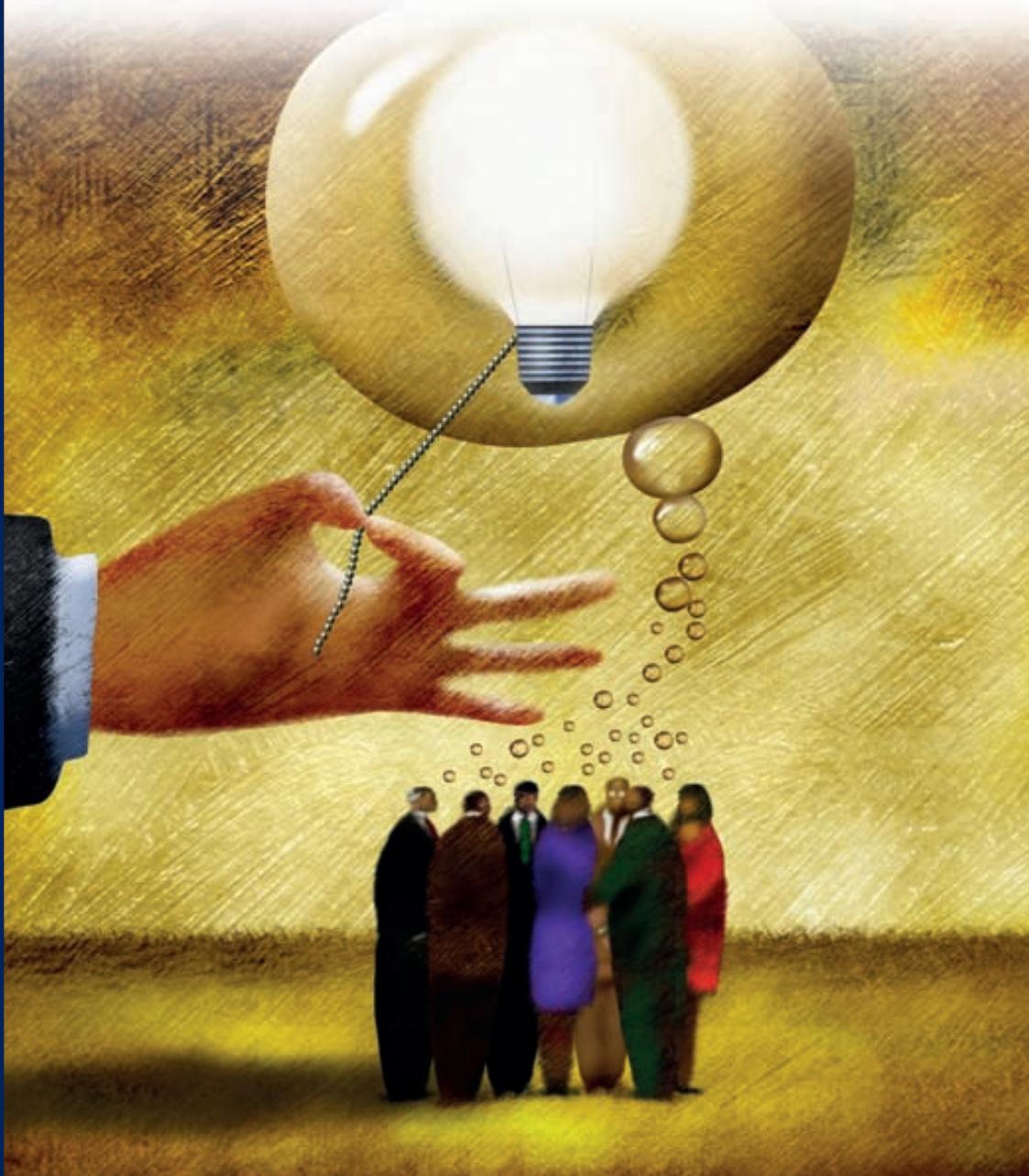


MARK BOONS

Working Together Alone in the Online Crowd

The Effects of Social Motivations and
Individual Knowledge Backgrounds
on the Participation and Performance
of Members of Online Crowdsourcing
Platforms



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The effects of social motivations and individual knowledge backgrounds on participation and performance of members of online crowdsourcing platforms

Alleen samenwerken in de online menigte

De effecten van sociale motivaties en individuele kennisachtergrond op deelname en prestaties van leden van online crowdsourcing platforms

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“Now this is not the end. It is not even the beginning of the end. But it is, perhaps, the end of the beginning.” - Winston Churchill, 1942

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CHAPTER 1

INTRODUCTION

In today's fast-changing business environment, firms need to continuously innovate to improve their offerings and come up with new products and services in order to sustain and enhance their performance and ensure their long-term survival (e.g. Chesbrough, 2003). All innovations, no matter how incremental or radical, start out as an idea (Kornish & Ulrich, 2011; Mumford & Gustafson, 1988). Idea generation is therefore considered to be a crucial part of a firm's innovation process (Terwiesch & Xu, 2008; Van de Ven, 1986). To improve firm's innovative performance, proponents of open innovation have argued that firms should look beyond their organizational boundaries and make use of both internal and external sources to generate the ideas that will fuel their innovation processes (Chesbrough, 2003; Laursen & Salter, 2006; Von Hippel, 2005). When a firm starts actively involving more participants in its innovation processes, its potential for coming up with great innovations will also increase (Leimeister, Huber, Bretschneider, & Krcmar, 2009). A popular method of getting ideas from outside into the firm's innovation process is the sourcing of idea generation tasks to the 'crowd', which is typically referred to as 'crowdsourcing' (Howe, 2008).

Crowdsourcing

The term 'crowdsourcing' was first popularized by Jeff Howe, who wrote an article about the outsourcing of work over the Internet in *Wired Magazine* in June 2006 (Howe, 2006a) and later offered the following definition: "Crowdsourcing is the act of taking a job traditionally performed by a designated agent (usually an employee) and outsourcing it to an undefined, generally large group of people in the form of an open call" (Howe, 2006b). Besides Howe's original definition, several authors have offered their own definitions of crowdsourcing, which has led to general confusion on whether certain cases represent forms of crowdsourcing or not (Doan, Ramakrishnan, & Halevy, 2011; Estelles-Arolas & Gonzalez-Ladron-de-Guevara, 2012). In this dissertation, I will follow the

definition as proposed by Afuah and Tucci (2012), who define crowdsourcing as “the act of outsourcing a task to a ‘crowd’, rather than a designated ‘agent’ (an organization, informal or formal team, or individual), such as a contractor, in the form of an open call” (Afuah & Tucci, 2012: 355). Although the use of information technology is not explicitly mentioned in this definition of crowdsourcing, the advent of the Internet is generally considered to be one of the major drivers behind the increasingly widespread use of crowdsourcing (e.g. Afuah & Tucci, 2012; Doan et al., 2011; Greengard, 2011; Howe, 2008).

Crowdsourcing has a strong firm perspective¹, essentially letting individuals in the crowd, who can also be employees (i.e. an internal crowd), work on a task on behalf of the firm in exchange for some form of payment, either in economic terms, such as monetary rewards, or social terms, such as recognition (Howe, 2008; Malone, Laubacher, & Dellarocas, 2010; Piller & Walcher, 2006; Sawhney, Verona, & Prandelli, 2005; Stiegler, Matzler, Chatterjee, & Ladstaetter-Fussenegger, 2012). The use of a form of payment for their individual contributions distinguishes crowdsourcing from other online production models, such as ‘wikinomics’ (Tapscott & Williams, 2006), ‘commons-based peer production’ (Benkler, 2006), and ‘open sourcing’ (Agerfalk & Fitzgerald, 2008), in which individuals are part of a large unrelated group *working collaboratively* on a joint project such as the Linux software package or the online encyclopedia Wikipedia ‘without relying on either market signals or managerial commands’ (Benkler 2006: 60). Relatedly, the output of crowdsourcing, especially in the case innovation-related tasks, comes in the form of ideas, designs, and/or solutions that the crowdsourcing firm can use as inputs into its innovation process. By themselves, the outputs of crowdsourcing have little value if not further developed by the firm to actually create a new product or service (improvement), whereas the output in the other online production models typically is a (information) product in itself² (Brabham, 2008a; Howe, 2008).

¹ Crowdsourcing can also be used by non-profit organizations and governments to engage the public in public participation projects (Brabham, 2009, 2012).

² Examples of open source design (e.g. OScar) exist in which the design is produced collaboratively online and the eventual physical product is later developed (see Raasch, Herstatt, & Balka, 2009).

The main benefit for organizations of using crowdsourcing is that it enables them to source knowledge and skills that lie outside the firm's traditional domain of expertise by gaining access to a large pool of potential workers who collectively represent a diverse range of skills and expertise. In many cases, these individuals have shown themselves willing and able to complete the required tasks better, faster, and cheaper than the firm would have been able to achieve without resorting to the crowd (Howe, 2008; Malone, Laubacher, & Johns, 2011; Whitla, 2009). In the case of a wide variety of tasks for which "virtually anyone has the potential to plug in valuable information" (Greengard, 2011: 20), such as 'microtasks' (e.g. Gino & Staats, 2012; Malone et al., 2011; Zheng, Li, & Hou, 2011) and 'crowdfunding' (e.g. Belleflamme, Lambert, Schwienbacher, 2012; Burtch, Ghose, & Wattal, in press), crowdsourcing allows larger jobs to be divided into many small tasks that individual workers in the crowd can then perform in parallel, thereby greatly increasing the speed with which the job is performed (e.g. Malone et al., 2011).

But the use of crowdsourcing is not restricted to simple tasks and can also be used for sourcing tasks that require individuals to have a certain combination of knowledge and skills to perform the task adequately, such as creative design tasks (e.g. Brabham, 2008b, 2010), R&D-related problem solving tasks (e.g. Afuah & Tucci, 2012; Boudreau & Lakhani, 2013; Jeppesen & Lakhani, 2010; Terwiesch & Xu, 2008; Villaroel, Taylor, & Tucci, 2013), and idea generation tasks (e.g. Bayus, 2013; Di Gangi & Wasko, 2009; Kornish & Ulrich, 2011; Poetz & Schreier, 2012; Soukhoroukova, Spann, & Skiera, 2011).

Crowdsourcing idea generation tasks. The importance of including individuals from outside of the organization in the innovation process has been discussed extensively in the literature on user innovation (e.g. Bogers, Afuah, & Bastian, 2010; Chatterji & Fabrizio, 2012; Lilien et al., 2002; Von Hippel, 2005). Traditionally, however, organizations had been limited in their ability to reach individuals outside of the organizations. The characteristics of the Internet allow organizations to further extend their reach, thereby including non-users as well as users, while maintaining the richness of their interactions (Sawhney et al., 2005). Several scholars have emphasized the importance of using the Internet to include individuals in the innovation process (e.g. Dahan & Hauser, 2002; Nambisan, 2002; Sawhney, Prandelli, & Verona, 2003), in the form of virtual customer environments (Nambisan, 2002; Nambisan & Baron, 2009, 2010), such as online

(brand) communities (e.g. Antorini, Muniz, & Askildsen, 2012; Dahlander & Frederiksen, 2012; Frey & Lüthje, 2011; Füller, Matzler, & Hoppe, 2008; Jeppesen & Frederiksen, 2006; Jeppesen & Molin, 2003; Kozinets, Hemetsberger, & Schau, 2008; West & Lakhani, 2008; Wu & Fang, 2010) and virtual platforms (Ogawa & Piller, 2006; Piller, & Walcher, 2006; Poetz & Schreier, 2012; Sawhney et al., 2003; Sawhney et al., 2005; Verona, Prandelli, & Sawhney, 2006).

Unlike, R&D-related problem-solving tasks which are about finding the single best idea from that one uniquely prepared mind, the goal of idea generation tasks is to get as many good ideas as possible into the innovation process (Afuah & Tucci, 2012; Bayus, 2013; Howe, 2008; Poetz & Schreier, 2012; Terwiesch & Xu, 2008). Collectively these ideas gained from crowdsourcing can represent huge value for an organization (Bayus, 2013; Girotra, Terwiesch, & Ulrich, 2010; Kavadias & Sommer, 2009; Kornish & Ulrich, 2011; Poetz & Schreier, 2012), but the use of crowdsourcing also comes with significant added costs for screening, selecting, and integrating ideas into the existing knowledge base of the firm in order to be able to develop them further into actual innovations (Alexy, Criscuolo, & Salter, 2012; Bjelland & Wood, 2008; Jouret, 2009).

Essentially, organizations can source idea generation tasks to the crowd in three ways; First of all, they can organize their own one-time challenge for an external crowd, such as Cisco did when it organized the I-Prize in 2007 to search for an idea that would spawn a billion-dollar business for Cisco (see Jouret, 2009), or an internal crowd, such as IBM did in their Innovation Jam in 2006, in which they asked their employees to come up with ideas that would result in 10 new business units, which would be funded with \$10 million dollar each (see Bjelland & Wood, 2008). Second, an organization can set up its own crowdsourcing platform, such as Dell's IdeaStorm initiative that since its inception in February 2007 had received almost 19,000 ideas of which more than 500 have been implemented ³ (see also Bayus (2013) and Di Gangi & Wasko (2009)). Third, organizations can make use of one of the many specialized online crowdsourcing platforms, such as InnoCentive, which has almost 300,000 registered members who have

³ According to Dell's IdeaStorm website: <http://www.ideastorm.com> (accessed on May 23rd, 2013).

collectively solved over 1,400 problems⁴ (see also Jeppesen & Lakhani, 2010), and have their call for ideas go out to the platform's member crowd. In this dissertation, I will focus on the use of specialized online crowdsourcing platforms for sourcing idea generation tasks to an online crowd.

Online crowdsourcing platforms. These specialized online crowdsourcing platforms, such as InnoCentive, generally act as knowledge brokers (Hargadon, 2002; Verona et al., 2006; Villaroel et al., 2013) or innovation intermediaries (Antikainen & Vääätäjä, 2010; Chesbrough, 2006; Malone et al., 2011; Sawhney et al., 2003) by providing organizations access to their member crowd, which essentially represents a large pool of skilled labor (Malone et al., 2011). While a lot attention has been given to crowdsourcing initiatives taken by established organizations (see Alexy et al., 2012; Bayus, 2013; Bjelland & Wood, 2008; Di Gangi & Wasko, 2009; Füller, Bartl, Ernst, & Mühlbacher, 2006; Jouret, 2009), the lion share of crowdsourcing idea generation tasks takes place on the hundreds of online crowdsourcing platforms that are specialized in organizing idea generation tasks. On a yearly basis, online crowdsourcing platforms organize thousands of idea generation challenges for hundreds of organizations and several of them boast crowds of more than 100,000 registered members⁵.

Importantly, online crowdsourcing platforms offer a unique social environment in which individuals can contribute ideas to the firm's innovation process, which is quite different from (firm-hosted) online communities⁶ (Boudreau & Lakhani, 2009). Specifically, while in online communities the focus is on the interactions among members and between members and the community organizers (e.g. Ebner, Leimeister, & Kremer, 2009), on online crowdsourcing platforms the focus is on tapping into the diversity of perspectives represented by the crowd, generally limiting interactions between individual members of the crowd and with the community organizers and resembling more a form of

⁴ According to InnoCentive's website <http://www.innocentive.com/about-innocentive/fact-stats> (accessed on May 23rd 2013).

⁵ For a relatively complete overview of the landscape of large specialized online crowdsourcing platforms see: <http://www.crowdsourcing.org/directory>.

⁶ Some authors, however, use the terms 'community' and 'crowd' interchangeably when describing online crowdsourcing platforms (e.g. Antikainen, Mäkipää, & Ahonen, 2010; Antikainen & Vääätäjä, 2010; Bayus, 2013; Di Gangi & Wasko, 2009; Muhdi & Boutellier, 2011; Muhdi, Daiber, Friesike, & Boutellier, 2011).

‘marketplace’ (Boudreau & Lakhani, 2013; Malone et al., 2011; Spradlin, 2012; Tapscott & Williams, 2006). Online crowds represent an almost pure form of collective distributed innovation, in which individuals in the crowd perform their tasks independently of each other (Alexy & Leitner, 2011; Lakhani & Panetta, 2007; Malone et al., 2010). The value-adding role of the intermediary online crowdsourcing platform is to integrate the collective output of the crowd in such a way that firms can use this in their innovation process (Spradlin, 2012).

In fact, individuals in the crowd often compete with each other as on online crowdsourcing platforms tasks tend to be organized as contests (Adamczyk, Bullinger, & Möslin, 2012; Boudreau, Lacetera, & Lakhani, 2011; Boudreau & Lakhani, 2013; Jeppesen & Lakhani, 2010; Malone et al., 2010; Poetz & Schreier, 2012; Terwiesch & Xu, 2008; Zheng et al., 2011), or competitions (Bullinger, Neyer, Rass, & Möslin, 2010; Ebner et al., 2009; Piller & Walcher, 2006; Villaroel et al., 2013), in which individual members of the crowd self-select to work on their own ideas and the best ideas receive some form of (often monetary) reward (Afuah & Tucci, 2012; Howe, 2008; Terwiesch & Xu, 2008). Organizing idea generation tasks as idea contests has been found to be an effective practice for integrating customers into the early stages of the innovation process (e.g. Ebner et al., 2009; Leimeister et al., 2009).

Clearly, sourcing idea generation tasks to the crowds of online crowdsourcing platforms offers firms with ample opportunities to improve the intake of (good) ideas into their innovation process (Jeppesen & Lakhani, 2010; Poetz & Schreier, 2012). However, our understanding of what drives members to participate and perform well, or how online crowdsourcing platforms can manage the crowdsourcing process to further improve the quantity and quality of the ideas that members contribute, is still limited (e.g. Alexy et al., 2012; Sieg, Wallin, & Von Krogh, 2010; Spradlin, 2012). In this dissertation, I aim to contribute to the understanding of the crowdsourcing process on online crowdsourcing platforms by taking on two important, but underresearched, issues; namely: 1) how social motivations affect members’ participation and their engagement in platform-oriented behaviors, and 2) how individuals’ knowledge backgrounds affect their performance on crowdsourced creative problem-solving tasks, such as idea generation tasks.

The Role of Motivations and Ability on Online Crowdsourcing Platforms

Research has confirmed that individuals' goal-oriented behaviors are affected by both their motivation to perform the task and their ability to do so (e.g. Gruen, Osmonbekov, & Czaplewski, 2005; MacInnis, Moorman, & Jaworski, 1991). Indeed, research on online crowdsourcing platforms has also highlighted the importance of members' motivations and (perceived) abilities as it has been argued that only when members of the crowd are "qualified and motivated to contribute promising ideas and relevant know-how" will their contributions potentially be valuable to the seeker organization (Fuller et al., 2012: 247).

Task-level motivations. Research investigating the motives of participants on online crowdsourcing platforms to participate has generally focused on both intrinsic and extrinsic motivations that are influenced by the characteristics of the task at hand (e.g. Antikainen et al., 2010; Borst, 2010; Brabham, 2008b; 2010; Lakhani, Jeppesen, Lohse, & Panetta, 2007; Zheng et al., 2011). In line with research on the motivations of participants on open source software platforms (e.g. Hars & Ou, 2002; Hertel, Niedner, & Hermann, 2003), members of the crowd have been found to engage in tasks, because they considered the tasks fun (Antikainen et al., 2010; Borst, 2010; Brabham, 2008b), challenging (Borst, 2010; Lakhani et al., 2007), and because participating provided them with an opportunity to acquire new skills and knowledge (Antikainen et al., 2010; Brabham, 2008b, 2010). In addition to these intrinsic motivations, members of the crowd have also been found to participate on tasks because of the opportunity to make money (Borst, 2010; Brabham, 2008b, 2010; Lakhani et al., 2007).

Social motivations. Besides task-level motivations, research on motives in crowdsourcing has also uncovered several social motivations that seem to affect members' behaviors on online crowdsourcing platforms. For example, research by Brabham (2008b, 2010) found that members referred to having developed an addiction or passion for being active on the online crowdsourcing platform. This passion went beyond performing the posted tasks or as Brabham argued: "these most 'addicted' individuals see themselves as meaningful actors in [the online crowdsourcing platform's] business process, as part of the organization" (Brabham, 2010: 1140). Huberman, Romero, and Wu (2009) found that productivity exhibited a strong dependence on attention from other users, which was in

line with their argument that attention represents ‘payment’ in the form of status and recognition. In the studies of Leimeister and colleagues (2009) and Zheng and colleagues (2011), social motives, such as the motivation to gain recognition, were found to affect the willingness of individuals to participate in idea contests on online crowdsourcing platforms. While these findings highlight that social motivations might be important drivers of member engagement with online crowdsourcing platforms, this relationship has not been systematically investigated in a theoretical framework. This is unfortunate as “learning how to keep [your pool of (online) workers] engaged” is likely to become “one of the key disciplines of 21st-century business” (Malone et al., 2011: 62). At the same time, many decisions that online crowdsourcing platforms make with regard to the design of the platform, such as the use of reputation mechanisms and community elements (e.g. Bayus, 2013; Dellarocas, 2010; Di Gangi & Wasko, 2009; Jouret, 2009; Leimeister et al., 2009; Malone et al., 2011; Ogawa & Piller, 2006) and their communication practices, such as the use of feedback mechanisms (e.g. Jeppesen & Frederiksen, 2006; Leimeister et al., 2009; Yang, Chen, & Pavlou, 2009), are expected to affect their members’ development of social motivations. In chapters 2 and 3 of this dissertation I will therefore investigate the impact of social motivations on member engagement and how community elements and communication practices affect the development of members’ social motivations.

Knowledge-related ability. The motivations of members are important predictors of whether members of the crowd will participate in tasks that are posted on the online crowdsourcing platform and the degree of effort they are willing to put into performing the task. However, how well they perform on those tasks is to a large extent dependent on members’ ability to perform the tasks (e.g. Amabile, 1996; Gruen, Osmonbekov, & Czaplewski, 2005; MacInnis, Moorman, & Jaworski, 1991; Weisberg, 1993). And even though participation decisions are completely voluntary on online crowdsourcing platforms, this does not imply that “every member of the crowd that self-selects to solve the problem is in the right position to solve it” (Afuah & Tucci, 2012: 360). Researchers studying online crowdsourcing platforms have argued for the inclusion of individuals who have little experience with the topic of an idea generation task (i.e. who do not possess knowledge that is related to the task at hand) (e.g. Bayus, 2013; Jeppesen & Lakhani, 2010; Poetz & Schreier, 2012), because these individuals are not affected by cognitive

fixation on the more ‘obvious’ solutions and may search for creative solutions to the problem at hand in different knowledge domains, thereby increasing their ability to come up with novel solutions (e.g. Bayus, 2013; Jeppesen & Lakhani, 2010; Marsh, Ward, & Landau, 1999). Research on creative problem-solving, on the other hand, has argued that possessing domain-relevant knowledge actually contributes to an individual’s performance on a creative problem-solving task, because related knowledge guides creative processes towards viable solutions and away from non-viable ones (e.g. Amabile, 1996; Pretz, Naples, & Sternberg, 2003; Weisberg, 1993). We argue that this is a paradox and in chapter 4 of this dissertation we explore this paradox in more depth.

Dissertation Overview

This dissertation consists of five chapters. Chapters 2 to 4 are stand-alone research articles that have been developed in cooperation with co-authors. For this reason I will use ‘we’ instead of ‘I’ when I refer to work done together with my co-authors. All three of these chapters are empirical in nature and investigate different aspects of participation and performance of members of online crowdsourcing platforms. Chapter 5 will put the results of these three chapters in a broader perspective and summarize the main theoretical and practical contributions of these studies.

Chapter 2: Member interaction as a source of respect on online crowdsourcing platforms. In this chapter we investigate how the possibility to interact with other members of the crowd influences members’ feelings of respect and their subsequent participation and group-oriented behaviors on an online crowdsourcing platform. Due to the social environment in which tasks are organized on online crowdsourcing platforms, members tend to be severely hampered in their ability to develop feelings of respect. We argue that especially the lack of interaction with other group members hampers the development of feelings of respect. By means of a field experiment in which we manipulate the possibility to interact with other members, we investigate whether, even in the absence of other characteristics of typical social groups, members of online crowdsourcing platforms develop feelings of respect and how feelings of respect affect participation, intentions to stay active, and positive word of mouth behaviors.

Chapter 3: Feelings of pride and respect as drivers of ongoing member activity on online crowdsourcing platforms. In the next chapter we extend the study detailed in chapter 2 by also including feelings of pride and identification, next to feelings of respect, as predictors of participation and group-oriented behaviors and investigating their antecedents in an existing online crowdsourcing platform. By means of a longitudinal, multi-method field study, we investigate how members' feelings of pride and respect influence members' participation, intentions to stay active, and positive word of mouth behaviors as well as how the communication practices of the platform organization affects members' feelings of pride and respect.

Chapter 4: The knowledge-performance paradox in crowdsourcing. In our third empirical chapter we shift our focus away from the drivers of participation of members of online crowdsourcing platforms towards the determinants of their performance on the tasks in which they participate. Specifically, we investigate the knowledge-performance paradox in crowdsourcing creative problem-solving tasks. On the one hand the literature on creative problem solving claims that possessing knowledge that is related to the problem positively affects an individual's performance on creative problem-solving tasks. On the other hand the literature on crowdsourcing has emphasized that possessing knowledge that is unrelated to the creative problem-solving task will positively affect an individual's performance on creative problem-solving tasks. We argue that both these perspectives are partly correct. Specifically, we argue that in order for participants of creative problem-solving tasks on online crowdsourcing platforms to perform well they need to possess knowledge that is related to the challenge as well as knowledge that is unrelated to the challenge. In this chapter, we investigate our ideas by analyzing over 6,000 contributions to 120 creative problem-solving challenges on an online crowdsourcing platform.

Chapter 5: General Discussion. In this final chapter I summarize the general findings of the empirical studies described in the previous chapters and relate and integrate these findings with the broader literature in order to derive the main contributions of this dissertation for future research. I also go into the practical implications of the studies in this dissertation for organizers of online crowdsourcing challenges and online platform organizations in general.

