

It ain't what you do it's the way that you do it

The effect of accountability focus on individual exploratory search

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What is it like to do a PhD? I like to think of a PhD not as a marathon, not as a sprint, but as a series of consecutive sprints that, together, are as long as a marathon... and you also don't know where you are going. If this sounds like a pretty daunting endeavor... it is. And you need a great deal of support along the way to make it.

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What is it like to do a PhD? I like to think of a PhD not as a marathon, not as a sprint, but as a series of consecutive sprints that, together, are as long as a marathon... and you also don't know where you are going.

However, it is not as bad as it sounds. Sure, you have the stressful pressure of the sprints combined with the exhaustion of the marathon, but you also have both the warm buzz of accomplishment after every phase along the way, as well as the runners' high that comes with the long journey. And the best part? You don't know where you are going. Not because you don't know the destination yet, but because there is no fixed destination: you get to make one up!

Best job in the world.

Bart Verwaeren,

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Chapter I

GENERAL INTRODUCTION

CHAPTER I – GENERAL INTRODUCTION

“Should I stay or should I go now?

If I go there will be trouble,

and if I stay it may be double.”

The Clash (1982)

“It ain’t what you do it’s the way that you do it,

that’s what it’s all about.”

Fun Boy Three & Bananarama (1982)

The two quotes above come from songs that were extremely popular in 1982, and, perhaps in a less obvious way, also represent important aspects of organizational life. They both signify questions that organizational leaders need to answer when they aim to become or remain competitive. The former relates to a fundamental strategic orientation that needs to be decided on. It points to the never-ending tradeoff between exploring and experimenting with new opportunities (new products, markets, services, processes, etc.) versus sticking with what you know. This tradeoff is important for organizations and how to resolve it has been the subject of much research in the field of management and innovation (March, 1991; O’Reilly & Tushman, 2013).

Explorative innovation is important for organizational survival, yet it can be an equally important subject for individual managers or employees within organizations (Bonesso, Gerli, & Scapolan, 2014; Cohen, McClure, & Yu, 2007; Mom, van den Bosch, & Volberda, 2009). Indeed, several studies on organizational innovation point to the role of individual managers as the source of organizational explorative innovation and as the route through which organizations can enhance their innovative performance (Rivkin & Siggelkow, 2003; Sheremata, 2000). A defining characteristic of exploratory innovation is the extent to which

there is sufficient exploratory search (i.e., experimenting with new task approaches) in the early stages of the innovation process. Without generating a wide array of possibilities (before selecting one), it will be unlikely that the eventual solution will be explorative (Katila & Ahuja, 2002). Therefore, in this dissertation, we will focus on individual exploratory search as an important and underdeveloped avenue of research (Gupta, Smith, & Shalley, 2006; Raisch & Birkinshaw, 2008).

The second quote relates to another fundamental choice that needs to be made in organizational life: are we going to focus on outcomes and results or on processes and inputs as drivers for management practices? Although the song seems to promote the latter, in organizations, most systems and practices are built on a very different maxim: *it's results that count*. For example, more often than not, organizational pay and evaluation systems reward results and outputs, not behavioral inputs (Rynes, Gerhart, & Parks, 2005). Traditional management control theory argues to make this decision based on the measurability and controllability of outcomes or processes. In short, this theorizing argues that process-based control can only be used when individual behavior is measurable and there is a process available to which the exerted behavior can be compared (Eisenhardt, 1985; Ouchi, 1979; Turner & Makhija, 2006). In this dissertation, however, we provide an alternative viewpoint and take a psychological perspective to arrive at contrasting predictions. While the lens of management control (e.g., Ouchi, 1979; Turner & Makhija, 2006) can be interesting from a rational motivational perspective (by aligning the interests of actors and principles), we argue here that it disregards the differences in affective and cognitive reactions to the control mechanisms, which may be important in predicting qualitative differences in performance (e.g., innovative or non-innovative).

Specifically, we frame the decision of organizations to emphasize outcomes or processes as the decision to make organizational members either outcome or process accountable, where accountability refers to the psychological state (the perception) of accountability (Lerner & Tetlock, 1999). These differences in feelings of accountability have been shown to be useful in predicting several important outcomes including information sharing (Scholten, van Knippenberg, Nijstad, & De Dreu, 2007), decision-making (Brtek & Motowidlo, 2002; de Langhe, van Osselaer, & Wierenga, 2011; Siegel-Jacobs & Yates, 1996), and (un)ethical behavior (Pitesa & Thau, 2013).

Accountability focus is not only of interest because it can be used to predict a wide variety of outcomes, it is also important because understanding how accountability focus relates to outcomes can tell us something about how we need to design management practices in order to manage these outcomes. Because outcome and process accountability relate to management practices like rewarding for outputs versus inputs or leadership behaviors that focus on results versus process considerations, insights into how accountability focus leads to valued outcomes can inform these important design decisions. In this way, using accountability as a lens through which to examine the effects of management practices can lead to alternative recommendations that are different from those proposed by management control theory (e.g., Eisenhardt, 1985; Ouchi, 1979).

We further argue that it is especially useful to study the role of accountability focus with regard the still hard-to-manage outcome of exploratory innovation (or exploratory search in particular). While prior research has made clear that accountability focus can have significant effects on a wide variety of outcomes, prior research on the role of accountability for innovation-related outcomes is notably lacking (Hall et al., in press; Patil, Vieider & Tetlock, 2014). If we can clarify the relationship between accountability focus and exploratory search,

this will help academics and practitioners to understand current management practices' effects on innovation and further aide in designing alternative management practices that optimally stimulate exploratory innovation. Thus, **the overarching goal in this dissertation is to link accountability focus (outcome vs. process accountability) to individual exploratory search.**

To this end, we have produced three research papers that will be the main chapters in the dissertation. In this first chapter, we will start by introducing and positioning the central concepts (exploratory search and accountability focus) and discuss why it is important to study the relationship between the two. Next, we will give an overview of the more specific research objectives and how we will tackle them in the next chapters.

WHAT IS EXPLORATORY SEARCH BEHAVIOR AND WHY IS IT IMPORTANT

In this dissertation, we focus on individual exploratory search behavior (or exploratory search, for short) as the dependent variable. Exploratory search can be defined as scanning for, and experimenting with alternative task approaches, prompted by a perceived potential for performance improvement (Adler & Obstfeld, 2007; Knight, 2015). Note that the concept of exploratory search is related to the exploration – exploitation dichotomy in innovation. Various definitions have been used for these terms. Benner & Tushman (2002), for example, who focus on the nature of the innovative outcome, say that “exploitative innovations involve improvements in existing components and build on the existing technological trajectory , whereas exploratory innovation involves a shift to a different technological trajectory” (p. 679). For example, a mobile phone manufacturer could either focus on making small modifications to new generations of essentially the same product (exploitation), or they could explore entirely

new ways of communicating, like integrating technology in glasses or watches (exploration). Others have defined exploration and exploitation more in terms of the process that is involved, where exploration is “learning gained through processes of concerted variation, planned experimentation and play” and is the opposite of exploitative innovation, “learning gained via local search, experiential refinement, and selection and reuse of existing routines.” (Baum, Li, & Usher, 2000, p. 768). This process definition is very closely related to our definition of exploratory search. However, for reasons of clarity, we will consistently use the term exploratory search instead of exploration to make clear that we are not talking about innovative outcomes.

As exploratory search can be described as experimentation with new alternatives, it can also be seen as an individual-level process that is a *necessary*, yet *not sufficient*, step in the process of exploratory innovation development (March, 1991). It is a necessary step because exploratory search produces the variations from which an innovation must be chosen in a later phase. As such, it can be seen as part of an evolutionary perspective on innovation, which posits that innovative products are the result of blind variation and selective retention (Campbell, 1960; Simonton, 1999). If the exploratory search is limited, the set of variations is constrained and the ultimate selected alternative will also be limited to this constrained set of options (a phenomenon called ‘selection through variation’ [Katila & Ahuja, 2002]). Consequently, exploratory search determines the maximum value of the eventual solution that is chosen and implemented.

Even though this means that without exploratory search an exploratory innovation process would not be possible, it is also not sufficient to predict innovative outcomes and must be seen as conceptually distinct from these outcomes. Previous research has shown that individuals, teams, and organizations are not always capable of selecting and implementing the

best available variation. If actors are unable to identify the best or most innovative idea, as several studies suggest is the case (Rietzschel, Nijstad, & Stroebe, 2006, 2010), the quality of the innovative outcome may be unrelated to the variations produced through exploratory search. In addition, several authors have argued that implementing innovative ideas may be an important hurdle as well (Klein & Knight, 2005; West, 2002) and ideas that are more creative may even be more difficult to implement (Baer, 2012). As a result, it is important to acknowledge that exploratory search, while it is an important step in the innovation process, cannot be equated to innovative outcomes.

ACCOUNTABILITY AND ACCOUNTABILITY FOCUS

Making people accountable for what they do is a common theme in many areas of society, ranging from education (Jacob, 2005), health care (Petersen, Woodard, Urech, Daw, & Sookanan, 2006) and politics (Grant & Keohane, 2005). Likewise, in the world of organizations there is a long tradition of making employees and managers accountable via a plethora of management practices including incentive and reward systems, evaluation systems, leadership styles, etc. (Eisenhardt, 1985; Langfield-Smith, 1997; Ouchi, 1979). While they are diverse, these management practices have in common that they make actors accountable for what they are doing, which means they force the actors to justify their performance and attach meaningful consequences to this justification (Frink & Klimoski, 1998; Lerner & Tetlock, 1999). It is important to note that, while various contextual factors (e.g., reward systems, evaluation practices) can lead to feelings of accountability, we do not focus on these objective practices, but rather on the subjective experience of accountability that they instill in individuals. In this sense, accountability, as it is addressed in the organizational behavior

literature, does not refer to a state of affairs, but rather to a state of mind (Hall, Frink, & Buckley, in press).

Previous research has shown that feelings of accountability can have various effects on individuals' cognitions, decisions, affective states, and behaviors. For instance, research has found that accountability can increase work stress and anxiety (Green, Visser, & Tetlock, 2000; Hochwarter, Perrewé, Hall, & Ferris, 2005) and reduce extra-role behavior (Mitchell, Hopper, Daniels, Falvy, & Ferris, 1998). More positive consequences have been reported as well: increased job satisfaction (Breux, Munyon, Hochwarter, & Ferris, 2009), increased positive effects of conscientiousness on performance (Frink & Ferris, 1999), and higher evaluator accuracy in rating subordinates' performance (Mero & Motowidlo, 1995). It can be concluded that accountability can have important effects on individual performance, in both desirable and undesirable directions. In this dissertation, we will examine how different features of accountability can help to predict when different effects should be expected.

