSON, AND E. MOLLEMAN (2010): "Power asymmetry and learning in teams: The moderating role of performance feedback," *Organization Science*, 21, 347–361.

VERA-MUÑOZ, S. C., J. L. HO, AND C. W. CHOW (2006): "Enhancing knowledge sharing in public accounting firms," *Accounting Horizons*, 20, 133–155.

VROOM, V. H. AND P. W. YETTON (1973): *Leadership and decision-making*, vol. 110, University of Pittsburgh Press.

WANG, S. AND R. A. NOE (2010): "Knowledge sharing: A review and directions for future research," *Human Resource Management Review*, 20, 115–131.

WEBB, R. A. (2002): "The impact of reputation and variance investigations on the creation of budget slack," *Accounting, Organizations and Society*, 27, 361–378.

WIT, A. P. AND H. A. WILKE (1992): "The effect of social categorization on cooperation in three types of social dilemmas," *Journal of Economic Psychology*, 13, 135–151.

WOLFE, C. AND T. LORAAS (2008): "Knowledge sharing: The effects of incentives, environment, and person," *Journal of Information Systems*, 22, 53–76.

ZANDER, U. AND B. KOGUT (1995): "Knowledge and the speed of the transfer and imitation of organizational capabilities: An empirical test," *Organization Science*, 6, 76–92.

ZÁRRAGA, C. AND J. BONACHE (2005): "The impact of team atmosphere on knowledge outcomes in self-managed teams," *Organization Studies*, 26, 661–681.

Appendix A

Experimental Materials Chapter 2

Figure A.1: The Spreadsheet Participants Received

	A	B	C	D	E	F	G	H
1	DRWY	Company						
2		Payroll	1st week	March	2014			
3		Code	Regular pay rate/hour	Regular hours	Overtime hours	Reular pay	Overtime pay	Total pay
4	Audenrode	D	8.9	40	3	356.00	40.05	396.05
5	Baete	B	11.30	35	0	395.50	0.00	395.50
6	Claes	C	9.60	38	2	364.80	28.80	393.60
7	Liekens	C	10.30	40	0	412.00	0.00	412.00
8	Maes	D	7.80	38	0	296.40	0.00	296.40
9	Mertens	B	11.50	40	3	460.00	51.75	511.75
10	Jacobs	D	9.30	40	2	372.00	27.90	399.90
11	Janssens	B	12.55	40	0	502.00	0.00	502.00
12	Peeters	C	10.80	40	0	0.00	0.00	0.00
13	Van Beneden	D	6.75	40	11	270.00	111.38	381.38
14	Willems	D	8.90	41	2	364.90	26.70	9742.83
15	Wouters	A	18.35	40	5	734.00	137.63	871.63
16	**Total:**			472	28	3793.60	424.20	14303.03
17								
18	Code	Total pay/code	Average pay/code					
19	D	11216.56	2243.31					
20	C	805.60	402.80					
21	B	1409.25	469.75					
22	A	871.63	871.63					

Examples of the Information that Participants Received
"Overtime hours cannot be higher than 10." (cell E13 should be "10"), "Mister Audenrode got promoted to Code C." (cell B4 should be "C"), "At the final board meeting, it was decided to raise the minimum regular pay rate per hour of 6.75 by 2%. Decisions from the board meeting should be effective since January." (cell C13 should be 1.02×6.75 or 6.89)

Doctoral dissertations from the Faculty of Business and Economics, see:
http://www.kuleuven.ac.be/doctoraatsverdediging/archief.htm.

FACULTY OF BUSINESS AND ECONOMICS
Naamsestraat 69 bus 3500
3000 LEUVEN, BELGIË
tel. + 32 16 32 66 12
fax + 32 16 32 67 91
info@econ.kuleuven.be
www.econ.kuleuven.be