CHAPTER 2

MEMBER INTERACTION AS A SOURCE OF RESPECT ON ONLINE CROWDSOURCING PLATFORMS

Online crowdsourcing platforms are Internet-based platforms that organize work by outsourcing tasks to ‘crowds’ in the form of an open call for contributions. For the success of online crowdsourcing platforms it is essential that their members actively participate and engage with these platforms. The degree to which members feel respected (i.e. have a high intragroup status) has been shown to be an important driver of member engagement with the social groups to which they belong. Online crowds, however, do not resemble typical social groups and, therefore, group-based feelings of respect are not expected to develop to the extent that they will influence member behaviors. In this chapter, we will argue that on online crowdsourcing platforms, where online crowds lack the group characteristics that have implicitly been assumed to be necessary for group-based feelings of respect to develop, offering members the possibility to interact with their peers will allow them to develop group-based feelings of respect to the extent that they will subsequently influence their behaviors. We test these ideas in a longitudinal, multisource field experiment on an online crowdsourcing platform and find general support for our ideas.

INTRODUCTION

Crowdsourcing, a process by which tasks are outsourced to a diverse ‘crowd’ of individuals with varied skills, experience, and perspectives in the form of an open call, has been heralded as an important new way by which organizations can organize various tasks (e.g. Afuah & Tucci, 2012; Boudreau & Lakhani, 2013; Brabham, 2008a; Doan et al., 2011; Howe, 2008; Jeppesen & Lakhani, 2010; Poetz & Schreier, 2012). For organizing their online crowdsourcing initiatives, many organizations work together with independent online crowdsourcing platforms (e.g. Boudreau & Lakhani, 2013; Howe, 2008). These

online crowdsourcing platforms have often specialized in organizing a specific type of tasks and attracted online member crowds that consist of thousands of individuals who are specifically interested in working on that type of task (Afuah & Tucci, 2012; Howe, 2008). When crowdsourcing tasks that benefit from parallel experimentation and multiple solutions, such as idea generation tasks, these tasks tend to be organized by means of an online contest (Adamczyk et al., 2012; Boudreau et al., 2011; Bullinger et al., 2010; Terwiesch & Xu, 2008), or competition (Ebner et al., 2009; Piller & Walcher, 2006), in which individuals (or teams of individuals) submit solutions that compete for (monetary) rewards (Boudreau & Lakhani, 2013). On online crowdsourcing platforms, members self-select the tasks on which they want to work and due to this voluntary nature of participation, online crowdsourcing platforms are critically dependent for their success on having an engaged online crowd that consists of members who actively participate on tasks and show high levels of engagement with the platform (Brabham, 2008a, 2010; Greengard, 2011; Howe, 2008). For most online crowdsourcing platforms, however, getting members to engage with the platform is a major challenge.

With regard to group members' motivations to engage with the groups to which they belong, research has shown that individuals are not only motivated to participate in tasks because of task-level characteristics, but also to a large degree by the characteristics of the social setting in which they perform these tasks (e.g. Deci & Ryan, 2000; Vallerand, 1997). Indeed, group-level motivations, such as members' feelings of intragroup respect, have been found to positively affect members' participation and their engagement in group-oriented behaviors in a wide range of social settings, including organizational (e.g. Blader & Tyler, 2009), non-organizational (e.g. Boezeman & Ellemers, 2007, 2008a, 2008b), and online environments (e.g. Bateman, Gray & Butler, 2011).

The online crowds of crowdsourcing contest platforms that host online contests, however, do not resemble typical social groups. These online crowds are different from typical social groups because they have highly permeable group boundaries, no superordinate identity that members of the crowd can identify with (such as the idea that "software should be free" acts as a superordinate identity for members of open source software communities), and because members of such online crowdsourcing platforms do not interact, they do not behave according to commonly held norms nor do they strive

towards shared goals (such as in online communities). In fact, online crowds that are active in crowdsourcing contests are so different from typical social groups, that we might not even consider them to be part of the domain of social groups. Unfortunately, this would imply that group-level motivations, such as feelings of respect, which have implicitly been assumed to only be relevant in social groups, are unlikely to develop to the extent that they will affect member behavior in the context of online crowdsourcing platforms.

In this chapter, we build on the literature on the role of intragroup status (e.g. Branscombe, Spears, Ellemers, & Doosje, 2002; De Cremer, 2002; Simon & Stürmer, 2003) and argue that offering members the possibility to interact with other members of the online crowd allows members to evaluate *the manner* in which other members interact with them and others (Huo, Binning & Molina, 2010; Smith et al., 1998). This provides them with a basis for developing a sense of being respected by others in the social group, even in the absence of group characteristics that have implicitly been assumed to be necessary for group-based feelings of respect to develop.

We test our ideas using a longitudinal field experiment, in which we manipulate the social environment of an online crowdsourcing platform that organizes online contests to allow the possibility of interaction among members of the crowd. We combine objective data gathered at the platform over a period of three months with survey data collected from members in two questionnaires at different stages of the field experiment, allowing us to collect subjective data on group-based feelings of respect in at the end of stage 1 and relate it to data on member activity and behavioral intentions collected at the end of stage 2. Our study offers several important contributions. First of all, we contribute to the literature on intragroup respect by investigating how feelings of respect influence the behavior of members on an online crowdsourcing platform, a previously unexplored setting, and how it is affected by the possibility to interact with other members. By investigating feelings of respect in this ‘extreme’ social setting we also, to our knowledge for the first time, empirically test the fundamental underlying assumption that feelings of respect occur only in *social* groups. Second, we contribute to the literature on online (crowdsourcing) platforms by investigating the effect that feelings of respect have on members’ participation and group-oriented behaviors, which are critically important for online

(crowdsourcing) platforms. Third, an important practical contribution of this study is that it highlights the long-term implications of considering the social drivers of member behavior when designing online (crowdsourcing) platforms, such as allowing for the possibility for member interaction. In the following we further develop the theoretical arguments underlying our ideas.

THEORETICAL BACKGROUND AND HYPOTHESES

What It Means to Feel Respected in a Social Group

An individual's feeling of respect is his/her assessment of how he/she is evaluated by others in the group (De Cremer, 2002; Smith & Tyler, 1997; Huo & Binning, 2008). It is a social evaluation based on the collective opinions of the group members and in this sense closely related to the notion of social reputation (Emler & Hopkins, 1990). Feeling respected has been argued to matter to people because it reflects two core motives of social life - the need to belong and the striving for status (Huo & Binning, 2008). Indeed, these two motives underlie two psychological consequences of perceived respect; feeling included in the group (indicative of belongingness) and feeling valued by the group (indicative of status attainment) (Bartel, Wrzesniewski, & Wiesenfeld, 2012; Ellemers et al., 2013; Huo et al., 2010).

On the one hand, feeling respected can lead to a sense of being included as a full member of the group (De Cremer, 2002; De Cremer & Tyler, 2005; Ellemers et al., 2013; Huo & Binning, 2008; Tyler & Smith, 1999), satisfying the general need to belong and establish social links with others, which has been argued to be a universally held need of individuals (Baumeister & Leary, 1995; Deci & Ryan, 2000; Leary & Baumeister, 2000). When perceived respect is indicative of feeling included, it helps individuals make sense of who they are by telling them that they are like other members of the group (De Cremer, 2002; De Cremer & Tyler, 2005). In line with social identity theory (Tajfel, 1978; Tajfel & Turner, 1979), several scholars have argued that feeling included in the group influences the degree to which individuals think of themselves in terms of the group and in this way affects individuals' perceptions and behaviors towards the group (Ellemers et al., 2013; Simon & Stürmer, 2003). Indeed, individuals have been argued to draw self-relevant

information from their group memberships, especially from the way in which they are treated as group members (Lind & Tyler, 1988; Tyler, DeGoey, & Smith, 1996; Tyler & Lind, 1992; Tyler & Smith, 1999).

Perceived respect can also be indicative of members' status within the group and provide them with a sense of what they are worth (Emler & Hopkins, 1990; Tyler & Blader, 2000, 2001, 2003; Tyler et al., 1996). When individuals feel that they are important for the group as a whole, in the sense that their contributions are valuable to the group, they tend to perceive themselves as having high intragroup status (Branscombe et al., 2002; Simon & Stürmer, 2003; Tyler, 1999; Williams & DeSteno, 2008), which contributes to their overall feelings of self-worth (Sleebos, Ellemers, & Doosje, 2006; Smith et al., 1998; Tyler & Blader, 2003; Tyler et al., 1996) and how they relate to their groups (Blader & Tyler, 2009; Smith & Tyler, 1997). Because this sense of being included in and/or being valuable for the group cannot simply be transferred to another group, perceived respect has been argued to be contingent on (the strength of) a shared collective identity of self and the source of respect, in this case the group (Smith et al., 1998).

Antecedents of Feeling Respected in Online Crowdsourcing Platforms

Essentially, individuals feel respected in a group setting when they feel that they are being treated with respect. While it is “often difficult ... to specify precisely what constitutes respectful treatment in a given situation” (Miller, 2001: 532), research on procedural fairness has posited that the way in which individuals are treated by group authorities and other group members communicates to what extent they are respected in the group and thus the degree to which they are able to satisfy their needs of belonging and status in this particular group setting (De Cremer, 2002; Huo et al., 2010; Lind & Tyler, 1988; Smith & Tyler, 1997; Tyler & Blader, 2000; Tyler et al., 1996; Tyler & Lind, 1992; Tyler & Smith, 1999). Respectful treatment has been characterized by fair procedures and treatments that are a function of how caring, polite, and sensitive the authority or group is considered to be (e.g. Bies & Moag, 1986) and by the relational criteria of neutrality, trust, and standing (Tyler & Lind, 1992). Fair treatment leads members to feel respected within the group as group members are able to assess the fairness of treatment by peers and group authorities and distill specific information about one's group membership, that is, whether

one is included and valued by the group and its members (Blader & Tyler, 2009; De Cremer, 2002; Tyler & Blader, 2003).

The literature generally distinguishes between two sources of respect: group authorities and peers (Huo & Binning, 2008; Smith et al., 1998). While online crowdsourcing platforms have so far focused on social reputation mechanisms that are based on the performance evaluations and activity data provided by the organizers of these platforms (i.e. the group authorities), the treatment by other members of the in-group can also communicate a sense of inclusiveness (e.g. De Cremer, 2002; De Cremer & Tyler, 2005) and being valued (e.g. Tyler & Blader, 2000, 2003; Blader & Tyler, 2009). Indeed, such peer-based feelings of respect have been shown to influence group-oriented behaviors (e.g. Branscombe et al, 2002; Ellemers, Doosje, & Spears, 2004).

In order to assess their treatment by group authorities and their peers in the group, members need to be able to receive social information cues from other members of the group, which they generally achieve by interacting with them (e.g. Tyler & Blader, 2003). While, members of social groups typically have several opportunities to interact with other members of the group, members active in virtual work settings typically do not have as many possibilities to interact with other members of the group, and these computer-mediated interactions are less rich in social information cues, which can result in feeling less included and valued (e.g. Bartel et al., 2012). Members of online crowdsourcing platforms typically have no interaction with their peers and work on tasks individually, which would deprive them of the basis on which to develop feelings of respect. We argue that offering members of online crowdsourcing platforms the possibility to interact with other members by allowing them to see each other's contributions and provide each other with feedback through commenting on each other's contributions should provide them with the opportunity to assess their treatment by others and develop group-based feelings of respect based on these assessments. We therefore hypothesize that:

Hypothesis 1a.

Members who have the possibility to interact with other members will perceive themselves to be more highly included within the crowdsourcing platform than members who do not have the possibility to interact with other members.

Hypothesis 1b.

Members who have the possibility to interact with other members will perceive themselves to be more highly valued within the crowdsourcing platform than members who do not have the possibility to interact with other members.

Perceived respect and group-oriented behaviors

People who feel respected by their group members tend to engage psychologically and behaviorally with the group (Branscombe et al., 2002; De Cremer, 2002; Simon & Stürmer, 2003; Smith & Tyler, 1997; Smith et al., 1998; Tyler & Blader, 2000, 2003; Tyler & Smith, 1999), for example, by indicating a willingness to participate in the achievement of group goals by investing individual effort (De Cremer, 2002; Ellemers et al., 2013; Simon & Stürmer, 2003; Smith & Tyler, 1997; Smith et al., 1998; Tyler & Blader, 2000, 2003; Tyler et al., 1996) and cooperative group-oriented behaviors (Blader & Tyler, 2009; Boezeman & Ellemers, 2007; Tyler & Blader, 2000). While members who feel disrespected have a tendency to lower their efforts on behalf of the group and leave the group (e.g. Miller, 2001; Sleebos et al., 2006). Especially individuals who feel valued by the group and thus perceive themselves as worthy contributors of the group, have been shown to be motivated to expend effort on the group's behalf (Huo & Binning, 2008; Judge & Bono, 2001) for instance by engaging in group tasks (Tyler & Blader, 2003). For online crowdsourcing platforms, which are dependent on their members' voluntary behaviors, it is important to motivate members to exert effort by participating on tasks posted on the platform, to stay loyal to the platform by remaining active, and to engage in positive word of mouth behavior. The degree to which members feel respected is expected to influence these behaviors in an online crowdsourcing platform.

Task participation. Organizations need their members to participate and perform in their core activities to be successful; on crowdsourcing platforms participating in core activities comes down to members contributing solutions/ideas/designs/etc. to the tasks that have been posted on the platform. Being active in the core activities of the crowdsourcing platform is arguably the most important behavior that members can engage

in, because, by doing so, members directly contribute to the performance of the crowdsourcing platform (e.g. Fang & Neufeld, 2009; Koh, Kim, Butler, Bock, 2007). In most virtual platforms, however, only a small percentage of members are actively contributing to core activities and most members do not participate at all (Preece, Nonnecke, & Andrews, 2004). Indeed, the most important reason why so many crowdsourcing platforms fail is not a lack of members, but a lack of activity. For those crowdsourcing platforms that do achieve a ‘critical mass’ of activity, it becomes essential for their long-term success that they maintain their members’ level of activity. That is why motivating members to continue to actively participate on tasks is a key objective of online platforms (Dellarocas, 2010).

If members perceives themselves to be highly respected, i.e. perceives themselves to be included as full members and/or their individual status within the organization to be high, they will value the positive self-worth attached to the particular organizational membership and reciprocate by putting in effort from their side to maintain and further improve this favorable (social) identity (Blader & Tyler, 2009; De Cremer, 2002; Ellemers et al., 2013; Tyler & Blader, 2003; Tyler & Smith, 1999). Putting in effort by participating in the core activities of the organization is the most direct way that a member can reciprocate the good feelings received from the organization. Previous research has indeed found that feelings of respect are positively related to task participation and effort (e.g. Tyler & Blader, 2000; Williams & DeSteno, 2008) and in the only published study on social motivations in online crowdsourcing platforms, the expectation that one will be fairly treated was shown to affect people’s willingness to participate in a crowdsourcing challenge (Franke, Keinz, & Klausberger, 2013). We therefore hypothesize that:

Hypothesis 2a.

The more included members of a crowdsourcing platform perceive themselves to be, the more they will participate on tasks posted on the platform.

Hypothesis 2b.

The more valued members of a crowdsourcing platform perceive themselves to be, the more they will participate on tasks posted on the platform.

Intentions to stay active. Besides members' participation on the tasks that are posted on the crowdsourcing platform, it is also important that members are willing to stay active over time. Members build up useful experience on relevant tasks on the crowdsourcing platform by learning from their failures and their successes. Over time, their experience on the platform helps them improve their performance on the tasks posted on the platform and makes their participation count even more (Dholakia, Bagozzi, & Pearo, 2004). Indeed, studies have shown that member turnover tends to have detrimental effects on performance both at the individual as well as at the organizational level (Hancock, Allen, Bosco, McDaniel, & Pierce, 2013; Hausknecht & Trevor, 2011).

When individuals feel that they are respected members of an online crowdsourcing platform, they are expected to behave in a way that allows them to maintain the positive feelings associated with their respected position. By remaining affiliated with the platform and continuing to be active they can maintain and strengthen their respected position. In line with this reasoning, previous research has found that feelings of respect are positively related to intentions to remain an active member of the organization (e.g. Boezeman & Ellemers, 2007). We therefore hypothesize that:

Hypothesis 3a.

The more included members of an online crowdsourcing platform perceive themselves to be, the higher their intentions to stay active.

Hypothesis 3b.

The more valued members of an online crowdsourcing platform perceive themselves to be, the higher their intentions to stay active.

Positive word of mouth behavior. An important cooperative group-oriented behavior that members can engage in is speaking positively about the organization to others, i.e. engaging in positive word of mouth behavior (Hennig-Thurau, Gwinner, Walsh, & Gremier, 2004). Specifically, (positive) word of mouth behavior, which has been defined as “informal, person-to-person communication between a perceived

noncommercial communicator and a receiver regarding a brand, a product, an organization, or a service” (Harrison-Walker, 2001: 63), may persuade non-members to join and become active members themselves, in this way indirectly contributing to the long-term success of online crowdsourcing platforms (Kozinets, De Valck, Wojnicki, & Wilner, 2010; Trusov, Bucklin, & Pauwels, 2009).

Members who feel included in the group and/or valued by the group will be more willing engage in word of mouth behavior, because they are bound to gain more from making their own unique and valuable attributes in the organizational context visible to non-members (Tyler, 1999; Tyler & Smith, 1999). Members who feel included within the group and/or valued by the group are more likely to speak *positively* about the online crowdsourcing platform, as they gain most from non-members joining and becoming members themselves. Furthermore, through engaging in *positive* word of mouth behaviors, members can also reciprocate the positive feelings they get from feeling respected within the organization (Ellemers et al., 2013). We therefore hypothesize that:

Hypothesis 4a.

The more included members of an online crowdsourcing platform perceive themselves to be, the higher their willingness to engage in positive word of mouth behavior.

Hypothesis 4b.

The more valued members of an online crowdsourcing platform perceive themselves to be, the higher their willingness to engage in positive word of mouth behavior.

DATA AND METHODS

Research Context Design

Data were collected from an online crowdsourcing platform that was specifically created for research purposes at the first author’s university. The crowdsourcing platform allowed its members to work on creative problem-solving tasks that are posted on its platform by a number of organizations that were willing to contribute to the research by

offering some real-life problem-solving tasks for members to solve. In this way the crowdsourcing platform acted as an intermediary between “seeker” organizations and its member crowd of “solvers” (Howe, 2008; Jeppesen & Lakhani, 2010; Verona et al., 2006). These creative problem-solving tasks are framed as challenges to the members of the crowdsourcing platform to come up with conceptual solutions for new products and services and/or how to improve a seeker organization’s current offerings (see also Bullinger et al., 2010; Ebner et al., 2009). In the sense that members work on tasks individually and submit solutions that compete for rewards, this is a form of “tournament-based crowdsourcing” (Afuah & Tucci, 2012: 355).

Solver members. To closely resemble real-life crowdsourcing initiatives, students were not offered any incentive to register as a member or for participating on the platform. Registration was free and open to all students of the university. To confirm that they were indeed students at the university, members were required to provide their student number in the registration process. After signing up, members were free to decide whether or not they wanted to participate on one or more of the challenges that were made available through the crowdsourcing platform. In total, 169 students registered as members of the crowdsourcing platform and logged in at least once after registration.

Seeker organizations. Nine different organizations were asked to contribute an actual creative problem-solving task that they were currently confronted with and for which they would like to receive ideas from students. These organizations included, amongst others, the city council of the city in which the university was located, a globally operating management consultancy, and a building corporation. Besides contributing real-life creative problem-solving tasks, each of these organizations also commented on the contributions that were made to their challenges.

Manipulation of the possibility to interact with other members

Members of the online crowdsourcing platform were randomly assigned to either the ‘open’ or the ‘closed’ crowdsourcing environment. In the open crowdsourcing environment (open CE) members were able to read each other’s submitted contributions and provide each other with feedback in the form of comments and ratings, which were visible to all participants in the open CE. In the closed crowdsourcing environment (closed

CE), members were not able to see each other's contributions and it was not possible to interact with each other on the online crowdsourcing platform. Each of the nine challenges was simultaneously run in both environments and for each crowdsourcing environment the contributions to the challenges were rated and ranked independently of the other environment. Over the course of the study, members in the open CE voluntarily interacted with each other by providing feedback in the form of 113 ratings and 49 comments to 65 out of 87 contributions. For an average of 1.30 ratings (min = 0 ratings; max = 7 ratings) and an average of 0.56 comments (min = 0 comments; max = 7 comments) per contribution. Comments had an average length of 399 characters and they varied in length from very short to quite extensive ((min = 32 characters; max = 1426 characters). We used the dummy variable *crowdsourcing environment* to capture whether members were in the closed CE and did not have the possibility to interact with other members (0) or in the open CE, in which they had the possibility to interact with other members (1).

Data Collection Procedure

The online crowdsourcing platform was active for a total period of three months in which challenges were organized. From the second week onwards, one new challenge would be posted at the start of the week and this challenge would be open for contributions by members for two weeks. A total of 9 challenges were organized on the online crowdsourcing platform, each of which was presented in the form of a challenge briefing, which consisted of an introduction of the organization and the issue at hand, the main question members needed to address, and some relevant background information about the challenge, such as the total prize pool, the proposed distribution of monetary rewards among the best contributions, and submission deadline. After the submission deadline, submitted contributions were ranked by the seeker organization, provided with feedback from judges from the organization, and the best five contributions were rewarded with a monetary reward ranging from € 15 to € 100.

Over the course of the 3-month research period, 169 registered members of the online crowdsourcing platform logged in at least once after registration (closed CE = 79 members; open CE = 90 members). Of these active members, 76 members (closed CE = 38 members; open CE = 38 members) decided to participate in one or more challenges and

together they contributed 195 ideas to the nine challenges, for an average of 21.7 ideas per challenge (min = 14 ideas; max = 33 ideas). Overall, the contributions that were submitted by students were quite extensive with an average of 693 words (min = 174 words; max = 2217 words), many of which included additional visual illustrations.

Research data were collected from three sources; First of all, we collected detailed information on all the individual contributions to the 9 challenges that were organized on the online crowdsourcing platform, including the feedback participants received on their submissions from the organizations that posted the challenge (in both the closed and the open CE) as well as from other members (in the open CE). Secondly, a questionnaire was sent to all registered members of the online crowdsourcing platform in the ninth week after 6 challenges had finished, asking members the degree to which they felt respected as members of the online crowdsourcing platform. Finally, a second questionnaire was sent out after all 9 challenges on the online crowdsourcing platform had finished, asking members about their intentions to stay active on the platform and their willingness to engage in positive word of mouth behavior.

Sample

Of the 169 active members of the online crowdsourcing platform, 74 members completed the first questionnaire (for a 43.8% response rate), making up our main sample. To assess whether our sample is representative of all the registered members, we compared the demographic characteristics of the members in our sample (N = 74) to those of the non-respondents (N = 95) (see Table 2.1).

Table 2.1 *Sample representativeness*

Variable	Sample (N = 74)			Non-respondents (N = 95)			t
	M	SD	N	M	SD	N	
Sex	0.32	0.47	74	0.35	0.48	94	.36
Age	22.95	2.79	74	22.15	2.38	60	1.75
Nationality	0.34	0.48	74	0.52	0.50	77	2.28*
Crowdsourcing environment	0.55	0.50	74	0.52	0.50	95	.49

Note. t-tests of significance are two-sided: ** $p < .01$; * $p < .05$ ⁷

⁷ t-values represent t-test for equality based on equal variances, except for *nationality*. Levene’s test for equality of variances was significant for *nationality* ($F_{(1, 150)} = 8.53, p = .00$), and therefore this t-value is based on an adjusted degrees of freedom.

As can be seen in Table 2.1, the members in our sample do not differ significantly from the non-respondents on the key demographics sex, age, and whether they had been active in the open CE or in the closed CE. The percentage of foreign students was significantly lower in our sample than amongst the non-respondents ($M_{\text{sample}} = .34$, $SD_{\text{sample}} = .48$; $M_{\text{non-respondents}} = .52$, $SD_{\text{non-respondents}} = .50$; $t = -2.28$, $p = 0.02$). While this finding is interesting, we have no reason to believe that this difference should bias our findings.

Measures

All measures based on the two questionnaires consisted of, or were adapted from, existing scales. Where necessary, items were adjusted to be more appropriate to the context of the online crowdsourcing platform in this research. We used 5-point Likert scales (1 = *totally disagree*; 5 = *totally agree*) to assess participants' responses to the items in the two questionnaires. The first questionnaire was sent out after six out of nine challenges had finished and was used to collect data on the two ways in which members could feel respected on the online crowdsourcing platform; by feeling included as a member of the online crowdsourcing platform and/or by perceiving to be a valued member for the online crowdsourcing platform.

Perceived inclusion. The extent to which a member felt included as a member of the crowdsourcing platform was measured with 3 statements (Cronbach's $\alpha = .71$), which were adapted from the *inclusion of self in team*-scale (Ellemers et al., 2013). An example statement was: "When I talk about [the online crowdsourcing platform], I usually say 'we' rather than 'they'".

Perceived value. The extent to which members felt valued within the crowdsourcing platform was measured with 5 statements (Cronbach's $\alpha = .75$), which were adapted from the autonomous respect scale (Tyler & Blader, 2002). An example statement is: "I have the idea that I am a valuable member for [the online crowdsourcing platform]".

The second questionnaire was sent out to the members who had completed the first questionnaire after all challenges had finished, 59 out of the 74 members who completed the first questionnaire also completed this second questionnaire (for a response rate of

79.7%). This second questionnaire was used to collect data on members' intentions to stay active and their intentions to engage in positive word of mouth behavior.

Intentions to stay active. This variable was measured with 5 statements (Cronbach's $\alpha = .92$), which were based on Bhattacharjee's (2001) *continuance intention*-scale. An example statement is: "I would be happy to stay active in [the online crowdsourcing platform] in the coming months".

Positive word of mouth behavior. This variable was measured with 4 statements (Cronbach's $\alpha = .78$), which were adapted from Brown, Barry, Dacin, & Gunst's (2005) *word of mouth behaviors*-scale. An example statement is: "I speak positively of [the online crowdsourcing platform] to others".