Different effects of accountability may be explained by different *features of the accountability environment*. The accountability environment refers to aspects of an individual's work environment that affect the interpretation of accountability (Hall, Bowen, Ferris, Royle, & Fitzgibbons, 2007). In this dissertation, we focus on the role of *accountability focus*. Accountability focus refers to "the extent to which an individual is responsible for processes (how things get done) versus outcomes (results/outputs)" (Hall et al., in press, p. 6). We focus on the feature of accountability focus, not only because prior research and theory suggest that different effects on performance should be expected (Lerner & Tetlock, 1999), but also because this distinction relates to important decisions that organizations have to make when designing management practices (Ouchi, 1979; Rynes et al., 2005). That is, accountability focus relates to choices like: rewarding for outcomes or rewarding for inputs

(Gerhart, Rynes, & Fulmer, 2009), evaluating sales results or sales efforts (Oliver & Anderson, 1994), leadership that focuses on short-term results or long-term development (Judge & Piccolo, 2004). Again, we do not investigate the results of these management practices directly. Yet, to the extent that they are predictors of accountability focus, a better understanding of the effects of accountability focus may provide a new way to explain the effectiveness of such practices.

RESEARCH OBJECTIVES OF THE DISSERTATION

The overarching research goal of this dissertation is to investigate the role that accountability focus (outcome vs process accountability) plays in driving individual exploratory search. From the previous discussion, it can be concluded that examining the relationship between accountability focus and exploratory search is important for at least three reasons. First, there is a good amount of research that shows that outcome and process accountability can have substantial and different effects on important cognitive responses, which can be expected to relate to exploratory search. For example, process accountability has been found or suggested to lead to more systematic information processing (de Langhe et al., 2011), higher epistemic motivation (Nijstad & De Dreu, 2012) and more sharing of unique information (Scholten et al., 2007). All these findings indicate that accountability focus (and specifically process accountability) could have substantial effects on exploratory search. Second, although the research thus suggests that a relationship is possible, there has been no prior research that directly investigates the effect of accountability focus on (individual) exploratory search. According to several recent reviews (Hall et al., in press; Patil et al., 2014), innovation-related outcomes, including exploratory search, have been overlooked in the current accountability literature. A third reason why we propose that the relationship between

accountability focus and exploratory search deserves research attention is that outcome and process accountability can be associated with important design decisions with regard to many management practices, ranging from rewards systems (e.g., ‘are we rewarding outcomes or behaviors’), evaluation systems (e.g., ‘do we focus on inputs or outputs in evaluation’), to leadership approaches (e.g., ‘do we train managers to focus on results or task strategies in steering a team’).

In this section, we will translate the main research goal in the dissertation, namely linking accountability focus and exploratory search into three concrete research objectives that will guide the structure of the dissertation. First, although there has been a good amount of research investigating the effects of accountability perceptions on all sorts of behavioral and cognitive outcomes (Hall, et al., in press; Lerner & Tetlock, 1999), to our knowledge, there has not been any research that links accountability, in general, and accountability focus in particular, to exploration or exploitation. At the theoretical level, there is some work that has suggested that accountability (specifically process accountability) may have a positive effect on group epistemic motivation (i.e., the desire to gain a rich understanding of the task and do a thorough job finding a solution), which should result in more open information sharing and, ultimately, higher creative performance (De Dreu, Nijstad, Bechtoldt, & Baas, 2011; De Dreu, Nijstad, & van Knippenberg, 2008). Others have argued that outcome and process accountability may lead to the adoption of different regulatory foci (either focus on promoting success or preventing losses), which would then affect the extent to which innovation is pursued or not (Patil et al., 2014). None of these propositions, however, have ever been explored further or been tested empirically. Hence, a thorough exploration of the effects of accountability focus on exploratory search constitutes an important research objective of this dissertation.

A second objective of this dissertation is to contribute to our understanding of the boundary conditions of the effects of outcome and process accountability. Previous work on the topic of accountability focus has exclusively investigated main effects of outcome and process accountability on judgment and decision-making tasks. The majority of these studies have found that actors under process accountability engage in more attentive information processing, resulting in superior performance (Brtek & Motowidlo, 2002; Siegel-Jacobs & Yates, 1996). However, to date, there have been no studies that investigated variables that could moderate this effect. As Hall and colleagues concluded in their recent review of the literature: “The effects of vigilant information processing under process versus outcome accountability seem clear, but much more needs to be done to further delineate boundary conditions for this issue.” (in press, p. 9). Hence, in this dissertation, we will investigate the role of several moderators of the effect of accountability focus.

Specifically, we will focus on moderators at the level of task characteristics and the characteristic of the focal actor. We focus on these factors because they have the most potential to change the effects of accountability focus. In particular, it can be theorized that any positive effect of process accountability will depend on the information that actors have about the *what it is* that their accountability audience expects (Patil et al., 2014). In addition, we also expect that individuals will differ in their natural (dispositional) tendency to engage in exploratory search and that accountability focus will interact with such tendencies, because of fit (or misfit) between the cognitive repertoire induced by the accountability focus and the dispositional characteristic (e.g., Chan, 1996).

A third objective lies at the methodological level, where we aim to combine experiments with data from a field study. Previous work on accountability focus has been almost exclusively experimental (for an exception, see Doney & Armstrong, 1996). While there are obvious

benefits to an experimental approach (controlling of alternative explanations, testing causality, and ease of manipulating accountability focus, to name a few; see Koch & Wüstemann, 2014) there are also downsides associated with this method. An important downside is that experimental studies do not necessarily tell us something about the relevance of the effects outside of an experimental setting. This potential lack of external validity reduces motivation of practitioners to look into the potential gains of applying insights from the accountability focus literature to their accountability practices (e.g., reward and evaluation systems). Also, field studies would allow us to explore additional interaction effects with a range of organizational factors, which could then inform further theory development. Therefore, we will adopt multiple methods (experiments and field study) in this dissertation to examine the effects of accountability focus on exploratory search in an organizational setting as well.

OVERVIEW OF THE DISSERTATION

In the final section of this introductory chapter, we will present an overview of the next chapters that correspond to three research papers that were designed to contribute to the research objectives outlined above. A visual summary of the research objectives and how they map onto the chapters can be found in figure 1.

Figure 1

Chapter 2 – Accounting for results or processes to drive positive change: The effects of accountability focus on exploratory search

In the first empirical paper, we mainly draw from Conflict Theory (Janis & Mann, 1977) to postulate hypotheses about the main effects of outcome and process accountability on individual exploratory search. Based on Conflict Theory, we argue that outcome and process accountability will lead to higher/lower levels of performance pressure, respectively. In turn, we propose that high performance pressure (caused by outcome accountability) leads to actors adopting a low-effort, heuristic task processing resulting in low exploratory search compared to lower performance pressure (because of process accountability), which is proposed to lead to high-effort, systematic processing and higher exploratory search.

Two experiments were performed that partially support our hypotheses. Specifically, different levels of exploratory search are found under outcome and process accountability (in the expected direction). However, even though there was a main effect of accountability focus on performance pressure, the data could not support the mediating role of performance pressure between accountability focus and exploratory search.

Chapter 3 – Accountability focus and exploratory search: The moderating role of norm availability and openness to experience

In the second paper, we explore two potential moderating variables in the relationship between accountability focus and exploratory search. Based on the Social Contingency Model (Tetlock, 1992), we first argue that the availability of a process norm (i.e., when an actor knows what kind of process the audience they are accountable to would find acceptable) would interact negatively with process accountability, but not with outcome accountability. Applying trait activation theory (Tett & Burnett, 2003), we also propose that process accountability, but again not outcome accountability, activates the systematic and flexible processing that is

associated with the personality trait of high openness to experiences. Because this mode of processing fits with that instilled by process accountability itself, a positive interaction on exploratory search is proposed.

An experiment is conducted, using the same task as in the previous chapter. Accountability focus and norm availability are manipulated and openness to experience is measured. Results show support for the positive interaction of process accountability and openness to experience and the negative interaction of process accountability and process norm availability. Consistent with the predictions, no significant interaction effects for outcome accountability were found.

Chapter 4 – Felt process accountability and exploratory search under different levels of routinization: A field study

A final study is described in chapter 4, that investigates the role of perceived accountability focus in driving individual exploratory search in a real work setting. To operationalize exploratory search, we use the concept of creative process engagement, which can be described as scanning for opportunities for improvement, gathering relevant information, and generating alternative solutions (Zhang & Bartol, 2010a). As such, we argue that it is a job-related expression of exploratory search and previous research has shown that it is a prerequisite of, yet conceptually distinct from, innovative performance (Zhang & Bartol, 2010b). Similar to the earlier studies, we argue that perceived process accountability would be associated with higher creative process engagement, yet that this relationship would be moderated by the type of job that someone held. Specifically, we hypothesized that process accountability would negatively interact with the level of routineness of a job. If a job is highly routinized, there are likely stricter norms about what an acceptable process is, which, based on

the Social Contingency Model, means that process accountability would lead workers to stick to those procedures and engage less in creative processes.

A survey study was conducted in a consultancy company. Results do not show main effects of outcome or process accountability, yet there is a significant interaction effect of process accountability and job routinization. This suggests that process accountability could be a way to increase exploratory search in the work context, yet only for non-routine jobs.

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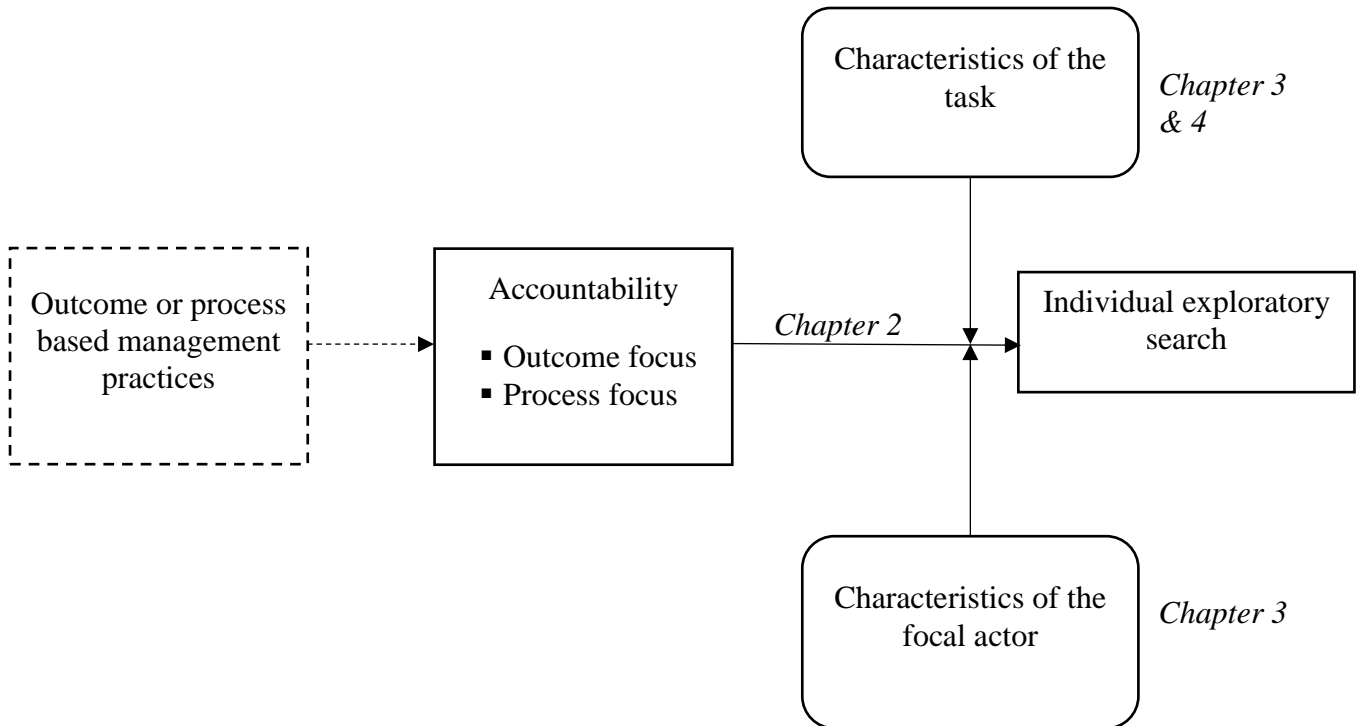
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Figure 1

Overview of the research objectives



Note: Dashed arrow and box represents assumed, but not tested, relationship

Chapter II

ACCOUNTING FOR RESULTS OR PROCESSES TO DRIVE POSITIVE CHANGE: THE EFFECT OF ACCOUNTABILITY FOCUS ON EXPLORATORY SEARCH

**CHAPTER II - ACCOUNTING FOR RESULTS OR PROCESSES TO DRIVE
POSITIVE CHANGE: THE EFFECT OF ACCOUNTABILITY FOCUS ON
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ABSTRACT

Most organizations today use human resources and leadership practices that make employees accountable for what they do and/or how they do it. In this paper, we examine how accountability with different foci (outcome vs process accountability) differentially affects exploratory search behavior, which is an important step in the process of innovation. Based on Conflict Theory, we argue that outcome and process accountability will lead to high/moderate levels of performance pressure, respectively. In turn, performance pressure determines if individuals approach a task by systematically exploring new ways to do a task (moderate performance pressure) or rather stick to existing solutions (high pressure). Results of two experiments are presented that generally support the hypothesis that outcome and process accountability lead to different levels of exploratory search, yet only partial support is found for the mediating role of performance pressure.

INTRODUCTION

When individuals are faced with a task, some problem to solve, they can either try to find a solution as quickly as possible and then stick with it, or they can keep exploring alternative ways of solving the problem at hand (Cohen, McClure, & Yu, 2007). If they follow the latter route, they are engaging in exploratory search. Individual exploratory search can be described as seeking new ways of doing a task and experimenting with alternatives to determine whether changing an existing approach improves performance (Knight, 2015). Exploratory search is part of the early stages of the innovation process, as it fuels the generation of diverging alternatives that in later stages of the innovation process can be selected as innovative outcomes. In that way, the breadth of an exploratory search process determines the variety of options to choose from in the consecutive selection process, and thus has a substantial impact on the quality of the eventual innovation (March, 1991). Although the concept can be examined at the organizational (Katila & Ahuja, 2002), team (Knight, 2015), or individual level (Keinan & Giora, 1987; Kudesia, Baer, & Elfenbein, 2015), we focus here on the latter, as this has received relatively little research attention, yet this lower level is essential as its effects can translate to the higher levels as well (Good & Michel, 2013; Mom, van den Bosch, & Volberda, 2009).

Just like organizations and teams (Audia & Goncalo, 2007; Gardner, 2012; March, 1991), individuals often show a tendency to prefer exploiting existing solutions over searching for new alternatives. Research in psychology suggests that our brains are to some extent hard-wired to fixate on present alternatives at the cost of new ones (Chrysikou & Weisberg, 2005; Kohn & Smith, 2011; Smith, Ward, & Schumacher, 1993). This tendency to disregard exploratory search in favor of local search (i.e., going for incrementally different alternatives) has also been shown hard to mitigate (Chrysikou & Weisberg, 2005; Smith, 2003).

This poses a challenge for organizations who aim to pursue an innovation strategy where they count on their employees to not only be on the lookout for ways to optimize existing products or processes, but also search for new ones altogether. Not surprisingly, managers in organizations have consistently called for insights on how to improve exploratory search among their staff (Barsh, Capozzi, & Davidson, 2008). Ironically, some common management practices may be exacerbating the problem. Specifically, there is a variety of management practices that make employees accountable for their performance in some way, via formal or informal evaluations with significant stakes attached to them (Hall, Bowen, Ferris, Royle, & Fitzgibbons, 2007). These accountability practices instill individuals with performance pressure (Hochwarter, Perrewé, Hall, & Ferris, 2005), which has previously been found to reduce search related processes, at least when the pressure to perform is high (Baumeister, 1984; Gardner, 2012; Litt, Reich, Maymin, & Shiv, 2011). These findings suggest that making an individual accountable for performance will negatively influence exploratory search.

However, accountability practices can have different characteristics and it is likely that these lead to different effects on behavior (Hall et al., 2003, 2007; Lerner & Tetlock, 1999). One important distinction that has been made is between accountability practices that differ in the focus of the accountability. In other words, they differ in *for what* someone is accountable: for the result (outcome accountability) or for how the result was achieved (process accountability) (Lerner & Tetlock, 1999). Previous research has shown that outcome and process accountability can lead to different results in terms of judgment and decision-making (e.g., Brtek & Motowidlo, 2002; de Langhe, van Osselaer, & Wierenga, 2011). In these studies, it is argued, based on Conflict Theory (Janis & Mann, 1977), that outcome and process accountability will lead to different levels of performance pressure and that these different levels of performance pressure lead to differences in behavior (Siegel-Jacobs & Yates, 1996).

In this chapter we build on this research in two important ways. First, we aim to directly test the different effects of accountability focus on performance pressure. In this way, this study is the first that attempts to explicitly test the arguments based on Conflict Theory. Second, we examine the effect of accountability focus on individual exploratory search behavior. While earlier studies have mostly focused on individual performance in decision-making tasks (e.g., selecting the best option), exploratory search or other parts of the innovation process have not been examined.

In the following section, we develop hypotheses about the effects of outcome and process accountability on exploratory search behavior and, subsequently, report the results of two experiments that provide (partial) support for the hypotheses.

THEORY AND HYPOTHESIS DEVELOPMENT

Defining Outcome and Process Accountability

It is commonplace in society for people to have to justify their actions and accomplishments to others (Frink & Klimoski, 1998; Lerner & Tetlock, 1999). Especially in organizations, there are often elaborate management systems and practices, including target setting, evaluation, and reward systems, to make people in the organization accountable for what they accomplish and/or how they accomplish it (Markman & Tetlock, 2000). A common feature of all these systems is that they instill feelings of accountability in individuals.

Felt accountability (usually just referred to as *accountability*) has been defined as the “implicit or explicit expectation that one may be called on to justify one’s beliefs, feelings, and actions to others” and that there are meaningful consequences attached to this justification

(Lerner & Tetlock, 1999, p. 255). It is important to note that consequences in an accountability context can be tangible (e.g., rewards) but also intangible, social, consequences like being berated or praised by a supervisor or colleague. Note that the different management practices that instill feelings of accountability are not the focus in this paper, but rather the individual's perception of accountability that are a result of such practices.

The focus in this paper is not on whether or not there is some accountability system in place, but on the focus of accountability that is induced by such systems. As Frink and Klimoski (1998, p. 20) put it: "What we are accountable for may be the paramount issue in predicting behavior, rather than simply that we are or are not accountable." Accountability focus answers the question 'for what' someone is accountable. Specifically, the literature defines accountability focus as a dichotomy of whether "an individual is responsible for processes (how things get done) versus outcomes (results/outputs)" (Hall, Frink, & Buckley, in press, p. 6). While outcome and process accountability have received some research attention, there are still many unanswered questions about how they differentially impact behavior, specifically with regard to the processes involved in innovation (Hall et al., in press; Patil, Vieider, & Tetlock, 2014).

Accountability Focus and Performance Pressure

Performance pressure can simply be defined as the feeling that performing well is important (Baumeister, 1984). However, in this paper we adopt the more specific definition by Eisenberger and Aselage (2009) that includes (a) a necessity to perform well, (b) a belief that current performance is inadequate, and (c) a negative affective connotation associated with performance pressure that motivates individuals to perform the task better.

People generally want to be regarded favorably by others (Baumeister & Leary, 1995), so it could be argued that accountability, regardless of its focus, will induce performance pressure. However, outcome and process accountability do differ in the perception of how easy it is to improve performance (Siegel-Jacobs & Yates, 1996). Under outcome accountability, there is (almost always) a certain degree of uncertainty involved in reaching a performance goal. For example, even a sales agent with the best possible sales strategy could still fail to sell product (for example when external market factors lowered demand). Under process accountability, since individuals have direct influence over how they approach their task, the same uncertainty is not present.