Finally, objective data were collected from the database of the online crowdsourcing platform. This objective data included data on member activity throughout the 3-month research period, and data on members' demographics, specifically members' sex, age, and nationality.

Participation. The variable *Participation* captures the level of participation of members on the online crowdsourcing platform in period 2 (the period following the deadline of the first questionnaire). This variable was measured by taking the count of the number of challenges participated in by the member in period 2, in which a total of 3 challenges were open for participation.

Control variables. An important aspect to control for in this study is the degree to which members had been active in period 1 (the period up until the deadline of the first questionnaire). In all our analyses we therefore included the variable *Participation experience*, which was measured as the count of the number of challenges participated in in period 1, in which a total of 6 challenges were open for participation. We also controlled for participants' sex, age, and nationality in all our analyses. Sex was a dummy variable that indicated whether a participant was male (Sex = 0) or female (Sex = 1). Age was measured as the year in which the research was done minus the birth year of the participant. Nationality was a dummy variable that indicated whether a participant was born in the same country as the university was located in (Nationality = 0) or not (Nationality = 1).

ANALYSES AND RESULTS

Descriptive Statistics

Table 2.2 reports the descriptive statistics and pairwise correlations of all the variables in the study. Correlations ranging from -.13 to .31 among the independent variables provide no indication that there might be problems of multicollinearity when running a simple linear regression on these variables. Additionally, we tested the degree of skewness and kurtosis of these variables; none of the variables came close to indicating a potential problem with the normality of their distribution (max skewness statistic = 1.47; max kurtosis statistic = -2.00) (Kline, 2011). We therefore proceeded with testing the hypotheses.

Test of Hypotheses

The effect of the possibility to interact with other members on perceived inclusion and perceived value. In order to test hypotheses 1a, we conducted a one-way (closed CE vs. open CE) analysis of variance with perceived inclusion as dependent variable, while controlling for participants' sex, age, nationality, and participation experience. We did not find a significant main effect of the possibility to interact with other members, $F_{(1,68)} = 0.26$, $p = .61$, partial $\eta^2 = .00$). Hypothesis 1a was thus not supported; members of the open CE reported (non-significant) lower levels of identification with the online crowdsourcing platform ($M = 2.53$) than members of the closed CE ($M = 2.62$) (see Figure 2.1).

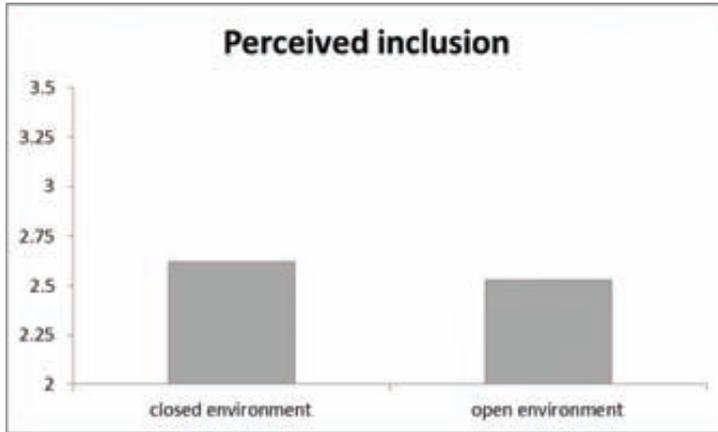
Table 2.2 Descriptive Statistics and Correlations (N = 74)

Variable	M	SD	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Sex	0.32	0.47	--								
2. Age	22.82	2.47	.03	--							
3. Nationality	0.34	0.48	-.01	-.08	--						
4. Participation experience	1.14	1.43	.14	.05	.31**	--					
5. Crowdsourcing environment	0.55	0.50	-.13	.11	.01	-.13	--				
6. Perceived inclusion	2.57	0.69	-.02	.08	.29*	.12	-.04	--			
7. Perceived value	3.22	0.54	-.06	.19	.30**	.27*	.24*	.30**	--		
8. Participation	0.57	0.94	-.08	.08	.30**	.44**	-.10	.21	.35**	--	
9. Intentions to stay active ^a	3.93	0.76	.00	.32*	.26*	.32*	.13	.31**	.53**	.52**	--
10. Positive word of mouth behavior ^a	3.09	0.81	.13	.21	.12	.46**	-.09	.43**	.49**	.27*	.34**

Note. t-tests of significance are two-sided. ** $p < .01$; * $p < .05$

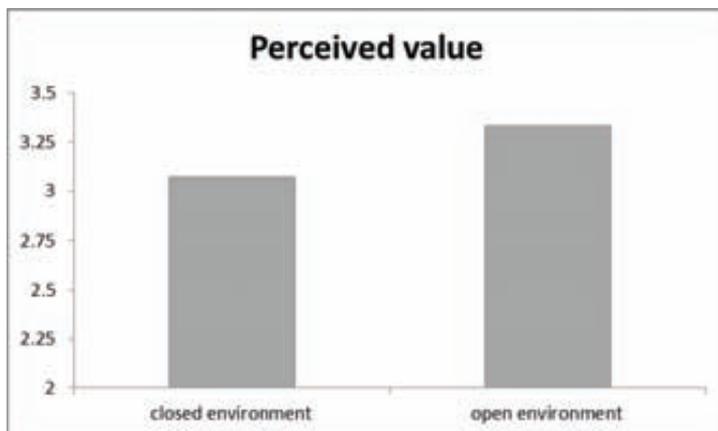
^a N = 59

Figure 2.1 *Perceived inclusion as a function of crowdsourcing environment.*



In order to test hypothesis 1b, we conducted a one-way (closed CE vs. open CE) analysis of variance with perceived value as dependent variable, while controlling for participants' sex, age, nationality, and participation experience. We found a significant main effect of the possibility to interact with other members, $F_{(1,68)} = 4.75$, $p = .03$, partial $\eta^2 = .07$). In support of hypothesis 1b, members of the open CE reported significantly higher levels of perceived value ($M = 3.33$) than members of the closed CE ($M = 3.07$) (see Figure 2.2).

Figure 2.2 *Perceived value as a function of crowdsourcing environment.*



The behavioral effects of perceived inclusion and perceived value. In order to test hypotheses 2a and 2b, we regressed participation on perceived inclusion and perceived value, while controlling for participants' sex, age, nationality, participation experience, and crowdsourcing environment (see Table 2.3; model 1c).

Table 2.3 Results Regression Analyses of Participation on Perceived inclusion and Perceived Value (N = 74)

Predictor	B	SE	β	t	R ²	F
Model 1a: Control variables					.25	5.75 ***
Sex	-0.27	0.21	-0.14	-1.30		
Age	0.03	0.04	0.08	0.75		
Nationality	0.35	0.22	0.18	1.62		
Participation experience	0.26	0.07	0.40	3.61 **		
Model 1b: Possibility to interact with other members manipulation					.26	4.67 ***
Sex	-0.29	0.21	-0.15	-1.38		
Age	0.03	0.04	0.09	0.83		
Nationality	0.36	0.22	0.18	1.66		
Participation experience	0.26	0.07	0.39	3.48 **		
Crowdsourcing environment	-0.14	0.20	-0.08	-0.72		
Model 1c: Perceived inclusion and perceived value					.30	4.09 ***
Sex	-0.26	0.21	-0.13	-1.24		
Age	0.02	0.04	0.04	0.39		
Nationality	0.22	0.23	0.11	0.98		
Participation experience	0.22	0.07	0.34	3.00 **		
Crowdsourcing environment	-0.24	0.21	-0.13	-1.16		
Perceived inclusion	0.08	0.15	0.06	0.51		
Perceived value	0.39	0.21	0.22	1.86 *		

Note. t-tests of significance are one-sided: ** $p < .01$; * $p < .05$

F-tests of significance are two-sided: *** $p < .001$; ** $p < .01$; * $p < .05$ The results⁸ of model 1c ($R^2 = .30$, $F_{(7,66)} = 4.09$, $p < .001$) show that, as hypothesized, perceived value has a significant positive effect on members' levels of participation ($b =$

⁸ All displayed p-values for individual variables in regression analyses are based on one-sided tests of significance.

0.39, SE = 0.21, $t = 1.86$, $p = .03$). Perceived inclusion, however, did not significantly affect members' levels of participation ($b = 0.08$, SE = 0.15, $t = 0.51$, $p = .31$).

Secondly, in order to test hypotheses 3a and 3b, we regressed intentions to stay active on perceived inclusion and perceived value, while controlling for participants' sex, age, nationality, participation experience, and crowdsourcing environment (see Table 2.4; model 2c).

Table 2.4 Results Regression Analyses of Intentions to Stay Active on Perceived inclusion and Perceived Value ($N = 59$)

Predictor	B	SE	β	t	R ²	F
Model 2a: Control variables					.23	4.02**
Sex	-0.14	0.21	-0.09	-0.68		
Age	0.10	0.04	0.31	2.57**		
Nationality	0.28	0.20	0.18	1.43		
Participation experience	0.13	0.07	0.26	1.97*		
Model 2b: Possibility to interact with other members manipulation					.24	3.28*
Sex	-0.11	0.22	-0.07	-0.51		
Age	0.09	0.04	0.29	2.38*		
Nationality	0.28	0.20	0.18	1.41		
Participation experience	0.13	0.07	0.26	1.98*		
Crowdsourcing environment	0.13	0.19	0.09	0.68		
Model 2c: Perceived inclusion and perceived value					.35	3.86**
Sex	-0.04	0.21	-0.02	-0.20		
Age	0.06	0.04	0.19	1.59		
Nationality	0.09	0.20	0.06	0.48		
Participation experience	0.08	0.07	0.15	1.17		
Crowdsourcing environment	0.01	0.19	0.01	0.06		
Perceived inclusion	0.11	0.13	0.11	0.84		
Perceived value	0.50	0.21	0.35	2.41**		

Note. t-tests of significance are one-sided: ** $p < .01$; * $p < .05$

F-tests of significance are two-sided: *** $p < .001$; ** $p < .01$; * $p < .05$

The results of model 2c ($R^2 = .35$, $F_{(7, 51)} = 3.86$, $p = .00$) show that, as hypothesized, perceived value has a significant positive effect on members' intentions to stay active ($b = 0.50$, SE = 0.21, $t = 2.41$, $p = .01$). Perceived inclusion, however, did not significantly affect members' intentions to stay active ($b = 0.11$, SE = 0.13, $t = 0.84$, $p = .20$).

Finally, in order to test hypotheses 4a and 4b, we regressed positive word of mouth behavior on perceived inclusion and perceived value, while controlling for participants' sex, age, nationality, participation experience, and crowdsourcing environment (see Table 2.5; model 3c).

Table 2.5 Results Regression Analyses of Positive Word of Mouth Behavior on Perceived inclusion and Perceived Value (N = 59)

Predictor	B	SE	β	t	R ²	F
Model 3a: Control variables					.25	4.39**
Sex	0.00	0.22	0.00	0.02		
Age	0.06	0.04	0.17	1.44		
Nationality	-0.03	0.21	-0.02	-0.14		
Participation experience	0.25	0.07	0.45	3.49***		
Model 3b: Possibility to interact with other members manipulation					.25	3.59**
Sex	-0.03	0.23	-0.02	-0.15		
Age	0.07	0.04	0.19	1.55		
Nationality	-0.03	0.21	-0.02	-0.12		
Participation experience	0.24	0.07	0.45	3.44***		
Crowdsourcing environment	-0.15	0.20	-0.09	-0.75		
Model 3c: Perceived inclusion and perceived value					.46	6.09***
Sex	0.08	0.20	0.05	0.41		
Age	0.02	0.04	0.06	0.55		
Nationality	-0.30	0.19	-0.18	-1.53		
Participation experience	0.17	0.06	0.31	2.62**		
Crowdsourcing environment	-0.26	0.18	-0.16	-1.40		
Perceived inclusion	0.29	0.13	0.26	2.22*		
Perceived value	0.57	0.20	0.38	2.86**		

Note. t-tests of significance are one-sided: ** $p < .01$; * $p < .05$

F-tests of significance are two-sided: *** $p < .001$; ** $p < .01$; * $p < .05$

The results of model 3c ($R^2 = .46$, $F_{(7,51)} = 6.09$, $p < .001$) show that, as hypothesized, both perceived inclusion ($b = 0.29$, $SE = 0.13$, $t = 2.22$, $p = .02$) and perceived value ($b = 0.57$, $SE = 0.20$, $t = 2.86$, $p = .00$) had a significant positive effect on members' positive word of mouth behavior.

Taken together, these results generally support our idea that the possibility to interact with other members positively affects perceived respect and that perceived respect drives members' participation and intentions to engage in platform-oriented behaviors.

More specifically, being in an open CE, where members had the possibility to interact with other members, positively affected the degree to which members felt valued in the crowdsourcing platform (H1b is supported) and feeling valued positively affected participation (H2b is supported), members' intentions to stay active (H3b is supported) and members' willingness to engage in positive word of mouth behavior (H4b is supported). However, if we consider the degree to which members feel included we see a very different story; the possibility to interact with other members did not affect the degree to which members felt included on the crowdsourcing platform (H1a is not supported) and although it did positively affect members' willingness to engage in positive word of mouth behaviors (H4a is supported), it did not positively affect participation (H2a is not supported) or members' intentions to stay active (H3a is not supported).

Mediation Analyses

To test whether the possibility to interact with other members had indirect effects on our behavioral outcomes through perceived inclusion and/or perceived value, we performed three mediation analyses based on the procedure described by Preacher and Hayes³⁹ (Preacher & Hayes, 2004, 2008). Based on 5000 bootstrap samples, we generated 95% bias corrected confidence intervals for the indirect effects of the crowdsourcing environment on participation, intentions to stay active, and positive word of mouth behavior through perceived inclusion and perceived value. In our models we included sex, age, nationality, and participation experience as covariates.

Our results indicate that there are significant positive indirect effects of the possibility to interact with other members on all three behavioral outcomes through perceived value, but no significant indirect effects through perceived inclusion (see Table 2.6).

⁹ We used the SPSS syntax provided by Preacher and Hayes (2004, 2008), which can be downloaded from:

<http://www.quantpsy.org/>

Table 2.6 Results Mediation Analyses of Crowdsourcing Environment on Behavioral Outcomes Through Perceived Value and Identification.

<i>IV: Crowdsourcing environment</i>		Participation	
	Lower bound	Upper bound	
<hr/>			
<i>Mediator</i>			
Perceived inclusion	-0.13	0.03	
Perceived value	0.01	0.28	
<hr/>			
	Intentions to stay active		
	Lower bound	Upper bound	
<hr/>			
<i>Mediator</i>			
Perceived inclusion	-0.13	0.02	
Perceived value	0.02	0.36	
<hr/>			
	Positive word of mouth behavior		
	Lower bound	Upper bound	
<hr/>			
<i>Mediator</i>			
Perceived inclusion	-0.23	0.05	
Perceived value	0.02	0.41	
<hr/>			

Note. Based on 5000 bootstrap samples.

These results from the mediation analyses further support the importance of creating online environments in which social motivations, such as perceived respect, might flourish as they highlight the importance of considering social motivations to capture the significant (indirect) effects of the design choices, such as the possibility to interact with other members, on online platforms. These results also emphasize the relative importance of feeling valued compared to feeling included as a driver of members' behavior on online crowdsourcing platforms.

Sensitivity Analyses

In the literature on intragroup status, feedback has been found to play a key role in people's evaluation of their status (e.g. Branscombe et al., 2002). To investigate whether it is indeed the feedback that members can receive from other members in the open CE that explains the positive effect of the possibility to interact with other members on members' perceived respect, we decided to investigate the effects of feedback from

other members by running additional regression analyses on the specific subsample only including the members in the open challenge environment ($N = 41$).

Participants in the open CE could receive feedback on their contributions from other members in the open CE in the form of comments and ratings and this feedback was visible to all members in the open CE. The number of comments or ratings that members in the open CE would receive on their contributions was dependent on the willingness of other members to write comments and/or rate a contribution. We coded *comments from other members* as the count of comments that participants received on their contributions in period 1 (the first six challenges) and *ratings from other members* as the count of ratings that participants received on their contributions in period 1.

First, we regressed perceived inclusion on comments from other members and ratings from other members for the subsample only including the members in the open CE. As in our previous analyses, we controlled for participants' sex, age, nationality, and participation experience (see Table 2.7; model 4a). The model as a whole did not account for significant variation in members' sense of being included ($R^2 = .08$, $F_{(6,34)} = 0.49$, $p = .81$), nor did feedback in the form of comments from other members ($b = 0.15$, $SE = 0.15$, $t = 0.99$, $p = .17$) or ratings from other members ($b = 0.00$, $SE = 0.10$, $t = 0.04$, $p = .48$) significantly affect perceived inclusion.

Secondly, we regressed perceived value on comments from other members and ratings from other members for the same subsample (only including the members in the open CE). As in our previous analyses, we controlled for participants' sex, age, nationality, and participation experience (see Table 2.7; model 4b).

While the model as a whole did not account for significant variation in members' perceived value ($R^2 = .21$, $F_{(6,34)} = 1.54$, $p = .19$), the coefficient of feedback in the form of comments from other members is positive and significant ($b = 0.16$, $SE = 0.09$, $t = 1.71$, $p = .05$), but the coefficient of feedback in the form of ratings from other members is not significant ($b = 0.06$, $SE = 0.06$, $t = 0.97$, $p = .17$) Taken together, the results of these two sensitivity analyses lend some support to our general idea that it is interaction with other members, and specifically in the form of receiving (constructive) comments, that underlies the effect of our crowdsourcing environment manipulation on members' perceptions of being valued.

Table 2.7 Results Regression Analyses Subsample Members in Open Crowdsourcing Environment ($N = 41$)

Predictor	B	SE	β	t	R ²	F
Model 4a: Perceived inclusion					.08	0.49
Sex	0.16	0.31	0.09	0.51		
Age	0.04	0.05	0.15	0.90		
Nationality	0.31	0.29	0.19	1.07		
Participation experience	-0.12	0.23	-0.22	-0.53		
Comments from other members	0.15	0.15	0.23	0.99		
Ratings from other members	0.00	0.10	0.01	0.04		
Model 4b: Perceived value					.21	1.54
Sex	-0.22	0.19	-0.19	-1.15		
Age	0.02	0.03	0.12	0.74		
Nationality	0.34	0.18	0.31	1.91*		
Participation experience	-0.12	0.14	-0.32	-0.86		
Comments from other members	0.16	0.09	0.37	1.71*		
Ratings from other members	0.06	0.06	0.31	0.97		

Note. t-tests of significance are one-sided: ** $p < .01$; * $p < .05$

F-tests of significance are two-sided: *** $p < .001$; ** $p < .01$; * $p < .05$

DISCUSSION

The aim of this study was twofold: First of all, we investigated whether the possibility to interact with other members of the group could act, even in the absence of group characteristics that have implicitly been assumed to be necessary for group-based feelings of respect to develop, as a source for the development of group-based feelings of respect. Second, we investigated whether group-based feelings of respect would influence members' participation and group-oriented behaviors on online crowdsourcing platforms. In this study, we found that the possibility to interact with other members positively affected members' feelings of respect, specifically their perceptions of being valued, on an online crowdsourcing platform. We also found that group-based feelings of respect, and specifically the perception of being valued, positively affected participation, intentions to stay active, and willingness to engage in positive word of mouth behavior. Moreover, the possibility to interact with other members indirectly motivated members to engage in these behaviors through its effect on members' perceptions of being valued on the online crowdsourcing platform. These findings have several important implications.

Theoretical Implications

First of all, our findings show that the possibility to interact with other members is an important driver of the development of group-based feelings of respect, and specifically feeling valued, by manipulating this aspect of an online crowdsourcing platform. This social environment is representative of several online social environments in which people have become increasingly active, and which lack the characteristics of typical social groups, such as having clear group boundaries, a group identity that members can identify with, and commonly held norms and goals. Our findings imply that the effects of having the possibility to interact with other members on members' feelings of respect are not dependent on the other characteristics of typical social groups to be present and that the domain in which feelings of respect are relevant drivers of behavior seems to extend beyond typical social groups to a wide range of online (work) environments. In our study we even found that feelings of respect affected behavior in the setting in which there was no possibility to interact with other members, indicating that not even interaction with other members is necessarily required for feelings of respect to develop and affect behavior.

Secondly, our study highlights the importance of distinguishing between two different routes of feeling respected; feeling included vs. feeling valued (see also Ellemers, et al., 2013; Huo et al., 2010). Whereas most research based in social identity theory has focused on the importance of members feeling included in their groups, this study shows that in online crowdsourcing platforms feeling valued for your contributions seems to be a more important driver of behavior than feeling included in the group. This finding emphasizes the importance of considering the actual social cues that group members receive in a particular social environment; online crowdsourcing platforms seem to lack the cues that are essential in allowing members to feel included and/or identify with their social group. It also emphasizes the way in which members develop feelings of respect; in this study we have considered an autonomous form of feeling valued, individuals can consider themselves valuable group members without having to make any explicit comparison with other group members (Tyler & Smith, 1999). While most experimental research has based its findings on manipulations of comparative respect (e.g. Branscombe et al., 2002), our study shows that individuals do not necessarily have to feel better than

others to feel good about themselves (see also Huberman et al., 2009; Tyler & Blader, 2002). For online crowdsourcing platforms this is good news; while most of the social reputation mechanisms that are discussed in the literature deal with comparative drivers of respect (see Dellarocas (2010) for a discussion of the most common online reputation mechanisms), stimulating autonomous forms of respect allows online platforms to essentially make everybody feel respected.

Practical Implications

This study also has important practical implications for organizers of online (crowdsourcing) platforms. First of all, while the organizers of online (crowdsourcing) platforms generally seem to focus on the impact of design choices on their members' ability to perform tasks, they should not neglect to consider how these choices might affect members' social motivations to engage in platform-oriented behaviors. In this study we highlight how designing the platform to provide members with the possibility to interact with each other positively affects members' feelings of respect and, through its effect on feelings of respect, platform-oriented behaviors of members. As online crowdsourcing platforms are two-sided platforms that need to have an active member crowd in order to attract new tasks (which will then attract new members and so on) these behaviors will contribute to the long-term success of online (crowdsourcing) platforms (e.g. Bakos & Katsamakos, 2008; Malone et al., 2011).

Secondly, this study has also indicated that there is a positive effect of feedback on members' contributions from the crowdsourcing organization on their feelings of respect, specifically their sense of being a valuable member. Even when online crowdsourcing platforms do not have the possibility to allow for interaction among their members, offering their members feedback on their contribution could already positively affect the development of a sense of value.

Strength & Limitations

To our knowledge, this study is the first investigation that uses a field experiment to collect data on how members of online platforms 'really' experience different online environments over an extended period of time (in our case over three months). Using an

experimental setup allowed us to test the causality of the relationship between the possibility to interact and feelings of respect. Performing this experiment in a field setting offers us additional support to generalize our findings. A limitation of our study is that our setup allowed us to only study a relatively small student sample over a period of time that might be short for developing deep-level group-based feelings.

By allowing members to act voluntarily, the setup of our field experiment allowed us to observe behaviors, as they would very likely also occur in ‘real’ online crowdsourcing platforms. By manipulating only the online crowdsourcing environment in which members were active through the manipulation of the possibility to interact with other members, we were able to observe actual interaction behavior and to measure the real effects interaction with others might have on members’ developing feelings of respect and their subsequent behaviors. In reality, however, the feedback provided by other members is never as clearly positive or negative as the manipulations we could have employed in a lab experiment and therefore many of the results we find, although significant, are not as strong as have been reported in lab experiments.

Future Research

In this paper, we have focused on autonomous forms of respect. In online platforms, however, most of the status information made available is expected to affect comparative forms of respect. Future research could therefore investigate how social reputation mechanisms such as performance rankings and activity overviews affect comparative forms of respect and how these forms of respect can subsequently affect member behaviors. More generally, whereas respect represents one particular form of status-based motivation, another status-based social motivator that might also influence members’ behavior towards the group is the concept of pride. Pride relates to intergroup status and reflects the degree to which the group to which an individual belongs as a whole has a high status (Tyler, 1999). Several studies have found that the status of the group as a whole influences members’ behaviors (e.g. Dukerich, Golden, & Shortell, 2002; Fuller et al., 2006; Mignonac, Herrbach and Guerrero, 2006). Future research should therefore also investigate how the collective achievements of the members of online crowdsourcing platforms affect their behavior towards the platform.

Secondly, in our study we found that interaction might contribute to the long-term success of online crowdsourcing platforms by stimulating certain platform-oriented behaviors, through its effect on feelings of respect. However, we did not investigate the effects of interaction on the performance of individuals' contributions to the idea generation tasks. There is an ongoing debate on the pros and cons of interaction for idea generation performance in the innovation literature, and several studies claim that the possibility to interact with other members of the group negatively affects the group's collective performance on idea generation tasks (see Stroebe, Nijstad, Rietzschel, 2010). In order to better understand the overall effects of allowing the possibility to interact on online crowdsourcing platforms on their long-term success, future research should study the direct 'performance' effect together with the more indirect 'social' effect we uncovered in this study.

CHAPTER 3

FEELINGS OF PRIDE AND RESPECT AS DRIVERS OF ONGOING MEMBER ACTIVITY ON ONLINE CROWDSOURCING PLATFORMS

Getting members to actively participate in tasks on an ongoing basis is essential for the success of online platforms. We argue that on an online crowdsourcing platform, feelings of pride and respect will play central roles in driving members' behaviors towards the platform organization and that members' feelings of pride and respect are influenced by the information the online crowdsourcing platform communicates to its members. Specifically, communications about the online crowdsourcing platform as a whole will influence members' feelings of pride and communications about a member's individual behavior will influence that member's perceived respect. We test these ideas in a longitudinal, multisource field research and find that feelings of pride and respect are indeed drivers of ongoing member activity on an online crowdsourcing platform and that specific organizational communication practices relate to ongoing member activity through their effects on members' feelings of pride and respect.