According to Conflict Theory (Janis & Mann, 1977), these differences in uncertainty associated with outcome and process accountability play an important role in determining performance pressure. When a certain decision or reaching a performance goal is important (when stakes are involved) but there is uncertainty about reaching the needed performance, high performance pressure will be experienced. When there is more direct control over the performance that needs to be justified, and thus lower uncertainty, lower levels of performance pressure are expected. This relationship between accountability focus and performance pressure has been proposed in the earlier work on accountability focus (de Langhe et al., 2011; Lerner & Tetlock, 1999; Siegel-Jacobs & Yates, 1996). However, none of these studies have explicitly set out to test this hypothesis. Therefore, in this paper, we formally examine the effect of accountability focus on individuals' perceived performance pressure.

Hypothesis 1: Accountability focus will predict performance pressure, such that relative to process accountability, performance pressure will be higher under outcome accountability.

Accountability Focus, Performance Pressure, and Exploratory Search Behavior

The differences in performance pressure that have been proposed based on Conflict Theory can be used to explain the differences in decision-making under outcome and process accountability that earlier studies have found. For instance, Siegel-Jacobs and Yates (1996) conducted an experiment in which participants had to select jury members for a fictional court case. These researchers found that when working under process accountability, participants took more advantage of the available information about potential jury members. This more systematic information processing was positively related to the accuracy of their choices (but only when the information was relevant to the case). Similarly, Brtek and Motowidlo (2002) found that when participants in an experiment were asked to watch a video recording of a job interview and try to predict the performance of the candidates in the video, they made more accurate predictions when working under process accountability compared to under outcome accountability. Further analysis revealed that participants working under process accountability approached the task more systematically (i.e., took more notes, were more attentive during the interview) than people working under outcome accountability. In a more recent example, researchers presented participants with a prediction task that was set up in a way to either favor systematic processing (i.e., ‘cue-abstraction’ processing) or to favor heuristic processing (i.e., ‘exemplar-from-memory’ processing) (de Langhe et al., 2011). The researchers found that when people were working under process accountability, they performed better when the task could be best solved using the systematic approach, but participants under outcome accountability worked better when solutions could best be found via a heuristic task approach.

All these studies indicate that under process accountability agents are more epistemically motivated compared to under outcome accountability, which means that they are

motivated to gain a rich understanding of the task and want to produce a high-quality response to it (Kruglanski & Webster, 1996; Van Kleef et al., 2009). At the level of behavioral responses (on which we will focus in this dissertation), high epistemic motivation means taking a high-effort, systematic information processing approach and low epistemic motivation means taking a low-effort, heuristic information processing route (De Dreu & Carnevale, 2003; Dreu, Koole, & Steinel, 2000).

The effects of performance pressure on individual epistemic motivation (i.e., depth of information processing) can be understood in terms of activation theory (Gardner, 1990; Gardner & Cummings, 1988; Scott, 1966), which has been used in past research to model the relationship between (performance) pressure and individual performance measures, including innovation-related outcomes (Baer & Oldham, 2006; Byron, Khazanchi, & Nazarian, 2010). Activation theory proposes that pressure associated with a task (time pressure, performance pressure) is linear and positively related to activation and that for every task there is an optimal (“characteristic”) level of activation. When performance pressure is moderate, activation is also moderate, and individuals are considered to be “optimally stimulated”. This optimal stimulation results in high task engagement and effortful, systematic processing. On the other hand, when performance pressure and activation are high, they deviate from an individual’s “characteristic level” of activation for the task, resulting in suboptimal task engagement and low-effort, heuristic information processing (Byron et al., 2010; Gardner & Cummings, 1988). Hence, the high pressure associated with outcome accountability and the relatively lower level of pressure associated with process accountability can explain the differences in information processing that are found in previous research (de Langhe et al., 2011; Siegel-Jacobs & Yates, 1996). This does not mean that process accountability will necessarily always lead to superior performance, as has been suggested in past reviews (Frink et al., 2008), but rather that outcome

and process accountability lead to different ways of working that can aide or hurt performance depending on what kind of processes are needed for the task in question (de Langhe et al., 2011; Hall et al., in press; Patil et al., 2014).

Because exploratory search is driven by high-effort systematic processing, we do argue that, for this type of outcome, process accountability will have a positive influence and outcome accountability a negative effect. Although research on the processes underlying individual exploratory search specifically is scarce, earlier work has been conducted on closely related outcomes. Recall that exploratory search means “experimenting with new ideas and approaches to [a] task” (Knight, 2015, p. 99). Two concepts that are very related to this definition are ‘individual exploration’ and the ‘persistence’ path in the dual pathway to creativity model (De Dreu, Baas, & Nijstad, 2008). Persistence in creativity (i.e., deliberate, focused, and structured exploration of different perspectives) draws on individuals’ sustained attention and allocation of working memory capacity (De Dreu, Nijstad, Baas, Wolsink, & Roskes, 2012). When this allocation of cognitive resources is hindered (for example by a competing task) persistence in creativity is lowered. Similarly, fMRI studies have shown that exploration (i.e., “disengaging from the current task to enable experimentation, flexibility, discovery, and innovation”, Laureiro-Martínez, Brusoni, Canessa, & Maurizio, 2015, p. 320) draws from regions of the brain associated with attentional control to track the value of alternative solutions, while exploitation drew from areas associated with reward seeking, which put focus on evaluating the value of current solutions (Laureiro-Martínez et al., 2013, 2015). We argue that exploratory search is very similar to these concepts (persistence, exploration) and will draw from the same resources that require high cognitive effort to keep attention on the task at hand and engage in systematically experimenting with new solutions to it.

Hence, because exploratory search is driven by high-effort systematic information processing, we argue that moderate levels of pressure associated with process accountability will favor exploratory search behavior. High levels of pressure, that stimulate low-effort heuristic processing, on the other hand, will lead to a lower tendency to engage in exploratory search.

Hypothesis 2: Accountability focus will influence individual exploratory search, such that process accountability should lead to higher exploratory search than outcome accountability.

Hypothesis 3: The relationship between accountability focus and exploratory search will be mediated by performance pressure.

Insert figure 1

To test the hypotheses, two experiments are conducted. The first experiment tests the hypotheses in a lab setting (study 1a), the second experiment was aimed at replicating the main effect of accountability focus in an online experiment (study 1b).

STUDY 1A

Samples and Procedures

We conducted an experiment with a sample of 82 Master students in Applied Economics who participated in the study in return for course credit. Participation was voluntary (there were alternative ways to earn the course credit). The participants were on average 22 years old (*SD*

= .97) and 64.4 percent were women. Participants were seated individually at a computer terminal and started by reading and signing the informed consent form, before reading the paper instructions for the task. After reading the instructions, participants started the computer based task.

Task

The task was adapted from Ederer and Manso (2013, also see the online appendix to their paper for task details). In this task, participants were put in charge of a virtual lemonade stand for twenty rounds. It was communicated that the goal of the task was to maximize the total profit. In every round, they had to make decisions about a number of strategic parameters: location (business park, school, or football stadium), color (green or pink), price, and percentage sugar and lemon in the drink. After every round they instantly got feedback in the form of the profit for that round. Each time, they could decide to make changes to the parameters, in order to try to increase the profit, or keep the parameters the same. After 20 rounds, participants completed a short post-task questionnaire and were debriefed in another room.

Consistent with the method used by Ederer and Manso (2013) the task instructions contained a letter ostensibly from the previous manager of the lemonade stand that explained how he set these parameters and that these settings made “around 90 Bucks” (Bucks were the fictitious currency in the exercise in order to avoid any relation to an actual currency). It was also made clear that the previous manager experimented with all parameters (price, sugar and lemon percentage, color), except location of the lemonade stand, and that a different strategy may be necessary at a different location.

Manipulation

In study 1a, the instruction page was the same for all participants, except for a box on the bottom titled ‘Evaluation’, which contained the experimental manipulation. For both accountability conditions it said: “Your performance will be evaluated. After you have finished that task, you need to go to room 4.9, where another researcher will take care of the evaluation”. The next part, however, was different for the various conditions. *Process accountability*: “The researcher will ask you to justify the procedures or strategy that you followed in this task. The evaluation will not be about the profit that you made, but only about how you approached the task.” *Outcome accountability*: “The researcher will ask you to justify the total profit you made over the 20 rounds. The evaluation will not be about how you approached the task, only about the result.” The *no-accountability condition* only contained a message about the anonymity of the results. This way of manipulating accountability is consistent with earlier experiments (e.g., Brtek & Motowidlo, 2002; Siegel-Jacobs & Yates, 1996).

Measures

Manipulation checks

Two items were included to test whether or not the manipulation was successful. Participants were asked to indicate to what extent two statements were true for them: “you will have to justify your results (profits) to a researcher” (outcome accountability) and “you will have to justify your strategy to a researcher” (process accountability). Participants used a seven-point scale from ‘Totally false’ to ‘Totally true’.

Exploratory search

Drawing from the original use of this task (Ederer & Manso, 2013), exploratory search can be assessed by employing a clear operational definition of what an exploratory search

round would look like. Following Ederer and Manso (2013), an exploratory search round is defined as a round in which either (a) a new location is chosen, that is not the initial location, or (b) a significant change (more than 0.50, on a scale from 1 to 10, on the continuous variables¹) is made in the parameters while in a location that is not the initial location. Any round that does not contain significant changes or that contain changes within the initial location receive a value of '0'.

Intrinsic motivation

Intrinsic motivation, the extent to which someone enjoys the task for the sake of the task itself, plays a central role in creativity and innovation research (Amabile, 1996; Grant & Berry, 2011). In addition, it is possible that people under different accountability foci would perceive that task as more or less enjoyable. Therefore, intrinsic motivation will be taken into account as a control variable. To measure intrinsic motivation, we used four items from Eisenberger and Aselage (2009). People were asked to indicate to which extent they believed the task to be enjoyable, interesting, boring, and unpleasant on a seven-point scale ('totally disagree' to 'totally agree'). Reliability was adequate with $\alpha = .74$ (1a). The same measure was used in both experiments.