INTRODUCTION

In recent years, we have witnessed a growing number of organizations that organize work over the Internet by sourcing tasks to an online “crowd” of individual workers who are themselves not employees of the organization (Howe, 2008; Malone et al., 2011). On the one hand, *online crowdsourcing platforms*, such as InnoCentive, 99designs, and Battle of Concepts, seem to have an enormous potential. With over 2.4 billion people worldwide having access to the Internet (Internet World Stats, 2012), online crowdsourcing platforms are able to tap into a nearly unlimited pool of knowledge and skills to solve a wide range of problems (e.g. Doan et al., 2011; Howe, 2008; Jeppesen &

Lakhani, 2010). On the other hand, online crowdsourcing platforms remain fully dependent on the willingness of their members to work on such tasks and without their members' ongoing activity crowdsourcing platforms will inevitably fail. We ask ourselves therefore: *“What drives members' ongoing activity in online crowdsourcing platforms and how can this be influenced by managerial practices?”*

To understand ongoing activity in crowdsourcing platforms we make use of the *group engagement model* (Blader & Tyler, 2009; Tyler & Blader, 2000, 2001, 2003), which postulates that three elements of social identity (identification, pride, and perceived respect) drive engagement in groups. We believe this model is especially suited for our purposes for several reasons. First, it focuses on engagement and cooperative behaviors in groups, which are exactly the types of behavior that we are interested in (i.e. ongoing activity). This type of group-oriented behaviors cannot be understood with theoretical arguments that only consider task-level characteristics (such as how a task can be intrinsically and/or extrinsically motivating), which has been the focus of research in this setting so far (e.g. Antikainen & Väättäjä, 2010; Brabham, 2008; Zheng et al., 2011). Second, it emphasizes processes underlying cooperative behaviors and may therefore help us understand exactly what drives ongoing activity in online crowdsourcing platforms and subsequently how managerial practices can influence this important behavior through their effect on these processes. Third, the group engagement model has been shown to be important in non-traditional work settings, such as volunteer organizations (Boezeman & Ellemers, 2007, 2008a, 2008b), and may, therefore, also be applicable in the case of online crowdsourcing platforms.

There is, however, one important catch here and that is that many cues that allow individuals to identify with a social group are absent on online crowdsourcing platforms; online crowdsourcing platforms are virtual organizations that offer no opportunity to meet other group members (unlike virtual organizations that are related to existing brick-and-mortar organizations) or opportunities to collaborate with other members (unlike open source software platforms); they have no clear ideology and/or identity that can form the basis for members to identify with (unlike open source software platforms and most virtual communities) and their group boundaries are extremely permeable. This is problematic in the sense that the applicability of social-identity-based models, such as the group

engagement model, is generally considered to be dependent on the degree to which group members are able to identify with their social group (Ashforth & Mael, 1989; Hogg & Terry, 2000).

In this article, however, we will argue that the evaluative components of social identity in the group engagement model, in the form of members' sense of pride and perceived respect, can still significantly affect members' behavior on online crowdsourcing platforms, even though identification might not be important in these organizations. Unlike identification processes, group-based feelings of pride and respect are not necessarily dependent on a comparison with other groups and can thus play an important role in group settings that lack a clear identity and have highly permeable boundaries such as online crowdsourcing platforms. Indeed, research has shown that such autonomous judgments of pride and respect can be important drivers of people's group-oriented behaviors (Tyler & Blader, 2002). We therefore argue that pride and perceived respect (but not identification) drive members' ongoing activity in crowdsourcing platforms and based on the work of Blader and Tyler (Blader & Tyler, 2009; Tyler & Blader 2000, 2001, 2003) we identify communication practices that crowdsourcing platforms can employ to foster the development of pride and perceived respect in their members.

We test our predictions using a sample of 153 members of an online crowdsourcing platform that organizes idea generation tasks. Employing structural equation analyses, we combine objective data gathered at the platform with survey data collected from members. We use a longitudinal design, in which objective data on managerial communication practices precede subjective data on pride, perceived respect and identification, which in turn precede objective data on member activity. By investigating both how pride and perceived respect (but not identification) drive ongoing member activity as well as how they mediate the effects of actual organizational communication practices on online crowdsourcing platforms, we offer several important theoretical contributions. First, we contribute to the literature on the group engagement model by showing how the model can be modified to be applicable to cases outside of its original domain. This opens the group engagement model up for application in many situations in which it had not been previously applied (including many online

environments). Second, we contribute to the literature on crowdsourcing by showing how a model that focuses on group processes can explain why individual members engage in ongoing activity on online crowdsourcing platforms and how platforms can stimulate these processes through communication practices.

THEORY AND HYPOTHESES

Online Crowdsourcing Platforms

Crowdsourcing has been defined as “the act of outsourcing a task to a ‘crowd,’ rather than to a designated agent (an organization, informal or formal team, or individual) ... in the form of an open call” (Afuah & Tucci, 2012: 355). To do so, organizations can set up their own online crowdsourcing platform or make use of one of the several independent online crowdsourcing platforms that host tasks for ‘seeker’ organizations (Brabham, 2008; Howe, 2008; Jeppesen & Lakhani, 2010; Zheng et al., 2011). While several successful examples exist of organizations that have organized their own online crowdsourcing platforms (see for example Dell Ideastorm and My Starbuck Idea), successful independent online crowdsourcing platforms such as InnoCentive (for scientific problem solving tasks), 99designs (for design-related tasks), TopCoder (for software development tasks), and Amazon Mechanical Turk (for so-called human intelligence tasks) all boast crowds (their registered members) of more than 200,000 individuals¹⁰. In most cases, organizations aim to make their tasks visible to as many people as possible and will therefore post their tasks on an existing independent online crowdsourcing platform that specifically deals with the type of task that the organization wants input on from the crowd. These specialized organizations will then act as brokers (e.g. Verona et al., 2006), or intermediaries (e.g. Bakos & Katsamakos, 2008) between their members (the crowd) and their clients (i.e. the organizations that source tasks to the crowd) in order to get the tasks solved.

A typical online crowdsourcing platform is very different from previously studied virtual organizations such as open source software communities, co-creation platforms like Wikipedia (in which many individual cooperate online to create a collective product), and

¹⁰ for more information on the examples, see their respective websites: <http://www.ideastorm.com/>; <http://mystarbucksidea.force.com/>; <http://www.99designs.com/>; <http://www.innocentive.com/about-innocentive/>; <http://www.topcoder.com/>; <http://www.mturk.com/>.

online communities of interest (in which members with similar interests communicate online about these interests) in that it does not allow for interaction between members, is not oriented on coordinated actions and collaborative outcomes, and does not rely on a fundamental collective ideology or interest (e.g. Boudreau & Lakhani, 2009). In fact, a fundamental requirement of the logic behind crowdsourcing, “the wisdom of crowds”, is that large crowds can be collectively smart if the individuals that make up the crowd are able to make decisions independently (Howe, 2008; Malone et al., 2010; Page, 2007; Surowiecki, 2004).

Furthermore, what distinguishes online crowdsourcing platforms from traditional organizations is that the organizational members who work on tasks are not employees of the organization (e.g. Doan et al., 2011; Howe, 2008). Unlike the hiring process in traditional organizations, there are very few requirements that individuals have to fulfill in order to register and become members of online crowdsourcing platforms; in most cases individuals need only to provide a name and an e-mail address. While this allows online crowdsourcing platforms to grow rapidly and gather huge crowds on their platforms, it also prevents these organizations from resorting to the organizational mechanisms that traditional organizations use to make their employees participate and perform on the tasks at hand, such as pay and promotion (Ashford, George, & Blatt, 2007; Zammuto et al., 2007).

Online crowdsourcing platforms are dependent on the voluntary behavior of their members to participate and perform on tasks, but, like most virtual platforms, only a small percentage of members are actively contributing to core activities and most members do not participate at all (Preece, Nonnecke, & Andrews, 2004). Therefore it is crucial for online crowdsourcing platforms to understand what drives their members to become and remain active over the course of multiple tasks and what they can do to motivate and retain their active members.

Unfortunately, previous research on online crowdsourcing platforms has focused almost exclusively on understanding how the intrinsic and extrinsic characteristics of a task motivate members to work on that *particular* task (e.g. Antikainen et al., 2010; Brabham, 2008; Zheng et al., 2011). While this research informs online crowdsourcing platforms on how to design the tasks that they want their members to work on, it does not

help these organizations to understand how they can stimulate members' ongoing activity *over the course of multiple tasks*.

Members' ongoing activity is an important form of discretionary, or voluntary, behavior that members can engage in on online crowdsourcing platforms. This type of behavior is oriented towards the organization as a whole and is therefore expected to be influenced by the way members relate to the organization (rather than the task at hand; Tyler & Blader, 2000, 2001, 2003; Vallerand, 1997). To understand members' ongoing activity on online crowdsourcing platforms, we will therefore build on the group engagement model; a social-identity-based model that argues that besides his/her level of *identification* with the group an individual's perception of social group-based status, in the form of *feelings of pride and perceived respect*, are critical to understand his/her discretionary group-oriented behavior (Blader & Tyler, 2009; Tyler & Blader, 2000, 2001, 2003).

Social Identity in Online Crowdsourcing Platforms

Social identity processes are a "critical ingredient for understanding the psychological basis of people's engagement with their organizations" (Blader & Tyler, 2009: 445). According to social identity theory (Tajfel, 1978; Tajfel & Turner, 1979), an individual's self-concept is composed of a personal identity, the part of the self that is composed of idiosyncratic attributes, and (several) social identities, where a social identity refers to "that part of the individual's self-concept which derives from his knowledge of his membership of a social group ... together with the value and emotional significance attached to that membership" (Tajfel, 1978: 63). A recent social-identity-based model that fits the current research question quite well is the group engagement model (Blader & Tyler, 2009; Tyler & Blader, 2003). In line with recent work on social identity (e.g. Bergami & Bagozzi, 2000; Ellemers, Kortekaas, & Ouwerkerk, 1999; Van Dick, Wagner, Stellmacher, & Christ, 2004) the group engagement model sees social identity as a multidimensional concept. Specifically, the model emphasizes that social identity consists of a cognitive and an evaluative dimension, and that group-oriented cooperation and engagement with the group is fostered by identification (the cognitive dimension) as well

as pride and perceived respect (the evaluative dimension) (Blader & Tyler, 2009; Tyler & Blader, 2000, 2001, 2003).

Identification with an organization, or organizational identification, is defined as “the perception of oneness with or belongingness to an organization, where the individual defines him or herself in terms of the organization(s) in which he or she is a member” (Mael & Ashforth, 1992: 104). Social identification develops through social interactions with in- and out-group members that teach individuals what in-group members have in common and how in-group members are different from out-group members (e.g. Ashforth & Mael, 1989). Research has shown that individuals who identify more strongly with an organization are more likely to invest effort in the organization and engage with the organization (e.g. Ashforth & Mael, 1989; Dutton Dukerich, & Harquail, 1994; Van Knippenberg & Sleebos, 2006).

Pride, sometimes referred to as perceived or construed external prestige (e.g. Dukerich et al., 2002; Fuller et al., 2006), relates to the categorical, or group-level, social self and reflects individuals’ evaluation of the status of their group as a whole (Tyler, 1999). When organizational members are proud of their organization (i.e. regard the organization as having a high status) their organization-based identity is likely to positively contribute to their self-concept (Blader & Tyler, 2009). Although previous research has sometimes considered pride as an important antecedent of organizational identification (Dutton & Dukerich, 1991; Dutton et al., 1994; Mael & Ashforth, 1992), several researchers have also found direct relationships between pride and organizational members’ behaviors (e.g. Dukerich et al., 2002; Fuller et al., 2006; Mignonac et al., 2006).

Perceived respect is an individual’s assessment of how he/she is evaluated by others in the group (Smith & Tyler, 1997). It is a social evaluation derived from the collective opinions of the group members (Emler & Hopkins, 1990; Huo & Binning, 2008). In as far as it reflects individuals’ perceptions of their status within the group (Tyler & Blader, 2000, 2001; Tyler et al., 1996), it relates to the reputational self (Tyler, 1999). To feel respected within a group implies that one perceives oneself to be regarded as a worthy member of the group (Tyler & Smith, 1999). Previous research has shown that group members’ perceived respect influence their group-related behavior (e.g. Simon & Stürmer, 2003; Smith et al., 1998; Tyler & Blader, 2000).

Several studies have confirmed the group engagement model and testify to its validity in traditional organizations (e.g. Blader & Tyler, 2009; Fuller et al., 2006) as well as in volunteer organization in which members are not official employees (Boezeman & Ellemers, 2007, 2008a, 2008b). Unfortunately, online crowdsourcing platforms are fundamentally different from the organizations discussed in prior studies. First, online crowdsourcing platforms are virtual organizations and therefore lack physical proximity and face-to-face interaction. Second, a typical online crowdsourcing platform also lacks computer-mediated interaction and collaboration between organizational members. Third, online crowdsourcing platforms have highly permeable group boundaries and therefore lack a relevant out-group against which to compare the organization. Due to these characteristics, intra-group and inter-group comparative processes are expected to be severely hampered in online crowdsourcing platforms. Although some researchers would argue that intra-group comparative processes are not crucial for social identity (as they make depersonalization easier; Postmes, Spears & Lea, 1998), the complete lack of intra-group interaction and intergroup comparison basically violates the assumptions of social identity-based models (Ashforth & Mael, 1989; Ellemers, 1993; Hogg & Terry, 2000; Pratt, 1998). One could argue, therefore, that social identity-base models are simply not applicable to online crowdsourcing platforms.

We disagree. Specifically, while we agree that the lack of comparative processes are especially detrimental for organizational identification as this cognitive concept is partly based on comparisons between in- and out-groups (Ashforth & Mael, 1989; Hogg & Terry, 2000), we believe that the evaluative concepts of pride and perceived respect are very much in line with research on virtual organizations, such as online crowdsourcing platforms, that has emphasized the importance of the “motivational power of reputation” (Dellarocas, 2010: 33). Indeed, Tyler and Blader (2002) demonstrate that status evaluations in terms of pride and respect can be comparative in nature (by comparing status of self or group with status of others individuals or groups), but that they can also be autonomous in nature (by comparing status to internal standards of what is appropriate). Importantly, their research shows that autonomous status evaluations of pride and respect are more predictive of group-oriented behaviors than comparative status evaluations. As autonomous pride and respect are based on comparisons to internal standards and are not a

result of comparisons to other in-group members or other groups, we argue that (autonomous) pride and (autonomous) perceived respect (but not organizational identification) drive members' ongoing activity on online crowdsourcing platforms. In the following we develop specific hypotheses regarding this idea.

Hypotheses Building

As gaining and maintaining *active* members is essential for the long-term success of organizations that are dependent on their members' voluntary behaviors (Boezeman & Ellemers, 2007, 2008a, 2008b), we will investigate three aspects of individual member behavior that, at the organizational level, determine the long-term success of online crowdsourcing platforms, namely: 1) the level of member activity, 2) the duration of member activity, and 3) positive word of mouth behavior.

Level and duration of member activity. Organizations need their members to participate and perform in their core activities to be successful; on online crowdsourcing platforms participating in core activities comes down to members contributing solutions/ideas/designs/etc. to the tasks that have been posted on the platform. Being active in the core activities of the online crowdsourcing platform is arguably the most important behavior that members can engage in, because, by doing so, members directly contribute to the performance of the online crowdsourcing platform (e.g. Fang & Neufeld, 2009; Koh et al., 2007). In most virtual platforms, however, only a small percentage of members are actively contributing to core activities and most members do not participate at all (Preece et al., 2004). Indeed, the most important reason why so many online crowdsourcing platforms fail is not a lack of members, but a lack of activity. For those online crowdsourcing platforms that do achieve a 'critical mass' of activity, it becomes essential for their long-term success that they maintain their members' level of activity. That is why motivating members to continue to actively participate on tasks is a key objective of crowdsourcing platforms (Dellarocas, 2010).

Besides members' level of activity on the core tasks, also the duration of their activity over time is important; by being active over a longer period of time members build up useful experience on relevant tasks on the online crowdsourcing platform, thereby improving their performance, making their participation count even more (Dholakia et al.,

2004). Indeed studies have shown that in traditional organizations member turnover tends to have detrimental effects on organizational performance (Hancock et al., 2012; Hausknecht & Trevor, 2011).

If a member takes pride in the membership of an organization, i.e. evaluates the organization's status positively, he/she will value the positive self-worth attached to the particular membership and will be "intrinsically motivated to facilitate the viability and success" of the organization (Blader & Tyler, 2009: 446). Members who have high levels of pride in a group see that group in a positive light and this allows them to "bask in [the organization's] reflected glory" (Cialdini et al., 1976: 366). Because their link with the organization provides them with positive feelings, members are expected to engage in behaviors that: a) further strengthen the link between themselves and the group, and b) contribute to the overall success of the group (Tyler & Blader, 2000, 2001).

The prouder a member is of the online crowdsourcing platform, the more tasks a member is expected to actively participate in, making the member's activity an increasingly important part of the organization's performance as well as further increasing the status of the group as a whole and the strength of the link between the member and the online crowdsourcing platform. If members feel more pride in the online crowdsourcing platform, they are also expected to remain active longer, thereby becoming a more important part of the history of the organization and further strengthening the link between the online crowdsourcing platform and themselves. Members who are proud of the online crowdsourcing platform are thus expected to show both a high level and a long duration of activity. In line with this argument, previous research has found that pride is positively related to task participation and effort (e.g. Tyler & Blader, 2000) and intentions to remain an active member of the organization (e.g. Boezeman & Ellemers, 2007). We therefore hypothesize that in an online crowdsourcing platform:

Hypothesis 1a.

Pride has a positive relationship with the level of member activity.

Hypothesis 1b.

Pride has a positive relationship with the duration of member activity.

If a member perceives him/herself to be highly respected, i.e. perceives his/her individual status within the organization to be high, he/she will value the positive self-worth attached to the particular organizational membership and reciprocate by putting in effort from his side to maintain and further improve this favorable (social) identity (Blader & Tyler, 2009; Ellemers et al., 2013; Tyler & Blader, 2003). Putting in effort by participating in the core activities of the organization is the most direct way that a member can reciprocate the good feelings received from the organization. The longer a member remains active on the online crowdsourcing platform, the longer one can maintain the positive feelings that come from one's respected position within the organization. Previous research has indeed found that feelings of respect are positively related to task participation and effort (e.g. Tyler & Blader, 2000; Williams & DeSteno, 2008) and intentions to remain an active member of the organization (e.g. Boezeman & Ellemers, 2007). We therefore hypothesize that on online crowdsourcing platforms:

Hypothesis 2a.

Perceived respect has a positive relationship with the level of member activity.

Hypothesis 2b.

Perceived respect has a positive relationship with the duration of member activity.

Positive word of mouth behavior. Members can also contribute indirectly to the organization gaining (and maintaining) active members by speaking positively about the organization to others, i.e. engaging in positive word of mouth behavior (Hennig-Thurau et al., 2004). Specifically, (positive) word of mouth behavior, which has been defined as “informal, person-to-person communication between a perceived noncommercial communicator and a receiver regarding a brand, a product, an organization, or a service” (Harrison-Walker, 2001: 63), is a way for members to emphasize that they belong to the organization. By engaging in positive word of mouth members can accomplish two things: a) strengthen their perceived link with the organization and b) enhance the status of their

organization and “bask in [the organization’s] reflected glory” (Cialdini et al., 1976: 366). In the way that positive word of mouth may persuade non-members to join and become active members themselves, it is an important extra-role behavior that indirectly contributes to the continued success of organizations (Kozinets et al., 2010; Trusov et al., 2009).

The prouder a member is of the online crowdsourcing platform, the more the organization’s high perceived status is positively related to their own status and the more valuable it is for members to further enhance the status of the organization as a whole and strengthen the bond between the online crowdsourcing platforms and themselves. By speaking about the online crowdsourcing platform, members can strengthen the bond between the organization and themselves in the eyes of others. Moreover, the prouder a member is of the online crowdsourcing platform, the more positive his/her image of the organization and the more word of mouth behavior will be *positive*. By speaking *positively* about the online crowdsourcing platform members can maintain and further enhance the organization’s status. We therefore expect feelings of pride to lead to *positive* word of mouth behavior and hypothesize that on online crowdsourcing platforms:

Hypothesis 3.

Pride has a positive relationship with positive word of mouth behavior.

Speaking *positively* about the online crowdsourcing platform can also make a member’s own unique and valuable attributes in the organizational context visible to other people (Tyler, 1999; Tyler & Smith, 1999). Members who feel respected perceive themselves to have a high status within the organization. The more a member feels respected by the online crowdsourcing platform, the more positive his/her image of the organization and the more word of mouth behavior will be *positive*. Furthermore, through engaging in *positive* word of mouth behaviors, members are not only able to let their high status become visible to other people inside and outside the online crowdsourcing platform, but they can also reciprocate the positive feelings they get from feeling respected within the organization (Ellemers et al., 2013). We therefore hypothesize that on online crowdsourcing platforms:

Hypothesis 4.

Perceived respect has a positive relationship with positive word of mouth behavior.

Organizational communication practices and feelings of pride and respect.

Proponents of the group engagement model argue that people's engagement with the groups to which they belong is essentially a result of the different forms of (social) identity cues they receive concerning these groups (Blader & Tyler, 2009; Tyler & Blader, 2003). Social identity cues related to the status of the group as a whole provide information to members on how much the organization can contribute to a member's feelings of positive self-worth through the basking in the organization's reflected glory and are therefore expected to affect feelings of pride (Branscombe et al., 2002; Cialdini et al., 1976; Haslam, Powell, & Turner, 2000; Tyler, 1999).

Newsletters, blogs, and media repositories are important ways in which online crowdsourcing platforms can communicate organization-level status information to their members (e.g. Duhe, 2007). For example, InnoCentive, an online crowdsourcing platform that hosts problem-solving and idea generation tasks, makes extensive use of newsletters and blogs to communicate its achievements. It also keeps track of all (positive) news on the organization in its "In the news" section of the platform. We expect that feelings of pride will be influenced by online crowdsourcing platforms communicating such organization-level status information, as it provides a member with social identity cues about the status of the organization as a whole. We therefore hypothesize that:

Hypothesis 5a.

The amount of media attention for an online crowdsourcing platform has a positive relationship with pride.

Social identity cues affecting perceived respect are related to the status of the member within the group (Branscombe et al., 2002; Simon & Stürmer, 2003; Tyler, 1999; Williams & DeSteno, 2008). Online crowdsourcing platforms also make use of different

types of individual reputation and feedback mechanisms, such as rankings, overviews of activity status, and public and private feedback on members' contributions. For example, 99designs, an online crowdsourcing platform that hosts design tasks, provides members with feedback on their submitted contributions and keeps track of individuals' activity and performance. These mechanisms thus provide information concerning individuals' status within the virtual organizations (e.g. Dellarocas, 2010). Perceived respect is expected to be influenced by such individual-level status information, because the provision of feedback provides a member with a sense of being fairly treated. Fair treatment leads members to feel respected within the group (e.g. Blader and Tyler, 2009; Tyler and Blader, 2003). We therefore hypothesize that on online crowdsourcing platforms:

Hypothesis 5b.

The amount of task feedback that an individual receives has a positive relationship with perceived respect.

DATA AND METHODS

Research Context

We collected data at an online crowdsourcing platform that lets its members work on idea generation tasks that are posted on its platform by other organizations, in this way acting as an intermediary between “seeker” organizations and its member community of “solvers” (Howe, 2008; Jeppesen & Lakhani, 2010; Verona et al., 2006). We selected this particular online crowdsourcing platform for two reasons: first of all, this online crowdsourcing platform was an exemplar case of an independent platform that hosts tasks that were neither so insignificant that the contributions of individual participants would not ‘matter’ in the end (like in the case of the mundane ‘microtasks’ that are hosted on a platform like Amazon’s Mechanical Turk) nor so dependent on highly specialized knowledge that individuals are unlikely to be able to contribute meaningful solutions to multiple tasks (like in the case of the highly specialized scientific problem solving tasks on a platform like InnoCentive). Secondly, the platform had been among the first independent online crowdsourcing platforms that were created and by the time of the research had

developed their own standardized way of working with one particular type of tasks. This allowed us to consider members' behavior on relatively similar tasks over the course of a relatively long period of time.

The idea generation tasks that the online crowdsourcing platform hosted were framed as challenges to the members of the crowdsourcing platform to come up with conceptual solutions about new products and services and/or how to improve a seeker organization's current offerings (see also Bullinger et al., 2010; Ebner et al., 2009). Challenges consisted of a main question and some relevant background information. An example of a challenge was: "Come up with a conceptual solution to increase young professionals' attachment to a bank". After the submission deadline, submitted contributions are ranked and the best 20 ideas are rewarded with a monetary reward; from €100 for places 11-20 up to €1500 for the winner. At the time of data collection, the organization had been in existence for 2.5 years, had 1114 active members, and 66 challenges had been successfully completed. In total, the organization's members had contributed over 3700 solutions.

Data Collection Procedure

In July 2009, active members of the online crowdsourcing platform received a personalized e-mail with a link to an online questionnaire from the virtual organization in which they were asked for their participation and guaranteed the confidential treatment of their data. After one-and-a-half weeks, one reminder to participate in the research was sent and two weeks after this reminder, the questionnaire was closed for participation. Data on organizational communication practices over the period from January 2009 till June 2009 and demographic background of the participants were retrieved from the database of the organization. In order to be able to investigate members' actual behaviors, we collected the data on the level of member activity over the period of September 2009 till August 2010 and the duration of member activity over the period of September 2010 till August 2011.

Sample

We received 153 completed questionnaires from members of the online crowdsourcing platform who had previously participated in at least one challenge and had

received feedback on their performance. The average age of the participants was 24.0 years (SD = 3.0), 69% of the participants were male, and all participants were of the same nationality. On average the participants had been a member of the virtual organization for 12.6 (SD = 8.3) months. The demographics of the participants in the sample did not differ significantly from that of the overall population of active members of the online crowdsourcing platform.