Results

Manipulation and Attention Checks

The manipulation check measured perceived outcome and process accountability in two separate items. Supporting the successfulness of the manipulation, two between subjects ANOVA's show that participants score significantly higher on perceived outcome

¹ As a robustness check, we also used lower and higher thresholds (.25, .75 and 1.0). Although there are more or less rounds of exploration as the threshold is made more lenient or more strict, respectively, these changes are the same for different conditions. Hence, the results do not meaningfully change.

accountability ($F_{(2,78)} = 7.46, p = .001$) and higher on perceived process accountability in the ($F_{(2,78)} = 7.16, p = .001$) in the outcome and process accountability conditions, respectively. However, closer analysis of individual participants' scores reveals that 11 participants indicated that they expected more to be evaluated on outcomes, even though they were in the process accountability condition, or the other way around. These participants' results were discarded from subsequent analysis, leaving 26, 19 and 26 participants for the no accountability, outcome accountability and process accountability condition, respectively.

Descriptive statistics

Table 1 contains the means and standard deviations for the main study variables, for both studies (the results for total exploratory search and performance pressure will be discussed in the next section). The results show no significant differences in intrinsic motivation or average time per round (in seconds) between conditions (for both studies). Participants reach a significantly higher total profit under process accountability compared to under outcome accountability ($t_{(43)} = 2.16, p = .04$). There is no difference in total profit between no accountability and outcome ($t_{(43)} = 1.82, p = .08$) or between process accountability and no accountability ($t_{(43)} = .51, p = .61$).

Hypothesis testing

The main effect of accountability focus on performance pressure

The first hypothesis proposed that accountability focus would have an effect on performance pressure (lower perceived pressure under process accountability). From the results in table 1 (study 1a), we can determine that participants reported a significantly higher performance pressure under outcome accountability and no accountability compared to under process accountability ($t_{(43)} = 2.20, p = .03$ and $t_{(43)} = 2.89, p < .01$). To check whether a

participant's performance influenced the (post-task) performance pressure measure, we also conducted a regression analysis where (standardized) average profit was included as a control variable. The results show that average profit does have a significant effect on performance pressure ($F_{(1, 69)} = 4.08, p = .047, R^2 = .06$), but accountability focus explains additional variance ($F_{(2, 67)} = 4.06, p = .02, R^2 = .16$). Regression coefficients confirm that there is a significant negative effect of process accountability ($B = -.73, t = -2.77, p = .007$), but no effect of outcome accountability ($B = -.18, t = -.62, p = .54$) compared to no accountability. These results support the first hypothesis that under process accountability, performance pressure is significantly lower. However, a positive relationship between outcome accountability and performance pressure (compared to no accountability) could not be found.

Main effect of accountability focus on exploration

The total number of rounds of exploration (over 20 rounds) are presented in table 1. The results for study 1a show that there is no significant difference in total number of exploratory search rounds ($F_{(2, 71)} = 1.03, p = .36$). To further explore the possibilities of changes in exploratory search during specific intervals, we divided the 20 rounds into 4 quarters and examine if there are differences in exploration in these four stages of the task.² Table 2 contains the results of analyses of variance with exploration in the four quarters as dependent variables and condition as predictor (controlling for intrinsic motivation). The results show that for the first quarter, there is a significant difference in exploratory search between the conditions ($F_{(2, 67)} = 4.48, p = .02$), but not for the other quarters. Planned contrasts confirm that in the first quarter, exploratory search is higher under process accountability than in the other conditions

² As this division is arbitrary, we also performed an analysis of the 20 rounds individually. As exploratory search in an individual round is a binary variable, binary logistic regression was used. The results of these analyses are presented in appendix 1. Although estimation of logistic models is somewhat less straightforward than with traditional parametric models, the results do show that there are several rounds for which there is a significant effect of accountability focus.

(Difference_{PA-OA} = 1.08, $SE = .42$, $p = .01$ and Difference_{PA-No accountability} = .97, $SE = .38$, $p = .01$), and there is no difference between no accountability and outcome accountability (Difference_{OA-No accountability} = .11, $SE = .41$, $p = .78$). Overall, the data provide partial support for the second hypothesis.

Mediation effect of performance pressure

The third hypothesis proposed that the differences in exploratory search under outcome and process accountability could be explained by differences in performance pressure. Earlier, we already found that accountability focus has a significant effect on performance pressure. To see if performance pressure also has a significant effect on exploratory search, we performed a regression analysis of performance pressure on exploratory search (for the 4 quarters). The results reveal no significant relationship between performance pressure and exploratory search for any of the quarters (highest $R^2 = .004$, $F_{(1, 69)} = .10$, $p = .75$). This would mean, based on the traditional Baron and Kenny (1986) method for inferring indirect effects that mediation is not possible.

More recent methodology texts propose that it is better to perform a direct test of indirect effects rather than infer it through the Baron and Kenny (1986) steps (Zhao, Lynch, & Chen, 2010). Hence, we also used the PROCESS tool (Hayes, 2013, model 4) to directly assess the indirect effect for the four rounds where there was a significant effect of accountability focus on exploratory search. Results showed again no sign of mediation by performance pressure for the four quarters. Further analysis did show that for one round (round 6) there was a significant indirect effect through performance pressure (indirect effect = -.41, $SE = .33$, 95% bias-corrected $CI [-1.34, -.01]$), but not for the other rounds. While this is some indication of mediation, overall, the results are not supportive enough to accept hypothesis 3.

STUDY 1B

Although the results of the first experiment are (partially) supportive of hypothesis 2, a second experiment was conducted to replicate the results for this research question. The main effect of accountability focus on exploratory search is the central focus in this study. Therefore we wanted to build a more robust case for it.

Samples and Procedures

An online sample was recruited via Prolific Academic (www.prolific.ac), a crowdsourcing tool similar to Amazon Mechanical Turk, but specifically created to involve people in online academic research. While some have voiced concerns about experimental control in online settings, the use of online crowdsourced samples has been shown to be a useful and valid way to conduct certain types of experiments in psychological and organizational behavior research (Buhrmester, Kwang, & Gosling, 2011; Paolacci, Chandler, & Ipeirotis, 2010). We recruited 100 participants who were preselected on their first language (English). The average age was 34 years ($SD = 12.58$) and 57 % were female. In this study, all materials were on-screen. Participants started by reading the informed consent and indicating agreement by signing with their prolific ID number. While the ID number allows post-task communication and payment, it does not give the researcher any personal information. Hence, anonymity is preserved.

Task

For this replication, a small change was made to some of the labels in the task. Conversations with participants after the task in the first experiment, as well as pretests of this experiment, revealed that some participants, regardless of condition, use a pragmatic way to predict the optimal lemonade recipe based on the location. Specifically, many participants indicated that they figured that the school location would do well with high sugar and low price,

because this would likely appeal to children (a combination that, incidentally, would indeed result in very high profits in the simulation). Although this heuristic approach can be a valid way of defining a solution in the task, it potentially confounds the effect of accountability focus on exploratory search. That is, participants may end up at a high yielding solution via systematic exploration or via following a pragmatic hunch about the market in the location. Although this might play an equal role in all conditions, and thus not necessarily be a source of systematic distortion, we opted to change the names of the locations to neutral street names (Maple, Magnolia, and Oak street), without changing the underlying profit formulas.

Manipulation

In this study, accountability was manipulated, by telling participants that they could earn a small bonus for the task (between zero and two pounds) and that to determine the bonus amount they would have to justify either their result (outcome accountability) or the task process that they followed (process accountability). Participants were told that, after the task, they would connect via webcam with one of the researchers and they would have to account for their work face-to-face, albeit in a virtual way. Although some earlier research have used a written accountability manipulation in online experiments (Pitesa & Thau, 2013), we use a webcam because it is more equivalent to the face-to-face justification manipulation in study 1a, and potentially more potent than a written one. In addition, as the results of study 1a suggested that the effect of accountability focus can be rather subtle, we reminded participants of the manipulation in every round via a small text on top of the page. This text read “remember, after the task, you will have to justify the [profit you made] [strategy you followed] in this task”, depending on the condition.

Measures

Manipulation and attention checks

In this second study, a slightly more elaborate measure was used to test the manipulation of accountability. Given that the operational definition of (felt) accountability states that accountable individuals feel they are evaluated *and* that there are consequences associated with the evaluation (Tetlock & Lerner, 1999), four items were developed to measure these two dimensions of accountability. The items were: 'I feel like I'm being evaluated based on the task result (the total profit)' and 'I feel like I'm being evaluated based on how I approached the task', and 'My task result will determine my bonus' and 'My task strategy will determine my bonus'. The mean of the two outcome and the two process accountability items was calculated to examine the accountability manipulation. We also included an item to check whether participants actually believed that they would have to justify their work via webcam. To this end, at the very end (after it was revealed that there would not be a webcam discussion) an item was added to test this that read "Did you believe that you would have to justify your work via webcam?". The response options were 'I totally believed it', 'I had my doubts', 'It seemed very unlikely' and 'I didn't believe it at all'. Finally, a good practice in online experiments is to include attention checks in survey questions to be able to detect participants that are insufficiently motivated to really participate in the experiment.

Intrinsic motivation

This variable was measured in the same way as in the first study. Reliability was again good with $\alpha = .87$ (1b).

Results

Manipulation and attention checks

For the second experiment, two outcome and two process accountability items were used to assess the successfulness of the manipulation. The mean of the two outcome and the two process accountability items was taken to examine the accountability manipulation. The results showed that, as intended, participants under the outcome accountability condition perceived higher outcome accountability ($M_{PA} = 3.59$, $SD = .86$ and $M_{OA} = 4.02$, $SD = .69$, $p = .003$) and under process accountability more process accountability ($M_{PA} = 4.36$, $SD = .73$ and $M_{OA} = 2.52$, $SD = 1.00$, $p < .000$). However, just like in the first study, we also checked whether or not individual participants passed the manipulation check (i.e. had a higher score for the accountability focus of the condition they were in). In total, 16 participants failed this tests and these responses were not included in any of the further analyses. We also included an item to check whether participants actually believed that they would have to justify their work via webcam. To this end, at the very end (after it was revealed that there would not be a webcam discussion) an item was added to test this. They were prompted to be honest and that this would not have any effect on the reward they would get for the task. 10 participants indicated that they either ‘didn’t believe it at all’ or that it ‘seemed very unlikely’. These responses were also not included in the further analyses. Finally, a good practice in online experiments is to include attention checks in survey questions to be able to detect participants that are insufficiently motivated to really participate in the experiment. 4 (additional) participants failed this test. As a result, 70 participants were left.