Measures

All measures consisted of, or were adapted from, existing scales. When necessary, items were adjusted to be more appropriate to the context of the crowdsourcing platform in this research. We used 5-point Likert scales (1 = *totally disagree*; 5 = *totally agree*) to assess participants' responses to the items in the questionnaire.

Pride. The extent to which members felt proud of the online crowdsourcing platform was measured with four statements adapted from the autonomous pride scale (Tyler & Blader, 2002). An example statement was: "It feels good when people consider me to be a typical member of [the online crowdsourcing platform]".

Perceived respect. The extent to which members felt respected within the online crowdsourcing platform was measured with three statements adapted from the autonomous respect scale (Tyler & Blader, 2002). An example statement was: "I feel appreciated as a member of [the online crowdsourcing platform]".

Level of member activity. This variable was measured as the count of the number of challenges participated in by the member out of the 37 challenges that were open for participation in the *first year* (September 2009 till August 2010) following the questionnaire deadline. These data were retrieved from the database of the online crowdsourcing platform. Because this variable showed relatively high levels of both positive skew (SI = 3.20) and kurtosis (KI = 10.69), we performed a square root transformation by adding 1 to the count and taking the square root (Kline, 2011).

Duration of member activity. The extent to which members stayed active members of the online crowdsourcing platform over the long-term was measured by considering the last time a member logged in. Members need to log in to the website to post a concept, read the feedback on concepts they had posted, update their resumes,

change their profiles, and (in later challenges) comment and rate other members' submitted concepts. For this measure we considered a member's last login data and counted the number of months since August 2010 (Sept. 2010 = 1, Oct. 2010 = 2, etc.). To further distinguish the duration of member activity from the level of member activity, this measure reflects the last time a member logs in during the *second year* (September 2010 till August 2011) following the questionnaire deadline. If a member did not log in after August 2010 we coded this variable as 0. These data were retrieved from the database of the online crowdsourcing platform.

Positive word of mouth behavior. This variable was measured with 4 statements adapted from Brown, Barry, Dacin and Gunst's (2005) *word of mouth behaviors*-scale. An example statement was: "I speak positively of [the online crowdsourcing platform] to others".

Media attention. As a form of organization-level status information, we considered media attention (Kjærgaard, Morsing, & Ravasi, 2011). The online crowdsourcing platform carefully kept track of all (positive) media attention (television, radio, written press, and online blogs) generated about the platform itself and the challenges it organized. For each participant we counted the number of relevant media items in the 6-month period prior to the data collection period, in which 20 challenges had been open for contributions. An item was considered relevant when a) its topic was the online crowdsourcing platform and the member was registered at the time the item was in the media or b) its topic was a particular challenge in which the member had participated. This variable, however, was highly related to task participation in the previous period. We therefore adjusted the measure to not include the media items that were purely announcements of an upcoming challenge¹¹.

Task feedback. As a form of individual-level status information, we considered the personalized feedback participants receive on their contributions. The online crowdsourcing platform provided challenge participants with written feedback on their contribution. For the last 20 challenges prior to the questionnaire, we calculated the

¹¹ We also ran the hypothesized model without the adjustment for task participation in the previous period. None of the structural relationships in the model changed, but the fit of this model deteriorated significantly compared to our hypothesized model.

average amount of task feedback per submitted concept that was received by each participant by averaging the number of characters in the received feedback and subsequently taking the square root.

Organizational identification. We measured organizational identification in order to perform further robustness analyses of the results of our hypothesized model. While we argue that organizational identification does not play a role in crowdsourcing platforms, it has been shown to be an important element of the group engagement model in traditional organizational settings (Balder & Tyler, 2009; Tyler & Blader, 2000, 2001, 2003) and it might therefore be important to control for its effects. By comparing our hypothesized model to an alternative model that controls for organizational identification, we can empirically test whether pride and perceived respect indeed have effects on members' behavior towards the organization that go beyond the effects of organizational identification and allay potential fears that the results of our hypothesized model might be driven by an omitted variable (Kline, 2011). The extent to which the respondent identified with the crowdsourcing platform was measured with 5 statements adapted from the Mael and Ashforth scale (Mael & Ashforth, 1992). An example statement was: "When I talk about [the online crowdsourcing platform], I usually say 'we' rather than 'they'".

RESULTS

Preliminary Analyses

Descriptive statistics. We calculated average scores for each of the scales in order to inspect scale reliabilities and to conduct preliminary analyses of the correlations among the constructs (see Table 3.1 for the means, standard deviations, Cronbach α 's, and zero-order correlations of the variables in the model).

All Cronbach α 's (ranging from .75 to .85) were above the level of .70, suggesting sufficient scale reliabilities (Nunnally & Bernstein, 1994). Although some substantial correlations between the variables in the model were observed, we note that – given the size of the sample and the adequate scale reliabilities observed – intercorrelations in the range of -.09 to .50 (as observed here) have been found not to influence statistical results of structural equation modeling (Grewal, Cote, & Baumgartner, 2004). Interestingly, two

paired samples tests indicated that the means of the averaged constructs of pride ($M = 3.15$; $SD = 0.77$) and perceived respect ($M = 3.24$; $SD = 0.68$) are significantly higher than that of organizational identification ($M = 2.42$; $SD = 0.77$; $M_{\text{pride-OID}} = 0.73$; $t = 10.71$; $p < .001$; $M_{\text{respect-OID}} = 0.82$; $t = 12.46$; $p < .001$), which would be in line with our arguments that on online crowdsourcing platforms there is a lack of identity cues that drive organizational identification, but that identity cues driving feelings of pride and respect are present.

Measurement analyses. We conducted a confirmatory factor analysis in EQS 6.1 (Bentler and Wu, 2004) to check whether the items clustered as intended and to compare the hypothesized 7-factor measurement model to alternative measurement models to confirm that it accounts more satisfactorily for the data (see Table 3.2). The omnibus fit indexes that are presented are the chi-square test (χ^2), the Non-Normed Fit Index (NNFI), the Comparative Fit Index (CFI), the Root Mean Square Error of Approximation (RMSEA), and Akaike's Information Criterion (AIC). Generally, good model fit is indicated by a chi-square test that is not significant, the values of NNFI and CFI being above .95, and the value of the RMSEA lower than .08 (Kline, 2011).

The hypothesized 7-factor measurement model showed good fit with the data (see Table 3.2) and the factor loadings for each item on its corresponding construct were significant at the .01 level. The hypothesized 7-factor measurement model also showed a significantly better fit than an alternative 6-factor measurement model in which we let the items of pride and perceived respect load on a single factor ($\Delta\chi^2(6) = 75$, $p < .001$), corroborating the argument that these two concepts are related, but distinct forms of the evaluative component of social identity.

Structural Analyses

Structural equation analysis. To empirically test the hypotheses we performed a structural equation analysis. In the hypothesized model, we allowed pride and perceived respect to covary, as they are theoretically related concepts. We also allowed level of member activity and duration of member activity to covary. Each of the obtained fit indexes from the maximum likelihood solution of the hypothesized model indicated that overall the hypothesized model fits the empirical data well (Kline, 2011). The χ^2 of the

Table 3.1 Correlations between Averaged Constructs (N = 153)

Variable	M	SD	α	1.	2.	3.	4.	5.	6.	7.	8.
1. Task feedback	11.13	3.55	--	--							
2. Media attention	10.93	5.03	--	.13	--						
3. Pride	3.15	0.77	.79	.14	.23 ^{***}	--					
4. Perceived respect	3.24	0.68	.81	.22 ^{***}	.11	.48 ^{***}	--				
5. Positive word of mouth behavior	3.46	0.68	.75	.24 ^{***}	.06	.50 ^{***}	.48 ^{***}	--			
6. Level of member activity	1.53	0.90	--	-.06	.11	.28 ^{**}	.17 [*]	.13	--		
7. Duration of member activity	2.79	4.25	--	-.03	-.09	.24 ^{**}	.15	.14	.39 ^{***}	--	
8. Organizational identification	2.42	0.77	.85	.02	.09	.40 ^{***}	.38 ^{***}	.33 ^{***}	.09	.09	--

Note. ** $p < .01$. * $p < .05$.

Table 3.2 Confirmatory Factor Analysis Results of Study Variables ($N = 153$)

Model	df	χ^2	$\Delta\chi^2$	NNFI	CFI	RMSEA	AIC
7-factor measurement model	73	86 ^{ns}	--	.97	.98	.03	-60
6-factor measurement model ^a	79	161 ^{***}	75 ^{***}	.82	.87	.08	3
3-factor measurement model ^b	87	200 ^{***}	114 ^{***}	.78	.82	.09	26
1-factor measurement model	89	235 ^{***}	149 ^{***}	.72	.76	.10	57

Note. *** $p < .001$. ** $p < .01$. * $p < .05$.

^a in this model pride and perceived respect load on a single factor ; ^b in this model pride and perceived respect load on a single factor, media attention and task feedback load on a single factor, and level of member activity, duration of member activity, and positive word of mouth behavior load on a single factor.

Table 3.3 Structural Models ($N = 153$)

Model	df	χ^2	$\Delta\chi^2$	NNFI	CFI	RMSEA	AIC
Hypothesized Model	84	104	--	.96	.97	.04	-64
Reverse Causality Model	83	127 ^{**}	--	.90	.93	.06	-38
Additional Paths Model	76	89	15 ^a	.97	.98	.03	-63
OID Added Model	157	210 ^{**}	--	.93	.95	.05	-104

Note. *** $p < .001$. ** $p < .01$. * $p < .05$.

^a This $\Delta\chi^2$ -value represent the difference in χ^2 compared with the Hypothesized Model.

hypothesized model was not significant ($\chi^2(84) = 104$, ns), the NNFI (.96) and CFI (.97) were both above .95, and the RMSEA (.04) was below .08 (see Table 3.3). We therefore proceeded with examining the relationships among the variables in the hypothesized model in order to test the hypotheses¹².

Hypotheses testing. We hypothesized that pride would have a positive relationship with the level of member activity (Hypothesis 1a), the duration of member activity (Hypothesis 1b), and positive word of mouth behavior (Hypothesis 3). We found support in the SEM analysis for Hypotheses 1a ($\beta = .25$, $p = .04$ ⁴¹³), 1b ($\beta = .33$, $p = .01$), and 3 ($\beta = .41$, $p < .001$). Concerning perceived respect we hypothesized that it would have a positive relationship with the level of member activity (Hypothesis 2a), the duration of member activity (Hypothesis 2b), and positive word of mouth behavior (Hypothesis 4). Hypothesis 4 ($\beta = .36$, $p < .001$) was corroborated by the SEM analysis, but the relationships between perceived respect and the level of member activity ($\beta = .01$, $p = .95$) and between perceived respect and the duration of member activity ($\beta = -.02$, $p = ns$) were not found to be significant.

We further hypothesized that the amount of media attention would have a positive relationship with pride (Hypothesis 5a) and that the amount of task feedback would have a positive relationship with perceived respect (Hypothesis 5b). Both Hypothesis 5a ($\beta = .22$, $p = .00$) and Hypothesis 5b ($\beta = .18$, $p = .01$) were corroborated by the SEM analysis. The results of the SEM analysis for the hypothesized relationships are shown in Figure 3.1.

Mediation analyses. We also performed additional mediation analyses to find further support for our hypothesized relationships. For this analysis we used the Additional Paths Model (see Table 3.3), in which we added the relationships between media attention and perceived respect and between task feedback and pride to the hypothesized model as well as direct paths from media attention and task feedback to the three outcome variables.

¹² We also tested a *Reverse Causality Model* in which we reversed the direction of all the structural relationships in the hypothesized model. As can be seen in Table 3, the fit indexes of this alternative model indicated that a reverse causality model had a relatively worse fit with the empirical data than the hypothesized model, indicating more support for the hypothesized model than for the reverse causality model (Bentler & Wu, 2004; Kline, 2011).

¹³ p -values reflect two-sided tests of significance.

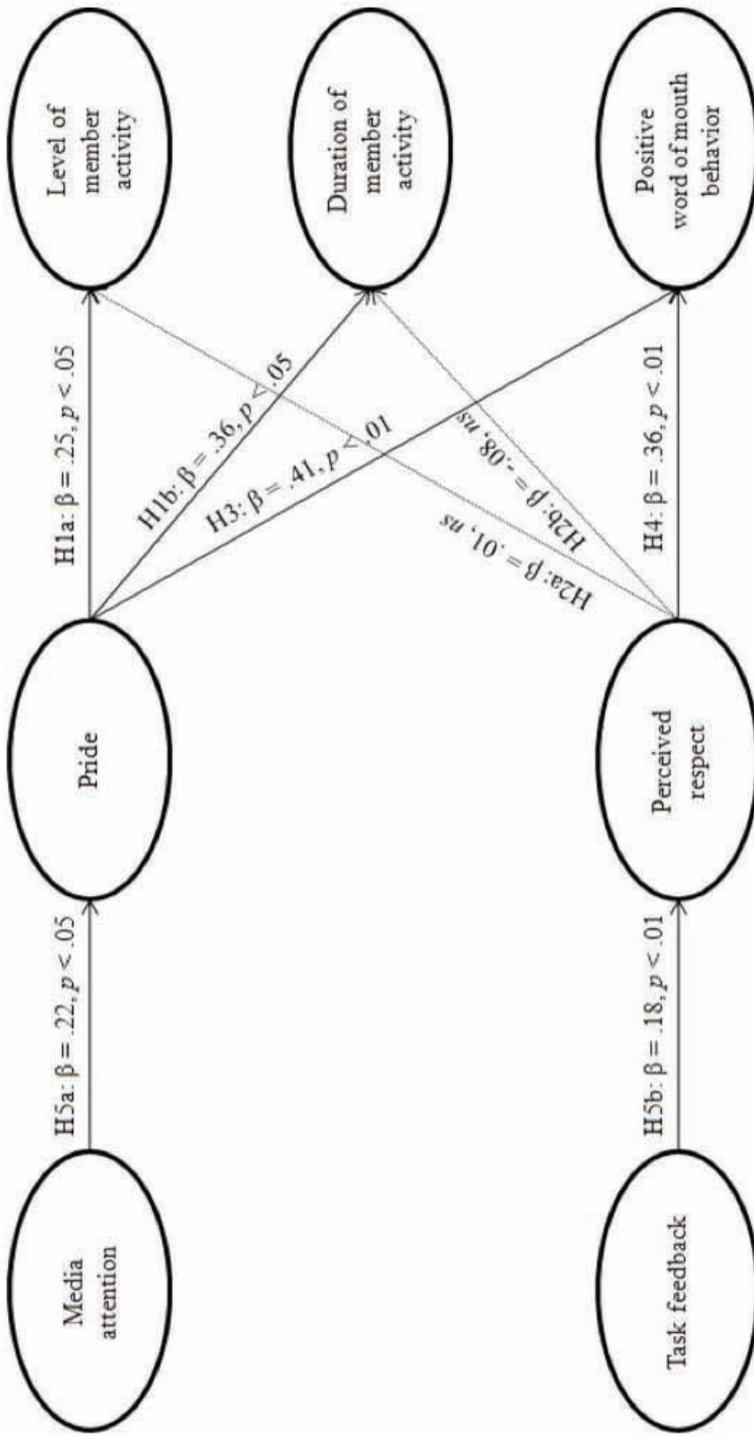
In order to test whether the organizational communication practices (media attention and task feedback) had an indirect effect (through their effects on pride and perceived respect respectively) on the outcome variables (level of member activity, duration of member activity, and positive word of mouth behavior), we performed Sobel-tests¹⁴ (MacKinnon et al., 2002; Sobel, 1982).

In line with our hypotheses, we found that media attention had a significant indirect effect on duration of activity (Sobel test statistic = 1.93, $p = .05$), and positive word of mouth behavior (Sobel test statistic = 2.81, $p = .00$) through pride. The indirect effect of media attention through pride on level of activity was marginally significant (Sobel test statistic = 1.90, $p = .06$). Because perceived respect was not significantly related to level of member activity and duration of member activity, we only tested the indirect effect of task feedback on positive word of mouth behavior through perceived respect, which was found to be significant (Sobel test statistic = 2.56, $p = .01$). Together, these four Sobel-tests provided additional support for the logic behind our hypothesized relationships in that media attention had significant positive indirect effects on all three outcome variables, which were fully mediated by pride and that perceived respect fully mediated the positive effect of task feedback on positive word of mouth behavior.

Robustness analyses. We performed robustness analyses by comparing the results of our hypothesized model to the results of two alternative models in order to provide further support that the results of our hypothesized model are not caused by the exclusion of relevant structural paths or omitted variables bias (Kline, 2011). In the first alternative model we included the non-hypothesized structural relationships between pride and task feedback and perceived respect and media attention to allow for an examination of the differential antecedents of pride and perceived respect. We also included direct paths from media attention and task feedback to level of member activity, duration of member activity, and positive word of mouth behavior (*Additional Paths Model* in Table 3.3). None of the added eight paths was found to be significant and a chi-square difference test indicated that adding these eight paths did not significantly improve the more parsimonious hypothesized model ($\Delta\chi^2(8) = 15$, ns).

¹⁴ We used an online tool to calculate the Sobel test statistics, which is available at: <http://quantpsy.org/sobel/sobel.htm>

Figure 3.1 Results of the hypotheses in our hypothesized model



In the second alternative model we added the control variable *organizational identification* to our more parsimonious hypothesized model. Although we do not expect organizational identification to be an important driver of ongoing activity in a crowdsourcing platform, this concept has been shown to be an important driver of organization-oriented behaviors in traditional organizations (Blader & Tyler, 2009; Tyler & Blader, 2000, 2001, 2003). Including organizational identification in this alternative model allowed us to test the effects of pride and perceived respect above and beyond any effects organizational identification might have on online crowdsourcing platforms. It also allowed us to substantiate our claim that the results of our hypothesized model are not simply caused by omitting a variable that has been shown to be important in traditional organizational settings. In this model, we therefore included direct paths from media attention and task feedback to organizational identification and from organizational identification to level of member activity, duration of member activity, and positive word of mouth behavior (*OID Added Model* in Table 3.3). We also allowed organizational identification to covary with pride and perceived respect. As can be seen in Table 3.3, although the NNFI, CFI, and RMSEA fit indexes were satisfactory, the chi-square test for this model was significant, indicating that the model does not fit the empirical data well. Closer inspection of this model showed that none of the added structural relationships with organizational identification were significant and that the results of the hypothesized relationships did not differ from those obtained from the hypothesized model.

Taken together, the results of the robustness analyses indicated that a) alternative models do not fit the empirical data significantly better than our parsimonious hypothesized model, b) adding direct paths from the antecedent variables to the outcome variables did not significantly improve our model nor did any of the added paths reach significance, adding support to the full mediating roles of pride and perceived respect, and c) feelings of pride and respect drive ongoing activity and positive word of mouth behavior on the online crowdsourcing platform in our study, not organizational identification.

DISCUSSION

The aim of this paper is to further our understanding of the factors that drive ongoing member activity on online crowdsourcing platforms. Taking a psychological approach (Blader & Tyler, 2009; Tyler & Blader, 2000, 2001, 2003), this paper has investigated the roles of pride and perceived respect as drivers of ongoing member activity on an online crowdsourcing platform. We found that pride is an important predictor of both the level and the duration of member activity and that both pride and perceived respect predict positive word of mouth behaviors. Moreover, feelings of pride and respect are directly influenced by an online crowdsourcing platform's use of organizational communication practices; feelings of pride are affected by media attention about the organization and its activities, while perceived respect is influenced by the amount of task feedback members receive on their individual contributions. These findings have several important implications.

Theoretical Implications

First of all, we extend previous findings in traditional organizations (e.g. Huo et al., 2010; Williams & DeSteno, 2008) to crowdsourcing platforms by generally finding support for the hypothesized relationships between feelings of pride and respect and the degree to which members engage with the organization. Importantly, whereas traditionally research on the role of social identity in organizational settings has focused almost exclusively on organizational identification, we show that on online crowdsourcing platforms feelings of pride and respect are the main drivers for members to engage in organization-oriented behaviors. Our findings raise the question which characteristics of organizations in general determine the relative importance of organizational identification on the one hand and feelings of pride and respect on the other hand. Considering the changing nature of the organization of work, in which work is moving away from the traditional employment relationship to more flexible, and more virtual, arrangements (Ashford et al., 2007; Zammuto et al., 2007), this paper provides a further indication that the field may want to reassess its general belief that social identity in organizations is all about organizational identification.

Secondly, we find support for our hypotheses concerning the differential antecedents of pride and perceived respect. As expected, pride was uniquely related to organization-level status information, whereas perceived respect was uniquely related to individual-level status information. While manipulation procedures used in experimental studies strongly resemble our measures of organizational communication practices (e.g. Branscombe et al., 2002; Haslam et al., 2000; Simon & Stürmer, 2003; Williams & DeSteno, 2008), this is (to our knowledge) the first field study that measures the actual effects of the communication of status information by an organization on its members' feelings of pride and respect. In so doing this study further emphasizes the importance of actively managing the communication of social identity information in organizations in general and on online crowdsourcing platforms in particular (see also Tanis & Beukeboom, 2011).

Thirdly, our study develops and tests a theoretical model of ongoing member activity on online crowdsourcing platforms. To our knowledge this is the first paper that provides a detailed analysis of the motivational factors of member behavior at the social group level rather than at the individual task level to explain what drives members to engage with an online crowdsourcing platform. So far, research has not really considered the social processes that underlie the membership of an online crowdsourcing platform. This paper provides insights into the social processes that drive ongoing member activity on online crowdsourcing platforms and how these social processes are themselves affected by organizational practices, specifically organizational *communication* practices. In sum, we provide an exciting new perspective to the field of online crowdsourcing platforms that explains member behavior and effects of communication practices.

Strengths and Limitations

The current study has several strengths. First of all, while many field studies investigating social identity processes suffer from the drawbacks of using cross-sectional, single-source, and self-reported measures, our study uses data gathered at different time periods from multiple sources and combines self-reported measures with objective measures. Specifically, data on the antecedent variables over the first six-month period were collected from the database system of the virtual organization. The questionnaire

subsequently measured several variables including organizational identification, pride, and perceived respect. Level and duration of member activity in the two-year period after the questionnaire was closed for participation was again collected from the database system. Using multisource data allays fears of common method bias, while the longitudinal nature of the current study strengthens the validity of our conclusions concerning the causal chain of events. However, because of the correlational nature of our field study, the model cannot provide a true test of causality. Future research could test our hypothesized model with an experimental study design to provide for a true test of causality.

Secondly, an important benefit of studying member activity in a single organization is the fact that one does not have to control for an organization's idiosyncratic characteristics. A drawback of considering only one organization is that results are harder to generalize. In this study we have carefully selected an online crowdsourcing platform that can be considered an exemplar case for many online crowdsourcing platforms that let their members work on a range of projects for third parties. Online crowdsourcing platforms, however, come in many different guises, organizing different types of work in different ways. We would therefore welcome future research that investigates the role of social identity processes on online crowdsourcing platforms that organize different types of tasks, other types of virtual organizations, and other forms of organizations to see how characteristics of an organization influence the different social identity processes.

Finally, we did not only test our theory with models that include feelings of pride and respect, but also models that additionally include organizational identification. By doing so, we were able to investigate the relative predictive power of these concepts. Most research on organizational identification does not include measures of pride and perceived respect (e.g. Van Dick, Grojean, Christ, & Wieseke, 2006; Wiesenfeld, Raghuram, & Garud, 1999, 2001), and, similarly, most research on pride and perceived respect does not measure organizational identification (see for instance Boezeman & Ellemers, 2007, 2008a, 2008b). By measuring organizational identification, pride, and perceived respect we are able to complement these studies considerably by showing the unique predictive strength of each of these social identity processes.

Managerial Implications

First of all, we show how organizational communication practices can have an influence on member activity in the organization through their effects on pride and perceived respect. Both communicating media attention and providing task feedback are practices that organizations can actively manage and this study thus provides practitioners with clear advice on how to stimulate member activity on an online crowdsourcing platform. Several online crowdsourcing platforms have already been active in communicating status information and based on the results of the current study we strongly advocate the communication of such status information as well. In general, organizations, not only online crowdsourcing platforms, should consider how both the form and the content of their communications might impact on their members' behavior in their organizations.

Secondly, in this research we found that members of the online crowdsourcing platform have relatively low levels of organizational identification and that organizational identification did not affect member activity when simultaneously considering feelings of pride and respect. This, however, does not mean that members cannot identify with an online crowdsourcing platform per se. In fact, previous research has shown that in online settings identification processes might actually play an important role (e.g. Postmes et al., 1998). However, in order to have their members identify more strongly virtual organizations need to think about and actively communicate their organizational identities (Pratt, 1998; Tanis & Beukeboom, 2011).

THE KNOWLEDGE-PERFORMANCE PARADOX IN CROWDSOURCING

Proponents of open innovation have argued that in today's rapidly changing business environment, organizations can no longer depend solely on the ideas generated inside the organizations as inputs for their innovation processes. By using an open call for contributions, crowdsourcing enables organizations to extend the search for ideas that will be the basis for future innovations far beyond the organizational boundaries, allowing organizations to tap into a wide range of knowledge bases and skill sets. But what knowledge bases and skill sets should organizations be looking for? On the one hand, the literature on creative problem solving has highlighted the positive effect of possessing knowledge that is related to the problem on individual's task performance. On the other hand, the literature on crowdsourcing has stressed the importance of possessing knowledge that is unrelated to the problem at hand for the best performance on creative problem solving tasks. In this paper, we offer a solution for this paradoxical relationship between individuals' knowledge bases and their performance on creative problem-solving tasks. We analyze more than 6000 contributions to 120 crowdsourced creative problem-solving challenges and show the importance of considering the joint effects of an individual's unrelated and related knowledge bases on creative problem-solving performance. We discuss the implications of our findings for theory and practice.

INTRODUCTION

In order to compete in today's fast-moving business environment, organizations need to continuously innovate to improve their current offerings and come up with new products and services that better meet their customers' changing demands (e.g. Hall, 2000). Organizations that do not want to be exclusively dependent on the ideas that come from within the organization have opened up their innovation processes and started to

collaborate with stakeholders in their networks, such as their suppliers, customers, and partner universities (e.g. Chesbrough, 2003; Laursen & Salter, 2006). Increasingly, organizations have also been exploring new sources of knowledge and engaging in searches for novel ideas and solutions outside of their existing networks by opening up their innovation processes to include inputs from anyone with a potentially valuable idea through “crowdsourcing” (Afuah & Tucci, 2012; Howe, 2008; Poetz & Schreier, 2012).

Crowdsourcing, which has been defined as “the act of outsourcing a task to a ‘crowd,’ rather than to a designated agent (an organization, informal or formal team, or individual) ... in the form of an open call” (Afuah & Tucci, 2012: 355), allows organizations to tap into the knowledge of individuals outside of their organizational networks and include their ideas and solutions in the organizational innovation processes. Individuals outside of the organizational network are likely to possess knowledge bases and skill sets different from the ones the organization currently has access to through its employees and its current network of partner organizations. Therefore, sourcing innovation-related tasks to the crowd is expected to provide organizations with an inflow of novel ideas and solutions, which has been argued to be vital for organizations’ long-term success (e.g. Cohen & Levinthal, 1990; Levinthal & March, 1993; March, 1991; Raisch, Birkinshaw, Probst, & Tushman, 2009). The success of crowdsourcing for innovation therefore seems to lie primarily in its ability to engage individuals with knowledge that is different and distal from that of the seeker organization (i.e. unrelated knowledge) (Afuah & Tucci, 2012; Jeppesen & Lakhani, 2010). For instance, when NASA needed a better way to forecast solar flares to protect its astronauts and satellites in space, they found a great solution that was developed by a semiretired radio-frequency engineer; someone who possessed a knowledge background that was unrelated to the problem NASA was facing (Spradlin, 2012).

This is remarkable considering that the literatures concerning creative problem solving and innovation suggest that it is rather knowledge related to the task at hand and the organization (i.e. related knowledge) that is needed to successfully solve creativity problems. For instance, research on creativity suggests that the extent to which individuals possess domain-relevant knowledge (related to the task/organization) is one of the three main characteristics that determine creative performance of individuals (the others being

task motivation and creativity-relevant skills; see Amabile, 1996; Sternberg, 1998; Woodman, Sawyer, & Griffin, 1993). Moreover, research on organizational learning, and specifically absorptive capacity, suggests that the knowledge bases of external sources need to (partly) overlap with those of the organization (i.e. external sources need to possess related knowledge) in order for an organization to be able to absorb new information from external sources and successfully integrate it into their knowledge base (Cohen & Levinthal, 1989, 1990; Lane, Koka, & Pathak, 2006; West & Bogers, 2013; Zahra & George, 2002).

Unfortunately, this leads us to a paradox concerning the relationship between individuals' knowledge bases and their performance in creative problem-solving tasks. On the one hand, possessing *unrelated* knowledge (i.e. knowledge that is not related to the topic of the creative problem-solving task) provides a basis for new and creative solutions for current problems (e.g. Jeppesen & Lakhani, 2010; Poetz & Schreier, 2012), but on the other hand possessing *related* knowledge (i.e. knowledge that is related to the topic of the creative problem-solving task) seems to be an important determinant of an individual's ability to correctly apply knowledge to a task in a creative way (see for example Amabile, 1996; Sternberg, 1998; Woodman et al., 1993).

The goal of this paper is to solve this paradox and contribute to both the literature on the upcoming phenomenon of crowdsourcing as well as the broader literatures on creativity and innovation by showing how these two literatures do not come to opposing, but complementary insights on the knowledge-performance relationship. We will argue that an individual's related and unrelated knowledge bases should be considered as two separate and independent types of knowledge that can coexist in a single individual. An individual's performance on creative problem-solving tasks is then determined by the interacting effect of possessing unrelated *and* related knowledge at the same time. We test this idea on a dataset of 6087 contributions by 2325 individuals to 120 idea generation challenges hosted on an online crowdsourcing platform. We find strong support for our hypotheses that performance on a crowdsourced creative problem-solving task is driven by the interplay of individuals' related and unrelated knowledge.

THEORETICAL BACKGROUND AND HYPOTHESES

Gathering Novel Ideas by Sourcing Creative Problem-Solving Tasks to the Crowd

An organization is crowdsourcing when it “outsources [a particular task] to a potentially large and unknown population, referred to as the ‘crowd’, in the form of an open call” (Poetz & Schreier, 2012: 246). The use of an undirected open call allows organizations to tap into the knowledge of a large, diverse crowd of individuals who collectively represent a wide range of knowledge bases (Afuah & Tucci, 2012; Howe, 2008; Jeppesen & Lakhani, 2010). By using specialized online crowdsourcing platforms (of which several have more than 200,000 registered members), organizations are now able to greatly expand their reach and bring to bear a large diversity of perspectives on innovation-related tasks, including the generation of ideas for new products and the solving of specific problems (e.g. Adamczyk et al., 2012; Bonabeau, 2009; Doan et al., 2011; Nambisan, 2002; Piller & Walcher, 2006; Sawhney et al., 2003; Terwiesch & Ulrich, 2009). Recently we have seen many examples in which crowdsourcing was used for creative problem solving to help the innovation efforts of companies (Bayus, 2013; Jeppesen & Lakhani, 2010; Poetz & Schreier, 2012) and it is exactly this sourcing of creative problem-solving tasks to the crowd that we are focusing on in this study.

Research on the use of external sources for innovation has mostly focused on the opportunities it offers organizations for gathering novel ideas and solutions (for a review see West & Bogers, 2013). Because sources external to the organization are likely to possess different knowledge bases and skill sets compared to the organization’s employees, tapping into external sources allows organizations to explore novel ideas that may fuel the development of new products and services or help solve problems that the organization is currently faced with (e.g. Chesbrough, 2003; Laursen & Salter, 2006; West & Bogers, 2013). However, organizations are limited in their ability to search for ideas too far outside of their organizational boundaries and, for this reason, tend to focus their efforts on collaborating with partners in their organizational networks, such as their suppliers, customers, and partner universities (Gavetti & Levinthal, 2000; Maggitti, Smith, & Katila, 2013). Crowdsourcing, however, allows organizations to perform so-called “distant searches” for knowledge, mainly by moving a large part of the search effort to the

individuals in the crowd (Afuah & Tucci, 2012). Instead of having to identify a priori what kind of knowledge is going to lead to the development of a new product or solve a particular problem and focusing solely on the individuals that possess such knowledge, organizations can now post a description of the problem and the type of contributions they are looking for on a crowdsourcing platform and let individuals in the crowd assess for themselves whether their knowledge bases allow them to contribute a valuable idea or solution (Afuah & Tucci, 2012; Piller & Walcher, 2006; Poetz & Schreier, 2012).

Unfortunately, little is known about the characteristics of individual and task that influence an individual's ability to contribute valuable ideas to a particular crowdsourced task. The only published empirical study to date that considers these issues is the study by Jeppesen and Lakhani (2010), in which they investigate crowdsourced scientific problem-solving challenges. They find that solvers are more likely to participate in challenges that deal with a topic that solvers have a scientific interest in. Their study also shows that solvers who perceive themselves to be technically 'marginal', which they define as "being distant in terms of technical expertise from the field of the problem, i.e. in a different technical field", have a higher chance of coming up with a winning solution (Jeppesen & Lakhani, 2010: 1017). These findings are in line with the general argument that using crowdsourcing for distant search allows organizations to tap into knowledge bases that are not directly related to the problem, which increases the chances of gaining valuable, novel insights from 'marginal' individuals (Afuah & Tucci, 2012).

However, the idea that the possession of knowledge unrelated to the task at hand (unrelated knowledge) is important in creative problem solving seems at odds with several literatures such as the creativity literature and literature on organization learning (specifically that on absorptive capacity). Rather, these literatures emphasize the importance of the possession of knowledge that is *related* to the task at hand (related knowledge). In the following we review the literature on creativity and organizational learning to conclude that related knowledge must be an important factor in successful creative problem solving. Thereafter we come back to the role of unrelated knowledge and argue that this may also be a key success factor in creative problem solving, but only if the problem solver also possesses knowledge that is related to that of the seeker organization.

The Effect of Related Knowledge on Individual Performance on Crowdsourced Tasks

When individuals are trying to generate ideas, they are essentially trying to “identify (or create) and solve a relevant ... problem by inventing a creative solution” (Poetz & Schreier, 2012: 245). A general description of this problem-solving process consists of a number of stages through which the problem solver must, not necessarily sequentially, proceed. The initial stages or planning stages, deal with the recognizing, defining, and representing of the problem, whereas later stages involve the development of a solution strategy, organizing a problem solver’s knowledge about the problem, the allocation of mental and physical resources for solving the problem, monitoring the progress toward the goal, and finally the evaluation of any solution for accuracy (Newell & Simon, 1972; Pretz, Naples, & Sternberg, 2003). Put differently, the initial stages are where a problem solver creates a certain ‘perspective’ (his/her internal representation of the problem) and the later stages are where a problem solver applies certain ‘heuristics’ to the problem in order to come to a solution (Hong & Page, 2001).

In creative problem-solving tasks, domain-related knowledge arguably plays its most important role in the initial stages of the problem-solving process and is generally considered a prerequisite for good performance on a creative task (Amabile, 1983, 1996). For most problems it often is necessary, or at least desirable, to “try out several representations of the problem in order to hit upon one that leads to an acceptable solution” (Pretz et al., 2003: 9). Problem solvers will approach a problem with their own unique knowledge base, allowing them to define and represent the problem in terms of what they already know. Specifically, having a related knowledge base helps a problem solver understand a problem and assess the appropriateness of different problem representations (Wiley, 1998). Without first having an appropriate understanding of the problem, it seems unlikely for problem solvers to subsequently develop good solution strategies that will provide valuable solutions. Possessing a related knowledge base is thus expected to improve a problem solver’s ability to come up with solutions that solve the underlying problem. Indeed, when comparing experts to novices, we see that they typically differ in how they define and represent problems (e.g. Chi, Feltovitch, & Glaser, 1981; Lesgold, 1988). Researchers investigating performance on crowdsourcing challenges have

also argued that “the more competence and experience inventors possess, the higher the expected quality of their solutions will be” (Poetz & Schreier, 2012: 247). We therefore hypothesize that:

Hypothesis 1.

Individuals possessing knowledge that is related to the domain of the creative problem-solving task perform better than individuals who do not possess domain-related knowledge.

The Effect of Unrelated Knowledge on Individual Performance on Crowdsourced Tasks

After having defined and represented the problem mentally, solvers need to develop a solution strategy, organize their knowledge about the problem, allocate mental and physical resources for solving the problem, monitor the progress toward the goal, and finally evaluate solutions for accuracy (Pretz et al., 2003). Problem solvers possessing knowledge that is *unrelated* to the problem domain have been found to be able to think of more novel solutions (Frensch & Sternberg, 1989; Hecht & Proffitt, 1995; Wiley, 1998). Being able to come up with novel solutions is arguably essential for performing well on creative problem-solving tasks on online crowdsourcing platforms. Organizations will only source those tasks to the crowd for which the existing, and quite likely known, solutions are not satisfactory solutions for the organization (Afuah & Tucci, 2012).

However, in most case, solutions based on knowledge from another domain cannot be applied to a different problem domain without adjusting it to specific characteristics of the problem at hand. Without possessing related knowledge, problem solvers are expected to have more difficulties to understand the specific problem, will thus be less likely to correctly adjust their solutions to a different problem domain, and therefore will be more likely to come up with solutions that are not useful (Amabile, 1996; Weisberg, 1998).

Problem solvers, on the other hand, who possess unrelated knowledge in addition to their related knowledge base, are able to combine knowledge from multiple domains and act as “boundary spanners” (Caldwell & O’Reilly, 1982; Tushman & Scanlan, 1981a,

1981b). Boundary spanners are able to take knowledge from one problem domain and apply it to a problem in another domain and several studies have found support for the positive effects of boundary spanning on creative performance (e.g. Rosenkopf & Nerkar, 2001; Teigland & Wasko, 2003). Possessing unrelated knowledge might thus not only provide problem solvers with an additional source of knowledge that they can tap into to develop a solution strategy, but also allows them to come up with more novel solutions. Of course, these effects amount to nothing if individuals do not possess the related knowledge to first truly understand a problem. We therefore hypothesize that:

Hypothesis 2. Possessing knowledge that is unrelated to the domain of the creative problem-solving task has a positive effect on performance, but only when problem solvers also possess knowledge that is related to the domain of the creative problem-solving task.

DATA AND METHODS

In order to investigate the relationship between participants' knowledge bases and their individual performances on creative problem-solving tasks, we needed data on the performance of people with different knowledge backgrounds on a number of different creative problem-solving tasks. An online crowdsourcing platform that specialized in idea generation tasks offered the perfect research context for investigating our ideas.

Research Context

Data were collected from an online crowdsourcing platform that allows its members to work on creative problem-solving tasks that are posted on its platform by organizations that would like to receive inputs for their innovation process. In this way the online crowdsourcing platform acts as an intermediary between “seeker” organizations and its member community of “solvers” (Howe, 2008; Jeppesen & Lakhani, 2010; Verona et al., 2006). These creative problem-solving tasks are framed as challenges to the members of the online crowdsourcing platform to come up with conceptual solutions for new products and services and/or how to improve a seeker organization’s current offerings (see

also Bullinger et al., 2010; Ebner et al., 2009). In the sense that members work on tasks individually and submit solutions that compete for rewards, this is a form of “tournament-based crowdsourcing” (Afuah & Tucci, 2012: 355). Individuals who would like to participate on these tasks need to register as members. Registration is free and after being signed up as a member, members are free to decide whether or not they want to participate on a particular challenge. As a member you can participate on all challenges that are posted on the crowdsourcing platform. The only restriction to participation is that a member can only submit one contribution per challenge.

Challenges are presented in challenge briefings, which consist of an introduction of the organization and the issue at hand, the main question members need to address, and some relevant background information about the challenge, such as the total prize pool, the proposed distribution of monetary rewards among the best contributions, submission deadline, et cetera. After the submission deadline, submitted contributions are ranked by the seeker organization and the best ideas are rewarded with a monetary reward ranging from € 50 to € 3000. At the time of data collection, the organization had been in existence for 4.5 years, had over 8000 registered members, and 135 challenges had been successfully completed. In total, the online crowdsourcing platform’s members had contributed over 7500 solutions.

Data Collection Procedure

Data were collected from three sources; First of all, we collected data on the participation and performance of members on all the 135 challenges that had been completed from the website of the online crowdsourcing platform. For each challenge, we were able to retrieve information on the ranking of all the individual submissions as well as the names of the members who submitted the conceptual solutions. Secondly, the online crowdsourcing platform provided us with access to their database, which contained detailed information about the demographic background of its members as well as data on when members signed up and the last date they logged in. Finally, we analyzed all the detailed challenge briefings, which were retrieved from the website of the online crowdsourcing platform, in order to categorize the challenges based on their topics and

collect information on submission deadlines, total prize pools, and the distribution of monetary rewards.

Sample

Out of the 135 challenges that had been successfully organized by the online crowdsourcing platform at the time of data collection, we had to exclude six challenges that offered no monetary rewards¹⁵. We also had to exclude the challenges in the start-up phase of the online crowdsourcing platform, because the composition of the member base during the first nine challenges was still highly skewed towards the local educational institutions that acted as launching partners for the organization. This left us with the data of 120 challenges. In total, 6842 ideas were contributed to these challenges. Because the focus of this paper is on the relationship between individuals' knowledge backgrounds and their individual performance, we excluded 622 ideas (9.1%) that were contributed by teams of two or more individuals. We also had to exclude 133 cases due to partially missing data. The remaining 6087 ideas have been contributed by 2325 members.

Sample representativeness. The online crowdsourcing platform specifically targeted Dutch students and young professionals up to 32 years old, all communication on the platform was in Dutch and all members shared the same (Dutch) nationality. In order to assess whether the participants in our sample were representative of the members of the crowdsourcing platform in general, we compared several key demographics and the knowledge backgrounds of the participants in our sample (N = 2325) with those of the registered members that were not part of our sample (N = 4899)¹⁶.

¹⁵ In three of these six cases the type of challenge was very different from the 'standard' challenge the crowdsourcing platform hosted; one was a naming challenge, which resulted in twice the number of contributions compared to the highest 'standard' challenge, the other two were recruitment challenges with an internship for the best contributor, both of which resulted in less than ten contributions). The other excluded challenges offered no monetary reward and received fewer than 20 contributions. Because all 'standard' challenges rewarded 20 contributions (and all of them received at least 20 contributions), we did not include these non-standard challenges in the analyses.

¹⁶ We only included members that were not part of our sample for which we had data on all the demographic variables.

Table 4.1: *Sample representativeness* ($N_{sample} = 2325$; $N_{non-sample} = 4899$)

Variables	Sample		Non-sample		Independent Samples Test	
	Mean	SD	Mean	SD	t	p
Member sex	0.31	0.46	0.30	0.46	0.81	.42
Member age (in years)	25.41	3.12	25.53	3.19	-1.52	.13
Member tenure (in months)	29.49	12.97	29.53	14.76	-0.12	.91
Educational level	0.56	0.50	0.52	0.50	2.91**	.00
Time since graduation (in years)	1.49	1.88	1.56	1.94	-1.44	.15

Note. * $p < .05$; ** $p < .01$; *** $p < .001$

As can be seen in Table 4.1, the members in our sample do not differ significantly on the key demographics sex, age, and tenure from members who have never contributed an idea to a challenge. Members in our sample did differ significantly on their educational level, but we have no reason to believe that this would bias our findings in a particular way.

Measures

Participant performance. The organization that has posted the idea challenge on the crowdsourcing platform is also responsible for ranking the contributions it receives according to a standard distribution scheme. The top 20 contributions of each challenge are then assigned a monetary reward¹⁷. While organizations are free to decide who to include as judges of their idea challenge, these judging panels generally include several organizational experts on the different aspects of the idea challenge. In this study, we therefore considered the final ranking of ideas provided by the judging panel of organizations to represent an expert opinion on the performance of the idea. We used the monetary reward amount that is linked to a particular rank as our performance measure. In 106 out of the 120 challenges under investigation, the total reward pool was € 5000. We therefore adjusted the performance measure of the 14 other challenges in such a way as to also resemble a total prize pool of € 5000 and included a control variable for the actual size of the total prize pool in all subsequent analyses. In order to deal with the non-normal

¹⁷ The member contributing the winning idea of a challenge receives 30% of the total prize pool made available by the “seeker” organization, while the second and third place contributions get rewarded with 15% and 7% respectively. The ideas ranked 4 to 10 each get rewarded with 4% of the total prize pool and the ideas ranked 11 to 20 each receive 2%.

distribution of the dependent variable we transformed the variable by taking its natural logarithm¹⁸.

Challenge type. An analysis of the full challenge briefings revealed that organizations essentially posted three types of challenges on the online crowdsourcing platform. Challenges either had a business orientation (dealing for example with the marketing of a product or service), a technical orientation (asking for technical solutions/designs to problems), or a more general orientation (often a question specifically focused on the member base of the specific online crowdsourcing platform under investigation: students and young professionals). Each challenge was coded as having either a ‘business’ orientation, a ‘technical’ orientation, or a more ‘general’ orientation by the paper’s first author and a research assistant, who was kept unaware of the goal of the paper. Interrater agreement was measured using Randolph’s free-marginal multirater kappa (Cohen, 1960; Warrens, 2010) and with a value of .71 found to be adequate (Gwet, 2012). The cases that lacked initial agreement were coded based on agreement reached after further discussion.

Knowledge background. To code the knowledge background of challenge participants, we considered their formal educational background as was provided by participants when they signed up as a member of the online crowdsourcing platform. Because the online crowdsourcing platform specifically targeted students and young professionals of up to 32 years old, we consider participants’ formal educations to reflect their knowledge backgrounds. Based on the information on educational backgrounds obtained from the online crowdsourcing platform’s database, a full list of studies was generated. In consultation with two educational experts at the first author’s university, each entry on this list was coded as having a ‘business’ orientation or a ‘technical’ orientation. If the studies neither had a business or technical orientation, the educational background was coded as ‘other’ (such as for example law or medicine). In some cases, studies were considered to have multiple orientations, such as in the case of the studies “Business and Law”, which was coded as having both a ‘business’ orientation and an ‘other’ orientation. A member’s knowledge background was thus coded based on the

¹⁸ Because there is no natural logarithm of the number zero, we calculated the natural logarithm of the number 1 in the cases in which the monetary reward was zero. The natural logarithm of the number 1 is equal to 0.

orientation(s) of their studies, and in the cases in which a member combined two studies, on the combination of the orientation(s) of these studies.

Related knowledge background. In the cases where participants with a business-oriented educational background participated in a challenge with a business orientation and in the cases where participants with a technical-oriented educational background participating in a challenge with a technical orientation, we coded that participants possessed a related knowledge background (related knowledge background = 1). In all other cases, we coded that participants did not possess a related knowledge background (related knowledge background = 0).

Unrelated knowledge background. In the cases where participants with a non-business orientation participated in a challenge with a business orientation and in the cases where participants with a non-technical knowledge background participated in a challenge with a technical-orientation, we coded that participants possessed an unrelated knowledge background (unrelated knowledge background = 1). In all other cases, we coded that participants did not possess an unrelated knowledge background (unrelated knowledge background = 0).

Importantly, a participant can be coded to possess both a related and an unrelated knowledge background with regard to a particular challenge; either by pursuing studies that have multiple knowledge orientations, such as “Business and Law” or by pursuing two (or more) studies with different knowledge orientations. To illustrate, consider a person who studies “Business and Law”. This person’s educational background would have been coded as having both a ‘business’ as well as an ‘other’ orientation. When this person would participate on a challenge with a business orientation, he/she would be coded as having a related background (because of the business orientation of his studies), but also as having an unrelated background (because of the law orientation of his studies). Because the category ‘other’ orientation is a rest category rather than a meaningful one, in our analyses, participants who participated in challenges with a general orientation are coded as having neither a related nor an unrelated background.

Control variables. To control for challenge-level and individual-level effects, we included several control variables. At the challenge level we controlled for the *total number of submitted solutions* to the challenge and the year in which the challenge took

place (by including year dummies). Although we adjusted our performance variable to reflect the same prize pools for all challenges, we also included the unadjusted *total prize pool*¹⁹ as a control variable. At the participant level we controlled for a participant's *age*, *sex* (male = 0; female = 1), and *educational level* (university of applied science = 0; university = 1). While students and graduates from both these types of university could be considered as highly educated compared to the general population, a degree from a 'university of applied science' reflects a significantly lower educational level than a degree from a 'university' in the Netherlands. We also controlled for the fact that some members pursued double degrees (*double degree*) and for the number of years since the participant had graduated prior to the challenge (*years since graduation*). Lastly, we controlled for the number of months a participant had been a member of the online crowdsourcing platform (*member tenure*), and the total amount of prize money that had been rewarded for previously submitted ideas (*member past performance*).

RESULTS

Descriptive Statistics

We conducted preliminary analyses of the correlations among the variables (see Table 4.2 for the means, standard deviations, and zero-order correlations of the variables in the model).

Analysis Hypothesis 1

In order to test our first hypothesis, we performed a univariate analysis of variance, in which we considered the effects of *knowledge background*, *challenge type*, and *their interaction on participant performance*, controlling for the previously identified control variables. We apply a univariate analysis of variance as our statistical model, since we are essentially interested in comparing the mean performances of different groups. The model was significant ($F(21, 6065) = 34.58, p < .001$) and accounted for 10.7% of the

¹⁹ In order to correct for high levels of skewness and kurtosis we performed a natural logarithm transformation of the variables *total prize pool* and *member past performance*. Because there is no natural logarithm of zero, we calculated the natural logarithm of 1, which is equal to 0, in these cases.