Test of hypothesis 2

In table 1 we see that for experiment 1b there is a significant difference in the total number of exploratory search rounds ($t_{(68)} = 2.30$, $p = .02$). Just like in the first experiment, we

also calculated the amount of exploratory search rounds per quarter (also, results for individual rounds can be found in appendix 2). Table 3 contains the results of ANOVA's for the four quarters. Results reveal that, contrary to the first experiment, there is no significant difference in exploratory search in the first quarter ($F_{(1, 67)} = .12, p = .73$). However, there is significantly more exploratory search in the second and third quarter ($F_{(1, 67)} = 7.78, p = .007$ and $F_{(1, 67)} = 4.20, p = .044$), showing that differences between conditions took more time to come about. Hence, overall, the data from the study 1a and 1b provide additional support for hypothesis 2.

DISCUSSION

Discussion of the Results

In this paper, we drew from Conflict Theory (Janis & Mann, 1977) and activation theory (Gardner & Cummings, 1988) to make predictions about the effects of accountability focus (outcome vs process accountability) on individual exploratory search (Lerner & Tetlock, 1999; Siegel-Jacobs & Yates, 1996). The results of the two experiments provide overall support for the main hypothesis that under process accountability, there is higher exploratory search compared to under outcome accountability. In study 1a, there were several rounds in which there was more exploratory search under process accountability, however, the overall number of exploratory search rounds was not significantly higher. Nevertheless, the localized differences in exploratory search in the first quarter did result in significantly higher profits under process accountability, suggesting that even relatively small differences in how a task is approached can have relevant effects on performance.

Regardless, because the effect in the first experiment was relatively modest, we conducted a second experiment where the accountability manipulation was made more potent

(need for face-to-face justification, financial incentive, reminder in every round). As a result, the effect was replicated and was stronger (more individual rounds where the effect was found and significantly higher total number of exploratory search rounds). Another difference between study 1a and 1b is that in the first experiment, the differences in exploratory search are mostly limited to the first quarter. This can be understood by looking at the nature of the task. That is, the task allows participants to experiment with only a limited set of parameters, which could explain why after a few rounds people stop engaging in exploratory search and rather stay in (or close to) their new position. However, in the second experiment, we observe no effects in the first quarter, yet significant differences between conditions are found in quarters 2 and 3. This pattern of search behavior where there is relatively low exploratory search in the first few rounds (across conditions) can likely be explained by the fact that the second experiment was conducted online. The online setting could result in people not paying as much attention to instructions, compared to in the lab, and lead people to use the first rounds to get acquainted with the interface. In future replications, this could be solved by having a (few) practice round(s) before the actual task starts.

Interestingly, the results from study 1a suggest that under no accountability, exploratory search is more in line with outcome accountability: no differences in exploratory search or performance pressure were found between these two conditions (there is a borderline significant difference in the total profit that was obtained [$t_{(43)} = 1.82, p = .076$]). Perhaps participants take an automatic outcome focus for the task, as this is its most salient feature (profits get displayed after every round). Hence, even without an explicit outcome accountability manipulation, they might have felt that an outcome focus was present and that there could be some possible consequences to doing well or poorly (e.g., anticipation of comparisons of scores with peers after the task).

Based on Conflict Theory, we also proposed that performance pressure would mediate differences in exploratory search under different accountability foci. The results (study 1a) show that, consistent with our predictions, there is a negative effect of process accountability on performance pressure (even when controlling for performance level). However, the effect of performance pressure on exploratory search is not supported. Although direct examinations of the indirect effect do provide some partial support, overall we must conclude that the results with regard to the mediation role of performance pressure are inconclusive.

Contribution to the Accountability and Exploratory Search Literature

In this paper, we aid the understanding of how contextual factors can increase exploratory innovation, not by examining it as an outcome, but by examining an essential step in the exploration process: exploratory search. By searching alternative approaches to tasks that they are faced with, individuals can create a wider set of variations that allows them (or others in the team, organization) to increase the chance of selecting a radical, breakthrough, innovative way of doing things (Simonton, 2011). Although exploratory search is important for innovation, it has not received much research attention, especially at the lower levels of analysis (Anderson, Potočnik, & Zhou, 2014). As a result, the present paper constitutes an early attempt at understanding what kind of contextual factors stimulate or hinder exploratory search and specifically points to the role of accountability as an antecedent.

The paper also contributes to the accountability literature itself. First, by examining accountability focus instead of the presence (or lack of) accountability, it paints a more nuanced picture (Frink & Klimoski, 1998). The studies provide further support for the necessity of taking into account this complexity when making hypotheses about the effects of accountability systems (Hall et al., 2007, in press). In addition, earlier research had not considered the role of accountability (and specifically accountability focus) with regard to the innovation process

(Patil et al., 2014). Although the focus here is specifically aimed at exploratory search, it is a first attempt to examine how different types of accountability relate to parts of the innovation process. Lastly, to our knowledge, this paper constitutes a first attempt to directly assess the role of performance pressure, or Conflict Theory. Although the results only partially support the hypotheses on the role of performance pressure, this paper both points to the importance of further investigating the mechanisms proposed by Conflict Theory and to the need to think about potential alternative theories and mechanisms.

Limitations and Suggestions for Future Research

Even though numerous interesting insights can be gained from this paper, there are also several limitations that could be addressed in future research. First, the post-task measurement of performance pressure may have been influenced by the fact that feedback is given throughout the task. This way, participants have some insight into their performance: if they see their profits going up round after round, they might feel that their performance is probably good enough. If they see it remaining stable or going down, they might worry more about poor performance. Hence, performance pressure may be, in part, determined by the actual performance instead of by the accountability condition. Here, we statistically dealt with this issue by controlling for task performance when examining the effect of accountability focus on performance pressure, yet future research should try to structurally solve this issue by measuring performance pressure before (but after the manipulation) or during the task. It is likely that using self-reported measures of pressure during the task would cause unwanted side effects (e.g., increasing pressure by drawing attention to it), yet a concurrent performance pressure measure could be achieved via a physiological measure of anxiety, which is conceptually related to performance pressure, as we have defined it in this paper (important elements are negative affective loading and uncontrollability, see Eisenberger & Aselage,

2009, and Ursin & Eriksen, 2004). Specifically, heart rate and skin conductance measures could be used to assess anxiety during the task (Akinola, 2010; Crone, Somsen, Van Beek, & Van Der Molen, 2004), which has the added benefit of being able to assess performance pressure variations over time.

A second limitation that needs to be acknowledged is the narrow scope of the experimental task that was used (Ederer & Manso, 2013). The behavior that is sampled in the task fits the definition of exploratory search (i.e., experimenting with new solutions to find a better one), but does not measure any other elements of the innovation process. Future research could consider alternative tasks that allow for the (separate) measurement of exploratory search and selection of ideas for implementation (e.g., Rietzschel, Nijstad, & Stroebe, 2006) or could give participants the opportunity to more freely search for information, and hence allow researchers to examine the amount and breadth of information that is considered (e.g., Weenig & Maarleveld, 2002). Examining these other elements in the innovation process could permit to draw conclusions about the broader innovation process and hence provide a more thorough examination of how accountability focus affects innovation.

Finally, the current paper focuses on the main effects of outcome and process accountability on exploratory search, yet does not examine any boundary conditions of these effects. Nevertheless, it is clear that different task characteristics may very well lead to different effects of outcome and process accountability. For example, the characteristics of the focal actor and the task could interact with accountability focus to predict individual behavior (Hall et al., in press). The characteristics of the focal actor, which include skill levels, affective states, and personality (among others), have received some research attention with regard to accountability, but not in connection to accountability focus specifically. For example, although several personality factors have been shown to become more influential in driving

behavior under accountability (e.g., Frink & Ferris, 1999), it may be that outcome and process accountability differently inhibit or facilitate specific dispositional inclinations (cfr. Trait activation theory, Tett & Burnett, 2003). With regard to the characteristics of the task, the Social Contingency Model (Tetlock, 1992), which takes an impression management approach to predict how individuals react to accountability pressures, could be used to make predictions. Specifically, the theory points to the role of the availability of a norm about how to do the task. If there is such a norm, process accountability may lead to blindly following it (Doney & Armstrong, 1996; Slaughter, Bagger, & Li, 2006), and hence to reduced exploratory search (Patil et al., 2014). These potential moderating variables will be further explored in the next chapters of this dissertation.

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Table 1: Means and standard deviations main study variables

	Study 1a			Study 1b	
	No accountability	Outcome accountability	Process accountability	Outcome accountability	Process Accountability
	(<i>n</i> = 26)	(<i>n</i> = 19)	(<i>n</i> = 26)	(<i>n</i> = 36)	(<i>n</i> = 34)
Total exploratory search rounds	9.12 (5.00)	9.11 (4.71)	10.73 (4.04)	5.33 (4.64)	8.15 (5.61)
Time per round	17.25 (6.42)	19.64 (8.06)	16.60 (6.62)	10.96 (7.88)	12.37 (5.30)
Total profit	1857 (418)	1651 (306)	1921 (478)	1669 (299)	1788 (402)
Exploration Q1	2.85 (1.38)	2.74 (1.59)	3.73 (1.12)	1.61 (1.38)	1.74 (1.21)
Exploration Q2	2.54 (1.58)	2.47 (1.54)	2.50 (1.75)	1.39 (1.54)	2.53 (1.81)
Exploration Q3	2.19 (1.67)	2.26 (1.48)	2.73 (1.82)	1.17 (1.70)	2.06 (1.82)
Exploration Q4	1.54 (1.75)	1.63 (1.67)	1.77 (1.95)	1.17 (1.73)	1.82 (1.93)
Intrinsic motivation	5.24 (.87)	5.22 (.91)	5.64 (.76)	4.30 (.56)	4.41 (.79)
Performance pressure	5.04 (.86)	4.95 (.99)	4.27 (1.05)	/	/

Note: standard deviations in parentheses

Table 2: ANOVA results for study 1a

	No accountability	Outcome accountability	Process accountability	<i>F</i>	<i>p</i>	<i>R</i> ²
Exploration Q1	2.82 (.27)	2.70 (.31)	3.79 (.27)	4.48	.02	.12
Exploration Q2	2.54 (.33)	2.47 (.38)	2.50 (.33)	.01	.99	.00
Exploration Q3	2.20 (.34)	2.27 (.39)	2.72 (.34)	.68	.51	.02
Exploration Q4	1.61 (.34)	1.71 (.41)	1.64 (.35)	.02	.98	.06

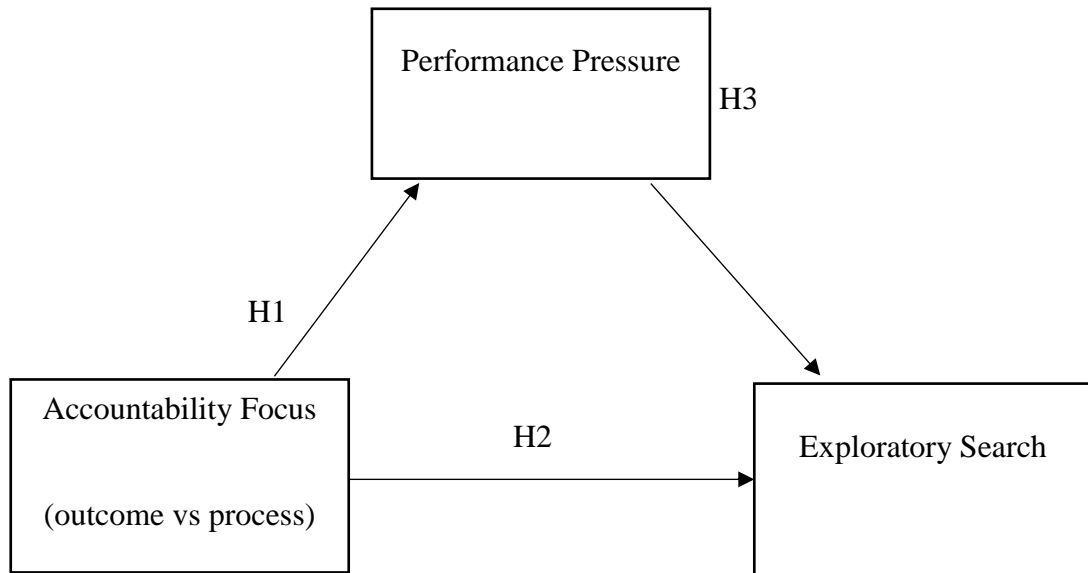
Note: estimated marginal means (controlling for intrinsic motivation); Standard errors in parentheses

Table 3: ANOVA results for study 1b

	Outcome accountability	Process accountability	<i>F</i>	<i>p</i>	<i>R</i> ²
Exploration Q1	1.62 (.22)	1.73 (.23)	.12	.73	.01
Exploration Q2	1.39 (.28)	2.52 (.29)	7.78	.01	.11
Exploration Q3	1.18 (.30)	2.05 (.30)	4.20	.04	.07
Exploration Q4	1.17 (.31)	1.82 (.32)	2.13	.15	.03

Note: estimated marginal means (controlling for intrinsic motivation); Standard errors in parentheses

Figure 1: Study Model



Appendix 1

Estimated marginal means and model fit tests for exploratory search per round (study 1a)

Round	conditions			Model fit					
	No accountability	Outcome accountability	Process accountability	χ^2 (df = 3)	p	H&L χ^2	p	Cox & Snell R ²	Nagelkerke R ²
1	.57 (.10)	.36 (.11)	.75 (.10)	7.42	.06	9.55	.30	.10	.13
2	.76 (.09)	.57 (.10)	.86 (.09)	4.95	.18	6.61	.58	.07	.10
3	.58 (.10)	.58 (.11)	.76 (.10)	2.84	.42	5.39	.72	.04	.05
4	.46 (.10)	.73 (.11)	.63 (.10)	4.09	.25	3.82	.87	.06	.08
5	.45 (.10)	.47 (.11)	.78 (.10)	7.04	.07	11.83	.16	.09	.13
6	.46 (.09)	.36 (.11)	.78 (.10)	8.98	.03	5.54	.70	.12	.16
7	.61 (.10)	.41 (.12)	.55 (.10)	2.28	.52	4.99	.66	.03	.04
8	.51 (.10)	.65 (.11)	.32 (.10)	7.80	.45	7.80	.45	.08	.10
9	.50 (.10)	.58 (.12)	.53 (.10)	.34	.95	7.06	.42	.01	.01
10	.46 (.10)	.47 (.12)	.32 (.10)	2.04	.56	14.97	.06	.03	.04
11	.53 (.10)	.47 (.12)	.58 (.10)	.48	.92	11.39	.18	.01	.01
12	.55 (.10)	.54 (.12)	.56 (.10)	.65	.89	8.13	.42	.01	.01
13	.53 (.10)	.46 (.12)	.56 (.10)	1.06	.79	11.59	.16	.02	.02
14	.37 (.10)	.36 (.12)	.56 (.10)	2.96	.40	8.94	.35	.04	.06
15	.21 (.09)	.44 (.11)	.47 (.09)	9.41	.02	6.92	.44	.12	.17
16	.36 (.10)	.43 (.11)	.37 (.10)	1.12	.77	7.14	.52	.02	.02
17	.29 (.09)	.50 (.11)	.30 (.09)	9.23	.03	6.44	.60	.12	.17
18	.36 (.09)	.22 (.11)	.29 (.09)	2.32	.51	5.20	.64	.03	.05
19	.32 (.09)	.23 (.11)	.39 (.09)	5.25	.15	6.85	.55	.07	.10
20	.28 (.09)	.33 (.11)	.29 (.09)	1.82	.61	12.24	.14	.03	.04

Note: Proportions are estimated marginal means, controlling for intrinsic motivation; Standard Errors in parentheses;

For the Hosmer and Lemeshow Test (H&L), a non-significant p-value indicates good model fit.

Appendix 2

Estimated marginal means and model fit tests for exploratory search per round (study 1b)

Round	Outcome accountability	Process accountability	χ^2 (df = 3)	p	H&L χ^2	p	Cox & Snell R ²	Nagelkerke R ²
1	.22 (.07)	.21 (.07)	.32	.85	6.65	0.47	.01	.01
2	.25 (.07)	.23 (.08)	.32	.85	2.82	.83	.01	.01
3	.39 (.08)	.32 (.08)	.36	.84	5.42	.61	.01	.01
4	.39 (.08)	.44 (.09)	.97	.61	2.09	.91	.01	.02
5	.37 (.08)	.53 (.09)	2.66	.26	6.29	.51	.04	.05
6	.30 (.08)	.57 (.08)	6.78	.03	9.39	.23	.09	.12
7	.25 (.08)	.53 (.08)	6.03	.05	9.74	.20	.08	.11
8	.28 (.08)	.61 (.08)	8.99	.01	8.69	.28	.12	.16
9	.28 (.08)	.41 (.08)	2.14	.34	5.91	.55	.03	.04
10	.28 (.08)	.41 (.08)	1.72	.42	10.49	.16	.02	.03
11	.37 (.08)	.46 (.08)	3.78	.15	3.70	.72	.05	.07
12	.25 (.08)	.50 (.08)	4.83	.09	4.77	.69	.07	.09
13	.23 (.08)	.41 (.08)	5.03	.08	4.34	.74	.07	.10
14	.19 (.07)	.30 (.07)	4.11	.13	5.31	.50	.06	.09
15	.14 (.07)	.38 (.07)	6.03	.05	2.34	.94	.08	.12
16	.28 (.08)	.41 (.08)	1.43	.49	3.29	.86	.02	.03
17	.28 (.08)	.32 (.08)	.65	.72	6.10	.41	.01	.01
18	.23 (.08)	.35 (.08)	3.18	.20	5.24	.63	.04	.06
19	.16 (.07)	.48 (.08)	8.38	.02	3.04	.89	.11	.16
20	.22 (.07)	.26 (.08)	.25	.88	3.47	.84	.00	.01

Note: Proportions are estimated marginal means, controlling for intrinsic motivation; Standard Errors in parentheses;

For the Hosmer and Lemeshow Test (H&L), a non-significant p-value indicates good model fit.

Chapter III

ACCOUNTABILITY FOCUS AND EXPLORATORY SEARCH: THE MODERATING ROLE OF NORM AVAILABILITY AND OPENNESS TO EXPERIENCE

**CHAPTER III - ACCOUNTABILITY FOCUS AND EXPLORATORY SEARCH:
THE MODERATING ROLE OF NORM AVAILABILITY AND OPENNESS TO
EXPERIENCE**

ABSTRACT

The aim of this paper is to investigate the interaction effects of accountability focus with task characteristics (process norm availability) and personality (openness to experience) in predicting individual exploratory search. Drawing from the Social Contingency Model we hypothesize that process accountability will lead to the use low-effort heuristic processing when there is a process norm available to follow. Drawing from trait activation theory, we further predict a positive interaction of process accountability with openness, because process accountability activates the complementary task approach that is favored by individuals high in openness. Results of an experiment ($N = 153$) show support for the predicted interaction effects.

INTRODUCTION

In the same way exploring new sources of food or shelter is instrumental to the survival of biological organisms (Cohen, McClure, & Yu, 2007), so is exploring new products, services or procedures in business, often considered to be the lifeblood of an organization (Ahuja & Lampert, 2001; Gupta, Smith, & Shalley, 2006; March, 1991). Just like in chapter 2 in this dissertation, the focus here is on an important element of the innovation process: individual exploratory search. Exploratory search can be defined as the “intentional pursuit of alternative approaches” to a task (Knight, 2015, p. 100). Although this does not directly pertain to the quality or radicalness of the innovation outcome, exploratory search is the process that produces the variation of options to choose from. Hence, exploratory search can be considered a vital part of the innovation process that will have considerable impact on its end-result (Katila & Ahuja, 2002).

Taking an interactionist perspective on the innovation process (Woodman, Sawyer, & Griffin, 1993) in this paper, we focus on the role that characteristics of the task and the focal actor play in stimulating exploratory search and how accountability focus interacts with these factors. With regard to the characteristics of the task, the availability of a norm about how to do a task is expected to play a significant role. Based on theory and research on modeling and conformity to norms, it can be proposed that when individuals are taught how a certain task could be handled, they are more likely to incorporate this process norm in their own way of doing the task (Bandura, 1986; Cialdini & Goldstein, 2004). Earlier research has shown that actors’ knowledge of how a task could be solved (e.g., by giving them examples) reduces subsequent creativity in their own solution, even when there is no reason for them to believe that this will be the best solution (Shalley & Perry-Smith, 2001; Smith, 2003). With regard to

exploratory search, having a salient process norm would thus reduce the opportunity to explore new variations in solutions.