Table 4.2 Means, Standard Deviations, and Correlations of Variables (N = 6087)

Variable name	Mean	SD	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Performance	1.76	2.47											
2. Performance (raw)	83.83	216.58	.66***										
3. Year 2007	0.04	0.20	.04***	.02									
4. Year 2008	0.23	0.42	.04***	.02	-.11***								
5. Year 2009	0.32	0.47	-.05***	-.02	-.14***	-.38***							
6. Year 2010	0.29	0.45	-.01	-.02	-.13***	-.35***	-.45***						
7. Year 2011	0.11	0.31	.00	-.07***	-.19***	-.19***	-.25***	-.23***					
8. Number of Concepts	66.44	27.01	-.26***	-.15***	-.11***	-.01	.18***	-.09***	-.05***				
9. Total Prize Pool	8.50	0.13	-.06***	-.04**	-.15***	-.25***	.11***	.20***	.02	.07***			
10. Member Sex	0.31	0.46	-.02	-.01	-.04***	-.06***	.00	.06***	.02	.04**	.02		
11. Member Age	24.45	3.01	.11***	.10***	.00	-.03**	.01	.03**	-.02	-.04***	.01	.01	
12. Member Tenure	7.28	9.43	.05***	.03*	-.11***	-.16***	-.02	.18***	.06***	-.04**	.09***	-.01	
13. Member Past Performance	3.04	3.27	.18***	.13***	-.05***	-.04**	-.02	.08***	.01	-.16***	.02	-.01	.22***
14. Member Educational Level	0.62	0.48	.09***	.07***	.00	.04**	.00	-.02	-.01	-.08***	.02	-.01	.13***
15. Double Degree	0.02	0.13	.03*	.02	.00	.00	.01	.01	-.03*	.00	.02	.04**	-.02
16. Years Since Graduation	0.68	1.42	.08***	.08***	-.01	-.01	-.03*	.05***	.00	-.03**	-.01	.03**	.62***
17. Challenge Type Business	0.29	0.45	.06***	.04**	-.01	.20***	.01	-.14***	-.07***	-.20***	-.08***	.01	-.01
18. Challenge Type Technical	0.24	0.45	.01	.00	.12***	-.11***	-.02	.05***	.03*	-.03*	.10***	-.08***	.04**
19. Challenge Type General	0.47	0.50	-.06***	-.04**	-.09***	-.09***	.01	.08***	.04**	.21***	-.01	.07***	-.03*
20. Knowledge Background Business	0.33	0.47	.01	.01	.07***	.07***	.02	-.06***	-.05***	-.01	-.05***	-.12***	-.02
21. Knowledge Background Technical	0.46	0.46	.02	.01	.03*	-.05***	-.03**	.04**	.03**	-.04***	.02	-.19***	.06***
22. Knowledge Background Other	0.50	0.50	.01	.01	-.05***	-.08***	.00	.07***	.03*	.04**	.05***	.26***	.03*
23. Related Knowledge Background	0.23	0.42	.09***	.07***	.04**	.07***	-.02	-.06***	-.01	-.13***	.01	-.14***	.01
24. Unrelated Knowledge Background	0.36	0.48	.02	.00	.06***	.00	.00	-.02	-.02	-.12***	.02	.03*	.05**

Note. * $p < .05$; ** $p < .01$; *** $p < .001$

Table 4.2 (cont'd) Means, Standard Deviations, and Correlations of Variables ($N = 6087$)

Variable name	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.
12. Member Tenure												
13. Member Past Performance	.42***											
14. Member Educational Level	.11***	.15***										
15. Double Degree	.06***	.05***	.07***									
16. Years Since Graduation	-.18***	.20***	.01	-.04**								
17. Challenge Type Business	.02	.04**	.03*	.01	-.01							
18. Challenge Type Technical	.03*	-.03**	-.05***	-.01	.00	-.36***						
19. Challenge Type General	.05***	.07***	.06***	.02	.03**	-.60***	-.53***					
20. Knowledge Background Business	-.06***	.03*	.20***	.02	-.08***	.10***	-.10***	.00				
21. Knowledge Background Technical	.00	.05***	-.15***	.09***	-.04**	-.04**	-.01	-.07***	-.47***			
22. Knowledge Background Other	-.03*	.00	.10***	.02	.00	.28***	.30***	-.51***	.22***	-.19***		
23. Related Knowledge Background											-.31***	
24. Unrelated Knowledge Background												-.15***

Note. * $p < .05$; ** $p < .01$; *** $p < .001$

variation in a participant’s performance. A number of control variables appeared to have an influence on participant performance; at the challenge level, the total prize pool ($F(1, 6065) = 7.18, p = .01, \eta^2 = .001$) and the number of submitted solutions ($F(1, 6065) = 324.16, p < .001, \eta^2 = .051$) had a significant negative effect on a participant’s performance. At the participant level, a participant’s age ($F(2, 6065) = 18.15, p < .001, \eta^2 = .003$), his/her past performance ($F(1, 6065) = 94.52, p < .001, \eta^2 = .015$), his/her educational level ($F(1, 6065) = 13.41, p < .001, \eta^2 = .002$), and whether he/she is pursuing a double degree ($F(1, 6065) = 4.61, p = .03, \eta^2 = .001$) all significantly affected a participant’s performance in a positive way.

Considering our variables of interest, neither the main effects of challenge type ($F(2, 6065) = 0.45, p = .64$) nor the main effects of knowledge background ($F(2, 6065) = 0.71, p = .49$) have a significant effect on a participant’s performance. The interactions between challenge type and knowledge background, however, do seem to significantly affect a participant’s performance ($F(4, 6065) = 7.986, p < .001, \eta^2 = .005$). A more in-depth look at this significant interaction effect (see Table 4.3) showed that participants with a business-oriented knowledge background did better on challenges with a business orientation ($M = 1.88, SD = 0.09$) than on challenges with a technical orientation ($M = 1.44, SD = 0.12$) and this difference was significant ($M_{diff} = 0.43, SD_{diff} = 0.15, p = .00$).

Table 4.3 Means and Standard Errors of Performance based on the Univariate Analysis of Variance for testing Hypothesis 1 ($N = 6087$)

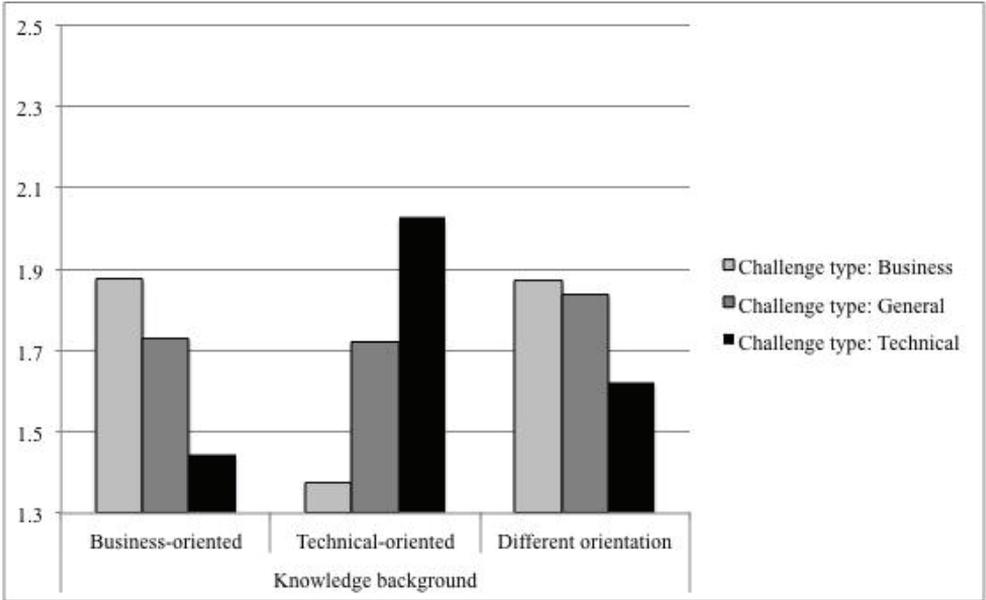
		Challenge type			Overall
		Business	General	Technical	
Knowledge background	Business-oriented	1.88 (0.09)	1.73 (0.08)	1.44 (0.12)	1.68 (0.06)
	Technical-oriented	1.38 (0.11)	1.72 (0.08)	2.03 (0.09)	1.71 (0.06)
	Different orientation	1.87 (0.10)	1.84 (0.07)	1.62 (0.11)	1.78 (0.06)
Overall		1.71 (0.06)	1.76 (0.05)	1.70 (0.06)	

Participants with a business-oriented knowledge background also performed less well on challenges with a general orientation ($M = 1.73, SD = 0.08$), but this difference was not significant ($M_{diff} = 0.15, SD_{diff} = 0.12, p = .21$). Participants with a technical

knowledge background showed the opposite effect, performing better on challenges with a technical orientation ($M = 2.03$, $SD = 0.09$) than on business-oriented challenges ($M = 1.38$, $SD = 0.11$) or challenges with a general orientation ($M = 1.72$, $SD = 0.08$).

Both the difference in performance with business-oriented challenges ($M_{diff} = 0.65$, $SD_{diff} = 0.15$, $p < .001$) as the difference with challenges with a general orientation ($M_{diff} = 0.30$, $SD_{diff} = 0.12$, $p = .01$) was significant. Finally, participants with neither a business nor a technical orientation did not show significant performance differences on the three types of challenges. Taken together, there was a significant interaction effect between participants' knowledge backgrounds and the type of challenge for participants with a business-oriented ($F(2, 6065) = 4.00$, $p = .02$, $\eta^2 = .001$) or technical-oriented ($F(2, 6065) = 10.06$, $p < .001$, $\eta^2 = .003$) knowledge background, but no significant interaction effects for participants who had neither of these knowledge backgrounds ($F(2, 6065) = 1.66$, $p = .19$, $\eta^2 = .001$) (see Figure 4.1).

Figure 4.1 Average performance of combinations of knowledge backgrounds and challenge types.



These findings generally supported hypothesis 1, which stated that possessing related knowledge positively affects a participant's performance. They do not seem to favor the idea that unrelated knowledge positively impacts performance. Of course, this analysis did not allow us to investigate any interaction effects of related and unrelated knowledge, as we simply coded for the possession (or not) of business-oriented and technical-oriented knowledge backgrounds²⁰. We therefore performed a second analysis to test hypothesis 2.

Analysis Hypothesis 2

In our second analysis, we specifically explored how possessing both an unrelated knowledge background and a related knowledge background affected a participant's performance on creative problem-solving tasks. To test our second hypothesis that having an unrelated knowledge background in combination with a related knowledge background positively affects a participant's performance, we performed another univariate analysis of variance. Here, we considered the effects of *related knowledge background*, *unrelated knowledge background* and *their interaction on participant performance*, controlling for the previously identified control variables.

The model is significant ($F(16, 6070) = 44.85, p < .001$) and accounts for 10.6% of the variation in a participant's performance. A number of control variables appear to have an influence on participant performance; at the challenge level, the total prize pool ($F(1, 6070) = 7.50, p = .01, \eta^2 = .001$) and the number of submitted solutions ($F(1, 6070) = 335.83, p < .001, \eta^2 = .052$) have a significant negative effect on a participant's performance. At the participant level, a participant's age ($F(1, 6070) = 17.70, p < .001, \eta^2 = .003$), his/her past performance ($F(1, 6070) = 93.17, p < .001, \eta^2 = .015$), and his/her educational level ($F(1, 6070) = 9.42, p = .00, \eta^2 = .002$) all significantly affect a participant's performance in a positive way. Except for the now only marginally

²⁰ An alternative analysis in which we only considered participants with a single knowledge background (either business-oriented, technical-oriented, or with neither a business, nor technical orientation) and excluded participants with multiple knowledge backgrounds led to very similar, but somewhat weaker, results as the one shown here.

significantly positive effect of pursuing multiple studies ($F(1, 6070) = 2.99, p = .08$), these results are similar to those found in the first analysis.

Considering our variables of interest, that there was a significant positive main effect of possessing a related knowledge background ($F(1, 6070) = 20.55, p < .001, \eta^2 = .003$), but no significant main effect of possessing an unrelated knowledge background ($F(1, 6070) = 2.540, p = .11$) on a participant’s performance on creative problem solving tasks. These findings thus lend further support to our first hypothesis about the positive role of possessing related knowledge. The interaction between related knowledge background and an unrelated knowledge background, also significantly affects a participant’s performance ($F(1, 6070) = 11.91, p < .001, \eta^2 = .002$).

Table 4.4 Means and Standard Errors of Performance based on the Univariate Analysis of Variance for testing Hypothesis 2 ($N = 6087$)

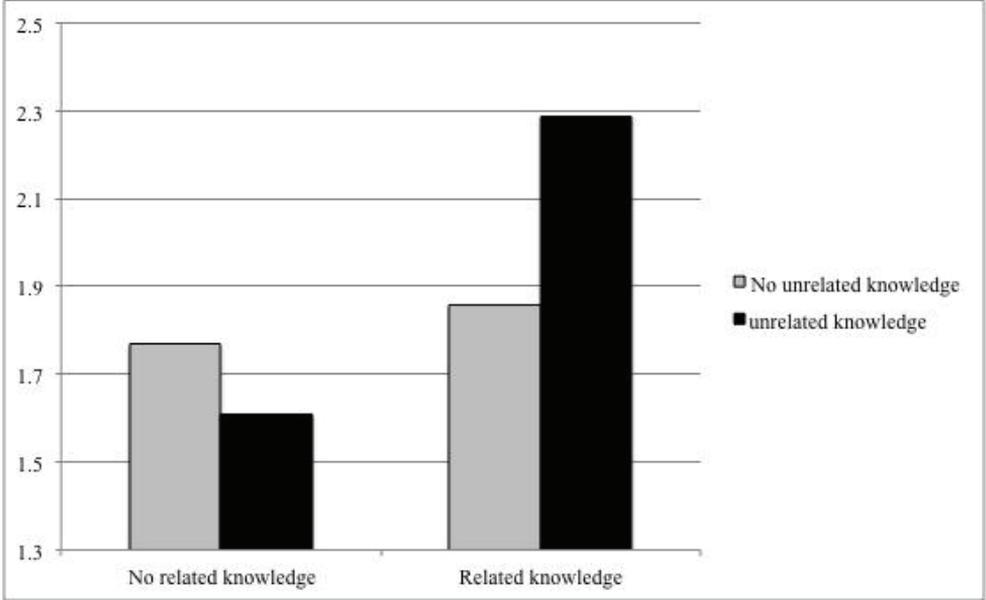
		Unrelated knowledge background		Overall
		No	Yes	
Related knowledge background	No	1.77 (0.04)	1.61 (0.05)	1.69 (0.04)
	Yes	1.86 (0.07)	2.29 (0.14)	2.07 (0.08)
Overall		1.81 (0.04)	1.95 (0.07)	

A more in-depth look at this significant effect of the interaction through pairwise comparisons (see Table 4.4) shows us that this effect is driven not only by the positive effect of possessing an unrelated knowledge background in combination with a related knowledge background (as was hypothesized), but also in part by the negative effect of possessing an unrelated knowledge background without possessing a related knowledge background. Participants thus do worse on challenges for which they only possess a knowledge background that is clearly unrelated ($M = 1.61, SD = 0.05$) than on general challenges for which no specific knowledge is required ($M = 1.77, SD = 0.04$) and this difference ($M_{diff} = 0.16, SD_{diff} = 0.07$) is significant ($F(1, 6070) = 5.05, p = .02, \eta^2 = .001$). Participants who do possess a related knowledge background perform even better when they also possess an unrelated knowledge background ($M = 2.29, SD = 0.14$) in

comparison to possessing only a related knowledge background ($M = 1.86, SD = 0.07$). This difference ($M_{diff} = 0.43, SD_{diff} = 0.15$) is also significant ($F(1, 6070) = 7.76, p = .01, \eta^2 = .001$) (see Figure 4.2 on the next page).

This second analysis thus provided a more nuanced perspective on the effect of possessing a related knowledge background on a participant's performance on creative problem-solving tasks. Whereas there was a significant positive main effect of related knowledge, this effect seems to be largely driven by the highly significant difference ($F(1, 6070) = 21.56, p < .001, \eta^2 = .004$) between the condition in which a participant possesses unrelated knowledge in combination with related knowledge ($M = 2.29, SD = 0.14$) and the condition in which a participant possesses unrelated knowledge without related knowledge ($M = 1.61, SD = 0.05$). This second analysis provided strong support for

Figure 4.2 *Average performance of combinations of related and unrelated knowledge backgrounds.*



hypothesis 2, which stated that unrelated knowledge would positively affect a participant's performance, but only when the participant also possesses a related knowledge background.

Sensitivity Analysis

Analysis on raw performance data. Since we were interested in how participants' choices for particular challenges for which they possessed related and/or unrelated knowledge bases would affect their economic outcomes, we reran our second analysis on the raw performance data (which reflects the actual monetary reward received by a participant for a submitted idea to a challenge). While the fit of this model was not as good as the fit of our main analyses ($F(1, 6070) = 18.97, p < .001, \eta^2 = .048$), which was due to the non-normal distribution of monetary rewards, we got similar results as in our main analyses, albeit somewhat weaker. Considering the performance of the different groups, we see that individuals who participated in a general-oriented challenge (our control group) earned, on average, € 83.38 (SD = 4.05) per contribution. An individual who chose to participate in a challenge for which he/she only possessed an unrelated knowledge background earned considerably less than this: € 71.53 on average (SD = 4.96). For individuals who only possessed a related knowledge background, a contribution earned them, on average, € 94.18 (SD = 6.62). Those individuals who possessed were able to combine a related knowledge background with an unrelated knowledge background earned significantly more than any of the other groups: € 126.66 on average (SD = 12.28).

Analysis on winners versus non-winners. Clearly, participating in the 'right' challenges has large economic implications for individuals participating in crowdsourcing challenges. However, organizations might not necessarily be interested in individuals' average performances, but in understanding how individuals' knowledge backgrounds affect the generation of the very best ideas. Several researchers have argued that for innovation it might be more important to increase the variance of performance than the average of performance (Fleming, 2007; Girotra et al., 2011; Lettl, Rost, & von Wartberg, 2009). In fact, Jeppesen and Lakhani's (2010) findings were also based on comparing the winners of challenges to non-winners, so perhaps unrelated knowledge contributes more positively only to the best ideas. To test whether individuals with a related knowledge background (hypothesis 1) and individuals with both a related and unrelated knowledge background (hypothesis 2) were indeed relatively overrepresented in the sample of best ideas, we compared the actual distribution of winners to the expected distribution based on the number of contributions in our sample as a whole.

As can be seen in Figure 4.3, the distribution of the best contributions is different from what we would expect based on the distribution of all contributions in our sample. A Yates corrected χ^2 -test (Yates, 1934) of the distributions indicates that for both the winners ($\chi^2(1) = 10.65, p < .01$) and for the top-3 performers ($\chi^2(1) = 14.78, p < .001$) the actual distribution is significantly different from what we would expect. Specifically, the pattern of differences is in line with our hypotheses; the number of winning ideas contributed by individuals possessing a related knowledge background (and no unrelated background) was 53% ($N_{\text{actual}} = 26$ vs. $N_{\text{expected}} = 17$) higher than expected and the number of winning ideas contributed by individuals possessing both a related and an unrelated knowledge background was even twice as high ($N_{\text{actual}} = 10$ vs. $N_{\text{expected}} = 5$) than would be expected on the basis of their share of total contributions. As can be seen in Figure 4.3, a similar

Figure 4.3 *Observed and expected distributions of (three) best ideas over combinations of related and unrelated knowledge backgrounds.*

Winners

Observed and (expected) best ideas

Unrelated knowledge

		No	Yes	Total:
Related Knowledge	No	38 (45)	23 (30)	61 (75)
	Yes	26 (17)	10 (5)	36 (22)
	Total:	64 (62)	33 (35)	97

Top 3

Observed and (expected) three best ideas

Unrelated knowledge

		No	Yes	Total:
Related Knowledge	No	125 (142)	84 (93)	209 (235)
	Yes	67 (53)	27 (15)	94 (68)
	Total:	192 (195)	111 (108)	303

pattern, although slightly less pronounced, can be seen when considering the three best ideas of each challenge. These findings provide further support for our hypotheses that possessing a knowledge base that is related to the challenge positively affects an individual's ideation performance, especially when combined with an unrelated knowledge base.

DISCUSSION

The aim of this study was to further the understanding of the role an individual's knowledge bases play in driving his/her performance on creative problem-solving tasks on online crowdsourcing platforms. Our results show that an individual's performance on creative problem-solving tasks is dependent on the interaction between two types of knowledge; knowledge related to the task at hand and knowledge unrelated to the task at hand. These findings have several important implications.

Theoretical Implications

Our study shows that when considering individuals' knowledge backgrounds, possessing related or unrelated knowledge should not be considered opposite ends of a single dimension, but rather these two knowledge bases should be considered as independent dimensions. This idea can help us understand several issues better. First of all, our study contributes to the upcoming literature on crowdsourcing by embedding the seemingly divergent findings in the crowdsourcing literature on the positive relationship between unrelated knowledge and performance in crowdsourced creative problem-solving tasks (e.g. Jeppesen & Lakhani, 2010) within the broader literature on creativity. Specifically, we reaffirm the findings of Jeppesen and Lakhani (2010) on the basis of objective data by showing that unrelated knowledge is indeed important for generating generate (the most) valuable contributions to creative problem-solving tasks. However, we add an important contingency to their findings by showing that the positive effects of possessing unrelated knowledge only applies when individuals are also able to draw on knowledge related to the task/organization. As Jeppesen and Lakhani's (2010) work only considered technical challenges and individuals holding technical backgrounds (thereby

only considering cases in which participants possess a basic level of knowledge related to the task at hand), our study is able to place their findings into the larger perspective of how knowledge affects performance on creative problem-solving tasks.

Secondly, our study contributes to the literature on creative problem solving (e.g. Amabile, 1983, 1996) by showing that an important contingency effect on the relationship between related (or domain-relevant) knowledge and individual performance on creative problem-solving tasks is the degree to which individuals possess knowledge that is unrelated to the creative problem solving task. In this literature, the effects of possessing domain-relevant knowledge on an individual's performance on creative problem-solving tasks are still a matter of debate; some scholars argue, in line with the general componential model of creativity (Amabile, 1983, 1996), that domain-relevant knowledge contributes to individuals' performance on creative problem-solving tasks (e.g. Pretz et al., 2003; Weisberg, 1998). Other scholars, however, have argued that possessing domain-relevant knowledge hinders individuals' performance on creative problem solving tasks (e.g. Frensch & Sternberg, 1989; Hecht & Proffitt, 1995; Wiley, 1998). We would argue that both the positive and the negative effects of domain-relevant knowledge are contingent on the amount of unrelated knowledge that an individual possesses.

Managerial Implications

This study also has an important practical implication for organizations organizing crowdsourcing initiatives as this study provides a basis for more targeted sourcing of creative problem-solving tasks. The goal of most organizations that use crowdsourcing for idea generation is not to generate as many ideas as possible, but to generate as many valuable ideas as possible. Unfortunately, idea generation in general produces a high ratio of bad ideas to good ones, and this is especially so in the case of crowdsourcing (Alexy et al., 2012; Bjelland & Wood, 2008; Jouret, 2009). Since idea selection mechanisms often function poorly (Goldenberg, Lehmann, & Mazursky, 2001; Rietzschel, Nijstad, & Stroebe, 2006), it becomes increasingly important to be able to target potential high-performance contributors. An important practical implication of this study is therefore that as those members whose knowledge backgrounds are at least partly related to the task at hand are more likely to contribute valuable ideas, more targeted

sourcing could improve the signal-to-noise ratio in crowdsourcing. Relatedly, while the focus of organizations active in crowdsourcing is often on the revenues that can be generated through crowdsourcing idea generation, organizations also need to consider the additional costs related to turning crowdsourced into actual innovations (Alexy et al., 2012; Kornish & Ulrich, 2011). By specifically targeting those individuals that have the right knowledge backgrounds to contribute potentially valuable ideas, organizations can make the crowdsourcing process more efficient, both in terms of overall costs and time spent.

Strengths and Limitations

In our study, performance was based on the monetary rewards linked to the ranking of individual ideas in the challenges. Because a judging panel consisting of organizational experts decided on these rankings, this measure can be considered as an expert rating of idea performance. An important strength of this approach is that experts from the organization rate all contributions to the idea generation tasks; a drawback of this approach is that it does not allow us to compare the value of ideas over challenges.

Relatedly, due to the fixed monetary rewards linked to the ranking, this way of measuring performance might have affected our results by underestimating performance differences of ideas that had different rankings but the same assigned rewards (ideas ranked 4 to 10 all received 200 euros and those ranked 11 to 20 were rewarded 100 euros) and by exaggerating the performance difference between ideas ranked 1, 2, and 3.

While we were able to use overall judgments from the perspective of the organization, we were not able to consider the content of the contributions, which makes it difficult to assess exactly what makes ideas perform well. Although our findings seem well in line with the argument that unrelated knowledge will lead to more novel ideas and related knowledge to more feasible ideas, we are unable to test this empirically within the current study.

In this paper we have taken educational background as a general proxy for an individual's knowledge base. While this approach allowed us to use an objective assessment of the knowledge an individual possesses, it also provided us with a relatively high-level measure of knowledge background and focused purely on knowledge gained

through education. For our particular context, a virtual platform organization that aims at students and young professionals up to 32 years of age, using individuals' educational backgrounds seemed a reasonable proxy for their knowledge bases. Also, considering that the control variable 'years since graduation' did not have a significant influence on performance, we are fairly confident that the use of this proxy is valid for our dataset.

Future Research

As we previously argued, there are clear benefits to using expert judgments that are directly linked to monetary outcomes for participants, however, there are also potential benefits to having individual contributions rated on their novelty, usability and, overall creativity. In combination with using different measures to capture an individual's knowledge base, specifically understanding which knowledge an individual actually used to generate a specific idea would greatly increase how different knowledge bases affect an individual's performance on creative problem-solving tasks. For instance, possessing related knowledge might lead to ideas that score higher on usability and possessing unrelated knowledge to ideas that score higher on novelty (see Poetz & Schreier, 2012). Related knowledge might also act as a filter through which unrelated knowledge is focused on relevant solutions or unrelated knowledge might act as a mitigating factor for cognitive fixation that hampers individuals who possess related knowledge. Future research could consider both the knowledge individuals possess and the content of their contributions to allow for an empirical test of *how* the different knowledge bases make ideas better.

In this study, we have considered the effects of possessing related and unrelated knowledge on individual's performance on creative problem-solving tasks on an online crowdsourcing platform. Future research could investigate to what degree our findings might be relevant in different domains as well as for different type of tasks.

Conclusion

In this paper, we have investigated how a participant's related and unrelated knowledge bases interact in a creative problem-solving task. In line with two theoretical perspectives, which had appeared to be at odds with each other, we find that having related knowledge positively affects an individual's creative task performance, and that having

unrelated knowledge strengthens these affects if and only if it appears in combination with related knowledge.

CHAPTER 5

GENERAL DISCUSSION

In recent year, crowdsourcing has become an increasingly popular method employed by firms for eliciting ideas and solutions from outside of the organizational boundaries as inputs for the innovation process (Afuah & Tucci, 2012; Bayus, 2013; Jeppesen & Lakhani, 2010; Poetz & Schreier, 2012). In this dissertation I have tried to add to the growing understanding of online crowdsourcing platforms by investigating two important issues; namely: 1) how social motivations, in the form of feelings of pride and respect, as drivers of participation and platform-oriented behaviors (in chapters 2 and 3), and 2) how individuals' knowledge backgrounds affect their performance on crowdsourced creative problem-solving tasks (in chapter 4). In this final chapter, I will first discuss the contributions of each of the three studies separately, after which I will discuss how the dissertation as a whole contributes to existing literature. Finally, I will discuss what some of the practical implications of this dissertation are for organizations that host online crowdsourcing platforms and for organizations that are using or planning to use crowdsourcing as a means for organizing idea generation tasks.

Summary of Main Findings

Chapter 2: Member interaction as a source of respect on online crowdsourcing platforms. In the second chapter we investigated how the possibility to interact with other members of the crowd influences members' feelings of respect and their subsequent participation and group-oriented behaviors on an online crowdsourcing platform. Based on a longitudinal field experiment in which we manipulated the possibility to interact with other members, we found that the possibility to interact with other members was an important driver of the development of group-based feelings of respect in a social environment that otherwise lacks the characteristics of a typical social group. We also found the distinction between feeling included and feeling valued as two distinct forms of perceived respect (see also Ellemers, et al, 2013; Huo et al., 2010) to be especially relevant

on the researched online crowdsourcing platform, as only feeling valued was affected by the possibility to interact with other members and feeling valued affected participation, intentions to stay active, and positive word of mouth behaviors (where feeling included only affected word of mouth behaviors).

These findings had several implications; first of all, the fact that group-based feelings of respect could develop and affect the degree to which members engage with the online crowdsourcing platform, a social environment that otherwise lacked the characteristics of a typical social group, implies that the domain in which concepts as group-based respect are applicable might be larger than had previously been assumed (see also Bartel et al., 2012; Franke et al., 2013).

Secondly, the fact that manipulating the possibility to interact with other members affected the degree to which members felt respected, even in the absence of other typical social group characteristics, implies that interaction might not just be one of the characteristics of a group, but perhaps its defining feature.

Thirdly, our findings emphasized the importance of considering the actual social cues that group members receive on an online crowdsourcing platform as the degree to which individuals felt valued and the degree to which they felt included were not affected in the same way by the possibility to interact with other members nor did they affect members' levels of engagement in the same way.

Chapter 3: Feelings of pride and respect as drivers of ongoing member activity on online crowdsourcing platforms. In the third chapter we extended the previous study by also including feelings of pride and identification, next to feelings of respect, as predictors of participation and group-oriented behaviors and investigating their antecedents in an existing online crowdsourcing platform. Based on a longitudinal, multi-method field study, we found that on online crowdsourcing platforms feelings of pride and respect, and not identification, affected level and duration of member activity and positive work of mouth behaviors. We also found that pride was uniquely related to organization-level status information and perceived respect was uniquely related to individual-level status information, which further confirmed the importance of actively managing the communication of social identity information on online crowdsourcing platforms (see also Tanis & Beukeboom, 2011).

These findings have several important implications; first of all, our findings further support the notion that feelings of pride and respect play an important role in social environments that cannot be characterized as typical social groups. Even in the absence of interaction with other members of the group (chapter 2), members of online crowdsourcing platforms are able to develop feelings of pride and respect to a degree that they affect their levels of engagement based on the interactions they have with the group authority (in this case the platform organizer).

Secondly, this study (in combination with the study presented in chapter 2) offers, what we consider compelling, evidence that social motivations can and do play a role in affecting member engagement on online crowdsourcing platforms. Understanding member engagement is crucially important in understanding why some online crowdsourcing platforms have success and others fail.

Chapter 4: The knowledge-performance paradox in crowdsourcing.

In our fourth chapter we investigated the knowledge-performance paradox in crowdsourcing creative problem-solving tasks. By analyzing over 6,000 contributions to 120 creative problem-solving challenges on an online crowdsourcing platform, we showed that the performance of participants of creative problem-solving tasks on online crowdsourcing platforms was best when they possessed both knowledge that was related to the challenge as well as knowledge that was unrelated to the challenge.

Our results show that these two knowledge bases should be considered as independent dimensions. With this study we reaffirm the findings of Jeppesen and Lakhani (2010) on the basis of objective data. However, we also add an important contingency to their findings by showing that the positive effects of possessing unrelated knowledge only applies when individuals are also able to draw on knowledge related to the task/organization.

Secondly, our study contributes to the literature on creative problem solving (e.g. Amabile, 1983, 1996) by showing that an important contingency effect on the relationship between related (or domain-relevant) knowledge and individual performance on creative problem-solving tasks is the degree to which individuals possess knowledge that is unrelated to the creative problem solving task. In light of the ongoing debate on whether the effects of possessing domain-relevant knowledge on an individual's performance on

creative problem-solving are positive or negative, we would argue that this effect is contingent on an individual's level of unrelated knowledge.

Theoretical Implications and Future Research

Taken together, the three studies presented in this dissertation have several broader implications for the literature and future research on social motivations, creativity, and crowdsourcing. In the following I will discuss these implications for each of these literatures.

Research on crowdsourcing. In general, our findings reaffirm that while processes on crowdsourcing platforms are not the same as those in more traditional settings, many of the underlying principles are not completely different either. In line with the findings of studies in different social environments, we found that social motivations, specifically feelings of respect (chapters 2 and 3) and pride (chapter 3), are important drivers of engagement on online crowdsourcing platforms. In chapter 4 we found the possession of knowledge that was related to the creative problem-solving task at hand to be positively related to individuals' performance on this task. Contrary to findings in different social environments, we found that feeling included (chapter 2) and identification with the platform (chapter 3) should not be considered drivers of engagement on online crowdsourcing platforms. In our study described in chapter 4, we also found an important interaction effect of possessing knowledge that was unrelated to the creative problem-solving task. These findings raise the question how exactly the contexts in which our studies took place actually affected these findings.

First of all, while the literature on crowdsourcing has identified numerous ways in which crowdsourcing can be organized for a range of tasks, no study that we know of has ever investigated how and why processes might be different in different forms of crowdsourcing or dependent on the specific task that is being sourced to the crowd. It should make a difference whether you are participating on a one-off challenge organized by a firm directly or whether you are a member of a specialized, independent online crowdsourcing platform that organizes numerous tasks every year. In the same way, when considering task-level motivations, it probably makes a difference whether an individual is participating in an intellectually challenging problem-solving tasks for which the best

solution can get a reward of \$100,000 or whether he/she is participating in a task that requires the filling out of a bunch of questionnaire for \$1 per questionnaire. Clearly, not all crowdsourcing initiatives are comparable and future studies on crowdsourcing should start reflecting this and investigate how the differences between crowdsourcing initiatives lead to different findings and conclusions. Relatedly, while most crowdsourcing studies have used survey data and/or archival data, the field would benefit from introducing more (field) experimental studies to strengthen the causal claims made in these and future studies.

Secondly, studies that have investigated the process of crowdsourcing or online crowdsourcing platforms have focused on making contributions to the understanding of the phenomenon of crowdsourcing itself. Based on the findings of the studies in this dissertation, I argue that online crowdsourcing platforms offer an interesting context that allows scholars to make contributions to the broader literature on (social) psychology (as our studies focus on motivation and creativity), sociology, and (information) management.

For example, future research could investigate whether our findings in chapter 4 with respect to the role of related and unrelated knowledge are applicable to other kinds of creative problem-solving tasks as well, and whether these effects are similar in different social environments. Relatedly, it would be very interesting to understand which aspects of online crowdsourcing platforms cause the underlying processes investigated in chapter 2 to 4 to be different (or the same) compared to other social settings.

Social motivations. The studies in this dissertation, and specifically chapters 2 and 3, make several important contributions to the literature on social motivations in general, and specifically the literature on respect and the group engagement model. First of all, the findings of chapters 2 and 3 highlight the importance of social motivations in understanding members' behaviors, and specifically their group-oriented behaviors, on online crowdsourcing platforms. Because these social environments lack the characteristics of typical social groups, it would seem that online crowdsourcing platforms are outside of the domain in which social motivations are relevant and this type of motivation has therefore received only scant attention in studies (see Brabham, 2010; Huberman et al., 2009; Zheng et al., 2011). The findings of our studies in chapters 2 and 3,

however, clearly show that social motivations do matter. These findings, therefore, open up a whole range of social environments that have previously not been studied.

Secondly, our studies show that not all social motivations are equally relevant on the online crowdsourcing platforms we investigated; specifically, feelings of pride (chapter 3) and feeling valued (chapter 2 and 3) seemed to matter, while feeling included (chapter 2) and identification with the platform (chapter 3) did not seem to be relevant in this social environment. While previous research has argued that each of these social processes indeed has its own antecedents and related outcomes, these social processes also tend to behave in concert in the social groups that have been studied previously (e.g. Blader & Tyler, 2009; Ellemers et al., 2013).

Relatedly, our studies have investigated several ways in which members interact with the platform; we explored the role of members interacting with each other in chapter 2, the role of feedback from the organizers of the online crowdsourcing platform in chapters 2 and 3, and the role of news about the online crowdsourcing platform in chapter 3. Future research should further explore how various information cues influence the development of these social motivations and what other causes might affect the different types of social motivations to act as they do in this particular social environment.

For example, future research could investigate how the use of reputation mechanisms (e.g. Dellarocas, 2010) affects members' social motivations. Specifically, since many of these reputation mechanisms provide social information that would affect comparative forms of respect it would be interesting to compare the 'performance' implications of stimulating comparative versus autonomous forms of respect.

Future research could also specifically focus on the role of identification on online crowdsourcing platforms. Can it be developed by members of online crowdsourcing platforms to such an extent that it will affect their behavior? If so, which social information cues allow for members to develop a sense of identification with online crowdsourcing platforms?

Creativity. This dissertation, and specifically chapter 4, also contributes to the literature on creative problem solving and the role knowledge has in driving performance on this type of task. First of all, our study contributes to this literature by introducing an important contingency that affects the relationship between the related knowledge an

individual possesses and his/her performance on a creative problem-solving task. As studies generally consider the degree to which an individual's knowledge is related to a particular problem, no previous study that we know of has considered the role of unrelated knowledge and/or its interaction with related knowledge.

This study, therefore, helps us solve the paradoxical implication that seemed to arise from the crowdsourcing literature that the more unrelated the knowledge an individual possessed, the better his/her performance (Jeppesen & Lakhani, 2010). Our study does not disqualify these findings, but puts them in a broader perspective: possessing knowledge that is unrelated to the task at hand positively affects an individual's performance if and only if the individual also possesses knowledge that is related to the task. It also offers a possible solution to the ongoing debate on whether the effects of possessing domain-relevant knowledge on an individual's performance on creative problem-solving are positive or negative, by arguing that this effect might well be contingent on the, so far unobserved, degree to which an individual possesses unrelated knowledge.

Secondly, the studies presented in the chapters of this dissertation have focused either on the role of (social) motivations and their effects on participation and group-oriented behaviors or on the role of ability (in the form of knowledge) and its effect on performance. While understanding individuals' performance on a particular task requires a different level of analysis than understanding their engagement in group-oriented behaviors and general participation behavior (e.g. Vallerand, 1997), there is likely to be some kind of interaction between an individual's motivations and ability and their participation and performance on online crowdsourcing platforms (e.g. Gruen, Osmonbekov, & Czapslewski, 2005; MacInnis, Moorman, & Jaworski, 1991).

For example, in our study we found that previous performance was an important predictor of task performance; some members were just better at performing these creative problem-solving tasks than others. It is very likely that better performing individuals will also be more highly motivated and vice versa. Future research could integrate these two levels of analysis and investigate how (expectations of) performance and motivation are related and interact to influence members' engagement with the online crowdsourcing platform as well as their performance on tasks.

Another potential interesting venue for future research is to dig deeper into the why of our finding in chapter 4. What is the underlying process that explains the strong interaction effect of possessing both knowledge that is related and knowledge that is unrelated that we found? Do these two types of knowledge affect two different outcome measures (for example novelty and usefulness)? Is the effect based on a mitigating or strengthening effect that occurs (for example that unrelated knowledge mitigates the effects of cognitive fixation that occur when individuals possess knowledge that is related to a task)?

Practical Implications

The studies in this dissertation also have several practical implications, specifically for designing an online (crowdsourcing) platform and deciding upon the characteristics of members who you need to attract, retain, and target for specific tasks.

Design implications. In chapters 2 and 3 we have investigated the effects of three design implications; the possibility to interact with other members (chapter 2), providing feedback on contributions (chapter 2 and 3), and generating media attention on your crowd's collective achievements (chapter 3). Importantly, our studies show that while the organizers of online (crowdsourcing) platforms generally seem to focus on the impact of design choices on their members' ability to perform tasks, they should not neglect to consider how these choices might affect members' social motivations to engage in platform-oriented behaviors. These studies show that thinking about interactions (both between members and between members and the platform organizers) is crucial for allowing members to develop social motivations that will benefit the platform in the long-run. Because active member crowds attract new tasks (which will then attract new members and so on), platform organizers should design their online (crowdsourcing) platforms to stimulate the social motivations that drive their members' activity. Relatedly, our studies also show that it is not only designing a platform to allow for interactions, but also that organization's actively engage in the communication practices that influence member activity on the platform.

While we found that feelings of inclusion and organizational identification were not as relevant as feeling valued and feelings of pride, this does not mean that members

cannot feel included or identify with a crowdsourcing platform per se. In fact, previous research has shown that in online settings identification processes might actually play an important role (e.g. Postmes et al., 1998). However, in order to have their members identify more strongly virtual organizations need to think about and actively communicate their organizational identities (Pratt, 1998; Tanis & Beukeboom, 2011). The findings of our studies in this dissertation seem to indicate that the members of online (crowdsourcing) platforms are able (and willing) to develop social feelings towards the platform. However, members need to receive the relevant social cues in order to develop such social feelings.

Attracting, retaining, and targeting the right members of the crowd. The study described in chapter 4 has important practical implications for organizations organizing crowdsourcing initiatives as this study provides a basis for more targeted sourcing of creative problem-solving tasks. The goal of most organizations that use crowdsourcing for idea generation is not to generate as many ideas as possible, but to generate as many valuable ideas as possible. Unfortunately, idea generation in general produces a high ratio of bad ideas to good ones, and this is especially so in the case of crowdsourcing (Alexy, Criscuolo, & Salter, 2012; Bjelland & Wood, 2008; Jouret, 2009). Since idea selection mechanisms often function poorly (Goldenberg, Lehmann, & Mazursky, 2001; Rietzschel, Nijstad, & Stroebe, 2006), it becomes increasingly important to be able to target potential high-performance contributors.

While advocates of crowdsourcing have usually stressed that literally anyone can make a valuable contribution (e.g. Howe, 2008; Shirky, 2008; Surowiecki, 2004), in reality a certain level of knowledge and skill is required to be able to contribute valuable ideas to innovation-related crowdsourcing initiatives (Afuah & Tucci, 2010; Jeppesen & Lakhani, 2010; Page, 2007). Within their crowd of members, online crowdsourcing platforms have generally two ways of targeting the right members: considering members' task performance on previous tasks and considering whether the knowledge background of individuals match with the topic of the task at hand. Our study implies that organizations can use previous performance as an indicator for future performance. Contrary to the findings by Bayus (2013) in Dell's crowdsourcing initiative IdeaStorm, good performance on previous tasks seems to generally indicate a certain understanding of how to go about

the process of solving a creative problem on online crowdsourcing platforms that offer many tasks of a particular type.

Furthermore, previous good performance indicates that the member is at least willing and able to participate and it generally increases a member's self-efficacy, which has been found to positively affect motivation (e.g. Bandura, 1997). More importantly, our study shows that the best performers are those members who possess both a related and an unrelated knowledge base. While targeting those members who have the highest chance of contributing a meaningful idea seems to run counter to the inclusive philosophy of crowdsourcing, organizations have found that their ability to select the right ideas to develop further is severely hampered when they are literally flooded with ideas, many of which will not be valuable (Alexy et al., 2012; Kornish & Ulrich, 2011). By specifically targeting those individuals that have the right knowledge backgrounds to contribute potentially valuable ideas, organizations can make the crowdsourcing process more efficient, both in terms of overall costs and time spent.

Concluding Remarks

In this dissertation, I have specifically investigated the effects of social motivations and individual knowledge backgrounds on individuals' participation, platform-oriented behaviors, and their performance on online crowdsourcing platforms. While I have focused on one particular type of tasks, namely idea generation tasks, which were organized through independent online crowdsourcing platforms in the form of an idea contest, I strongly believe that the findings presented throughout this dissertation are relevant, especially for online settings, beyond this narrow scope. The degree to which my findings are transferable to (online) (crowdsourcing) settings beyond the one I have investigated will be a matter of future research. Based on the findings that feelings of pride and respect drive members' willingness to participate and engage with the platform, I hope future research will further explore the role of social motivations, and especially those of feelings of pride and respect, in online settings. As a researcher the question of how (different types of) knowledge affect outcomes is very near to my heart. Although I am well aware that chapter 4 is not a definitive answer to this question, I hope that it will act as an important direction in which future research will explore this intriguing question.

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SUMMARY

The overarching goal of this dissertation is to improve our understanding of the role of members' social motivations and knowledge backgrounds in driving members' participatory behaviors and their task performance on crowdsourcing platforms.

In the first study we investigated how the possibility to interact with other members of the crowd influenced members' feelings of respect and their subsequent participation and group-oriented behaviors on an online crowdsourcing platform. Based on a longitudinal field experiment in which we manipulated the possibility to interact with other members, we found that the possibility to interact with other members was an important driver of the development of group-based feelings of respect in this social environment. We also found the distinction between feeling included and feeling valued as two distinct forms of perceived respect (see also Ellemers, et al, 2013; Huo et al., 2010) to be relevant on the researched online crowdsourcing platform, as only feeling valued was affected by the possibility to interact with other members and feeling valued affected participation, intentions to stay active, and positive word of mouth behaviors (where feeling included only affected word of mouth behaviors).

In the second study we extended this line of research by also including feelings of pride and identification, next to feelings of respect, as predictors of participation and group-oriented behaviors and investigating their antecedents in an existing online crowdsourcing platform. Based on a longitudinal, multi-method field study, we found that on online crowdsourcing platforms feelings of pride and respect, and not identification, affected level and duration of member activity and positive work of mouth behaviors. We also found that pride was uniquely related to organization-level status information and perceived respect was uniquely related to individual-level status information, which further confirmed the importance of actively managing the communication of social identity information on online crowdsourcing platforms (see also Tanis & Beukeboom, 2011).

The findings of these first two studies have several implications; first of all, the fact that group-based feelings of pride and respect could develop and affect the degree to which members engage with the online crowdsourcing platform, a social environment that

otherwise lacked the characteristics of a typical social group, implies that the domain in which concepts as group-based respect are applicable might be larger than had previously been assumed (see also Bartel et al., 2012; Franke et al., 2013). Secondly, these studies offer, what we consider compelling, evidence that social motivations can and do play a role in affecting member engagement on online crowdsourcing platforms. Understanding member engagement is crucially important in understanding why some online (crowdsourcing) platforms have success and others fail.

In the third and final study of this dissertation we investigated the knowledge-performance paradox in crowdsourcing creative problem-solving tasks. By analyzing over 6,000 contributions to 120 creative problem-solving challenges on an online crowdsourcing platform, we showed that the performance of participants of creative problem-solving tasks on online crowdsourcing platforms was best when they possessed both knowledge that was related to the challenge as well as knowledge that was unrelated to the challenge.

Our results show that these two knowledge bases should be considered as independent dimensions. With this study we reaffirm the findings of Jeppesen and Lakhani (2010) on the basis of objective data. However, we also add an important contingency to their findings by showing that the positive effects of possessing unrelated knowledge only apply when individuals are also able to draw on knowledge related to the task/organization. Secondly, our study contributes to the literature on creative problem solving (e.g. Amabile, 1983, 1996) by showing that an important contingency effect on the relationship between related (or domain-relevant) knowledge and individual performance on creative problem-solving tasks is the degree to which individuals possess knowledge that is unrelated to the creative problem solving task. In light of the ongoing debate on whether the effects of possessing domain-relevant knowledge on an individual's performance on creative problem-solving are positive or negative, we would argue that this effect is contingent on an individual's level of unrelated knowledge.

NEDERLANDSE SAMENVATTING

Het doel van deze dissertatie is om onze kennis te vergroten over de effecten die sociale motivaties en kennisachtergronden hebben op de bereidheid van leden om te participeren in taken op online ‘crowdsourcing’ platforms en de mate waarin zij presteren op deze taken.

In de eerste studie onderzoeken wij hoe de mogelijkheid om te interacteren met andere leden van de ‘crowd’ de gevoelens van respect van leden beïnvloedt en hoe deze gevoelens vervolgens een effect hebben op de participatie van leden en hun groepsgeoriënteerde gedrag op het online crowdsourcing platform. Op basis van een longitudinaal veldexperiment op een online crowdsourcing platform, waarin wij de mogelijkheid om te interacteren met andere leden gemanipuleerd hebben, vinden wij dat de mogelijkheid om te interacteren met andere leden een belangrijke drijfveer is voor het ontwikkelen van op de groep gebaseerde gevoelens van respect. Onze resultaten tonen ook aan dat het onderscheid tussen het gevoel dat je erbij hoort en het gevoel dat je gewaardeerd wordt (zie ook Ellemers, et al, 2013; Huo et al., 2010) relevant is op het onderzochte online platform. Waar het gevoel dat je gewaardeerd wordt beïnvloed werd door de mogelijkheid om te interacteren met andere leden en een effect had op participatie, de intentie om actief te blijven en positieve mond-op-mond reclame, daar had het gevoel dat je erbij hoort alleen een effect op positieve mond-op-mond reclame.

In de tweede studie bouwen we verder op het onderzoek uit de eerste studie door ook gevoelens van trots en de mate van identificatie met de groep mee te nemen als voorspellers van participatie en groeps-georiënteerd gedrag. Tevens onderzoeken we op een bestaand online crowdsourcing platform mogelijke antecedenten van gevoelens van respect, trots en identificatie. Op basis van een longitudinale veldstudie, waarin we gebruik maken van zowel objectieve data als data uit een vragenlijst, vinden we dat op online crowdsourcing platforms gevoelens van respect en trots, maar niet de mate van identificatie, invloed hebben op de mate en duur van participatie en positieve mond-op-mond reclame.

We vinden ook dat gevoelens van trots specifiek gerelateerd zijn aan status informatie met betrekking tot de organisatie als geheel en dat gevoelens van respect

specifiek gerelateerd zijn aan status informatie met betrekking tot de individu binnen de organisatie. Deze bevindingen bevestigen het belang van het actief communiceren van sociale identiteit informatie op online crowdsourcing platforms (zie ook Tanis & Beukeboom, 2011).

De bevindingen van deze eerste twee studies hebben diverse implicaties; ten eerste tonen deze studies aan dat leden op de groep gebaseerde gevoelens van trots en respect kunnen ontwikkelen op een online crowdsourcing platform. Deze bevindingen bevestigen dus dat het domein waarin sociale identiteitsconcepten van toepassing zijn groter is dan veel onderzoekers denken (zie ook Bartel et al., 2012; Franke et al., 2013). Ten tweede tonen deze studies aan dat sociale motivaties een rol spelen in het beïnvloeden van het groeps-georiënteerde gedrag van leden op online crowdsourcing platforms. Door de drijfveren van dit type gedrag beter te begrijpen, snappen we ook beter waarom sommige online (crowdsourcing) platforms succesvol zijn en andere platforms falen.

In de derde en laatste studie in deze dissertatie onderzoeken we de 'kennis-prestati paradox' van crowdsourcing. Op basis van een analyse van meer dan 6000 individuele bijdragen aan 120 idee generatie taken die door organisaties op een bestaand online crowdsourcing platform geplaatst zijn tonen we aan dat voor optimale prestaties op deze creatieve taken individuen zowel kennis dienen te bezitten die gerelateerd is aan de probleemcontext waarvoor ideeën bedacht moeten worden probleem als kennis die niet gerelateerd is aan de probleemcontext. De resultaten van deze studie bevestigen de eerder bevindingen van Jeppesen en Lakhani (2010) op basis van objectieve data, maar voegen daar ook een belangrijke randvoorwaarde aan toe: De positieve effecten van het bezitten van ongerelateerde kennis treden alleen op indien individuen ook kennis bezitten die gerelateerd is aan de probleemcontext. De resultaten van deze studie dragen tevens bij aan het voortgaande debat over de positieve danwel negatieve effecten van gerelateerde kennis op de creatieve prestaties van individuen door te laten zien dat deze effecten afhankelijk zijn van de ongerelateerde kennis die een individu bezit.

ABOUT THE AUTHOR



Mark Boons was born in 1980 in Nijmegen, the Netherlands. After obtaining a bachelor degree in Information Management and a bachelor degree in Business Administration from Tilburg University, he completed the Research Master in Business: Organization & Strategy track at Tilburg University cum laude in 2007.

In 2007, Mark started as a PhD candidate in the department of Management of Technology and Innovation at the Rotterdam School of Management, Erasmus University. In his dissertation, he investigated the role of social motivations on participants' behaviors on online crowdsourcing platforms and the role of knowledge backgrounds on individuals' performance on crowdsourced creative problem-solving tasks. Mark's general research interests include online platforms, social motivations, and creative problem solving. He has presented his work at several international conferences, such as the meetings of the *Society for Industrial and Organizational Psychology* and the *Academy of Management*. Currently, Mark works as an assistant professor of Business Information Management in the department of Technology and Operations Management at the Rotterdam School of Management, Erasmus University.

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WORKING TOGETHER ALONE IN THE ONLINE CROWD**THE EFFECTS OF SOCIAL MOTIVATIONS AND INDIVIDUAL KNOWLEDGE BACKGROUNDS ON THE PARTICIPATION AND PERFORMANCE OF MEMBERS OF ONLINE CROWDSOURCING PLATFORMS**

In this dissertation, I investigate the role of members' social motivations and knowledge backgrounds in driving their participation and performance on online crowdsourcing platforms. The first two empirical studies are among the first studies to explore the role of members' social motivations, and particularly members' group-based feelings of pride and respect, on their participation and group-oriented behaviors. Whereas social motivations have been shown to play an important role in several social settings, their importance on online (crowdsourcing) platforms has generally been assumed to be low, due to the nature of these online platforms. The findings of these first two studies highlight the importance of considering the social aspects of online (crowdsourcing) platforms. In the third empirical study we further explore one of the core principles of crowdsourcing; that including individuals who think differently, because they possess unrelated knowledge from outside of the field of a particular problem, will lead to better solutions. Our findings offer an important caveat to this generally accepted principle by showing that possessing unrelated knowledge is only beneficial to the quality of solutions if individuals also possess knowledge that is related to the field of the problem.

Together the three studies included in this dissertation offer several important implications for future research on online (crowdsourcing) platforms as well as for organizations that are considering using crowdsourcing as an additional pathway to gaining valuable ideas and improving their innovation processes.

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