Similarly, at the personal level, individuals with certain personality characteristics may be better at detecting opportunities for improvements and may be more open to making changes (Shalley, Zhou, & Oldham, 2004). Most of the research on personality and innovation-related outcomes has used the Five Factor Model of Personality (McCrae & Costa, 1987), and one particular personality factor that has been most consistently found to be (positively) related to measures of creativity and innovation is openness to experience (Feist, 1998). For example, in a classic study, McCrae (1987) found that divergent thinking scores collected over two decades were associated with both self-reported and other-rated openness to experience, but not with any other of the five factors. Although there is no research that directly examines the role of personality in exploratory search, it stands to reason that being broad minded, curious and analytical (as openness has been described) would certainly aid this step in the innovation process. Based on the current literature on exploratory search (or related innovation processes and outcomes), it can be concluded that salient process norms and high openness to experience will have a negative and positive effect on exploratory search, respectively.

However, taking an interactionist perspective on exploratory search, we examine how the contextual factor of accountability focus may interact with these personal and task characteristics. Accountability focus, which refers to feelings of having to justify either outcomes, results, or processes, task strategy (Lerner & Tetlock, 1999), has not only been found to have effects on performance in judgement and decision-making tasks (de Langhe, van Osselaer, & Wierenga, 2011; Siegel-Jacobs & Yates, 1996), it may also facilitate or inhibit the opportunities for effects of personality and task characteristics to come to fruition (Hall, Frink, & Buckley, in press). Specifically, drawing from the Social Contingency Model (Tetlock,

1992; Tetlock, Skitka, & Boettger, 1989) and Trait Activation Theory (Tett & Burnett, 2003), we will propose hypotheses about how outcome and process accountability will interact with the availability of a process norm and openness to experience to predict exploratory search.

In the following sections, we will start by defining accountability and accountability focus and examining how different foci may relate to exploratory search (cf. Paper 1 in this dissertation). Next, we will introduce the Social Contingency Model (Tetlock, 1992) and Trait Activation Theory (Tett & Burnett, 2003) to propose hypotheses about the moderating role of norm availability and openness to experience. Subsequently, the design and results of an experiment to test these hypotheses are presented.

THEORY AND HYPOTHESES

Accountability and Accountability Focus

Accountability is defined as the feeling that one will need to justify their performance and that there are significant consequences attached to this justification (Lerner & Tetlock, 1999). The accountability environment can take many shapes and forms and an important feature is the focus of the accountability: outcome vs. process accountability (Hall et al., in press). Under outcome accountability actors feel they need to justify the results of their work. Process accountability, in contrast, means that actors feel they will need to justify how they achieved the result (and not what the result was) (Lerner & Tetlock, 1999).

The current research on outcome and process accountability generally shows that process accountability leads to better performance than outcome accountability (de Langhe et al., 2011; Hall et al., in press; Lerner & Tetlock, 1999). Several experimental studies find that under process accountability performance on judgement and decision-making tasks is improved, compared to under outcome accountability (Brtek & Motowidlo, 2002; Doney &

Armstrong, 1996; Rausch & Brauneis, 2015; Siegel-Jacobs & Yates, 1996; Simonson & Staw, 1992; Zhang & Mittal, 2005). For instance, Brtek and Motowidlo (2002) asked participants to look at recorded job interviews and give the candidates scores on leadership potential. The results showed that when participants were told that they would have to justify their thinking process (process accountability) as opposed to having to justify their scores (outcome accountability), they were better at predicting candidates' skills and abilities for the job. Siegel-Jacobs and Yates (1996) used a task in which participants received access to information about a large number of potential jurors for a fictional court case. The task was to select the best jury for that particular case. Again, process and outcome accountability were manipulated by telling participants that, after the task, they would either have to justify their thinking process or their choices (results) to a researcher. Results showed that under process accountability participants used more of the available information and this resulted in being able to select the better jurors.

These effects can be understood by drawing from Conflict Theory (Janis & Mann, 1977). According to this theory, the amount of control an actor has over an important performance outcome will determine the level of performance pressure that is experienced, where performance pressure is defined as a negative affective state induced by the need to perform combined with the perceived inability to perform up to standard (Eisenberger & Aselage, 2009). Situations with accountability have, by definition, significant stakes attached to performance, but there may be differences in the controllability of the performance based on the accountability focus. When an actor is accountable for the process of a task (in other words: the task behavior), he or she has direct influence over what the accountability systems focusses on. In contrast, under outcome accountability actors have only indirect influence, through their task behavior, on the accountability focus. Hence, based on Conflict Theory (Janis & Mann, 1977), most of the current literature has argued that outcome and process accountability will

lead to higher and lower performance pressure, respectively (de Langhe et al., 2011; Siegel-Jacobs & Yates, 1996).

The differences in information processing that are observed in studies on accountability focus are the result of these pressure differences, which is consistent with earlier work that has found that high performance pressure reduces the systematic scanning of information (Keinan & Giora, 1987), leads individuals (and teams) to be more prone to focus on familiar and less risky solutions (Gardner, 2012; Litt, Reich, Maymin, & Shiv, 2011; Mano, 1992), and generally decreases systematic information processing (Markman, Maddox, & Worthy, 2006). Based on these findings, it has been argued that process accountability will lead to more systematic information processing, resulting in higher performance on judgement and decision-making tasks (Siegel-Jacobs & Yates, 1996). Given that exploratory search has been defined as seeking new ways of doing a task and persistently experimenting with alternative approaches (Knight, 2015), it can be proposed that process accountability, and the high-effort systematic information processing that it stimulates, will also increase exploratory search (De Dreu, Nijstad, Baas, Wolsink, & Roskes, 2012).

While the current theorizing in the accountability focus literature, drawing from Conflict Theory, provides insight in the main effects of different foci on behavior and decision making (de Langhe et al., 2011; Siegel-Jacobs & Yates, 1996), it is not well suited to inform predictions about potential interaction effects of accountability focus and contextual factors. Therefore, we will next engage in further theorizing about how the type of task and the personality of the focal actor may change the effects of accountability focus on exploratory search.

The Interaction of Accountability Focus and Process Norm Availability

To make the connection between outcome and process accountability and exploratory search for different types of tasks, we draw from the Social Contingency Model (Tetlock, 1992). This framework suggests that actors under accountability act like metaphorical politicians, who do whatever they have to, to satisfy the expectations of the audience they are accountable to. The type of task strategy that an actor uses is thus seen as a coping mechanism for dealing with the performance pressure associated with accountability (Tetlock et al., 1989). Where the reasoning based on Conflict Theory focuses on differences in performance pressure, the Social Contingency Model focuses on how actors determine what the best coping strategy is to deal with the performance pressure, regardless of the level.

The central consideration that will determine the degree to which a high-effort systematic processing approach will be used is whether or not it is known to the actor what constitutes a good result or process according to the audience to whom one is accountable (a supervisor, the client, an evaluator, etc.). In other words, whether or not there is a salient norm about what constitutes a good course of action, opinion, outcome, etc. When there is no such norm available, actors will be motivated to engage in flexible and systematic information processing (called *preemptive self-criticism* in the Social Contingency Model), because they want to reach the best possible solution to justify to the audience they are accountable to. However, when there is such a norm available, research has shown that people employ an *acceptability heuristic*, which means that they shift their opinion, judgement or behavior towards that norm.

For instance, Tetlock (1983) predicted that participants who believed they would have to justify their attitudes on social-political issues (i.e., who felt accountable) would take part in more effortful and complex reasoning and end up with more balanced ideas about the topics.

However, it was also predicted and empirically supported that people only pursued more high-effort processing under accountability when they did not know what the opinion of their audience was. When they did know their audience's opinions, participants took positions that were in line with those salient norms. This suggests that accountability can lead to motivation for systematic and flexible reasoning but can also lead to conformity to a perceived norm. In other words, faced with accountability-induced performance pressure, actors engage in information processing that will be the easiest to defend to their audience, not necessarily the best processing (Tetlock, 1983; Tetlock et al., 1989).

Some authors have argued that this positive effect of accountability on conformity may be especially likely to manifest under process accountability (Patil, Vieider, & Tetlock, 2014). Patil and colleagues (2014) propose that “process accountability in organizations with well-defined norms about what constitutes ‘quality’ procedures could potentially degrade quality of judgment and choice if it simply encourages decision makers to rely on the acceptability heuristic to convince influential constituencies that their processes are rational and that they are reasonably intelligent” (p. 72). With outcome accountability, on the other hand, people have less opportunity to refer to existing norms to justify their outcome. When actors need to justify their outcomes, they will not be able to refer to norms about ‘how things are done’, but rather their focus will be on maximizing the results. This reasoning accords with the view of managers that outcome accountability is harder to “game” and process accountability is vulnerable to cosmetic or symbolic compliance (Doney & Armstrong, 1996; Patil et al., 2014; Tetlock, Vieider, Patil, & Grant, 2013).

This points to an important boundary condition of the positive relationship between process accountability and exploratory search: the availability of a salient process norm. Although most experiments do not explicitly manipulate the salience of the process norms,

there are some indications that process accountability can increase conformity to such a norm when it is present. In their experiment (discussed earlier), Siegel-Jacobs and Yates (1996) did find that process accountability increased information use, even when the information has no value in improving the decision. Along the same lines, research has shown that process accountability can increase the likelihood that a decision-maker falls prey to the ‘decoy effect’, which means that an undesirable option that holds no information influences the attractiveness of other options even though the value of these latter options was not changed (Slaughter, Bagger, & Li, 2006). These studies suggest that process accountability may result in actors referring to some perceived (implicit) norm about what constitutes a good process. In these studies, participants may have assumed that the audience expected them to include as much information as possible, even when the information does not add much value. In other words, there may have been a perceived process norm that was attractive for them to follow and exert little effort to reach an easily defensible procedure.

Earlier experiments on outcome and process accountability have consistently used tasks in which the participants had no prior experience or had no other way of knowing what the evaluator thinks is a good process or task strategy (e.g., Brtek & Motowidlo, 2002; Siegel-Jacobs & Yates, 1996; Simonson & Staw, 1992). Hence, while these studies have found that process accountability increases systematic information processing and through this systematic task approach increase exploratory search (De Dreu, Nijstad, Bechtoldt, & Baas, 2011; Verwaeren, Buyens, & Baeten, 2016), this will likely not be the case when there is a known process norm. Thus, in this paper, we argue that the extent to which an actor will engage in exploratory search will depend on a combination of the focus of accountability and whether or not there is a process norm known to the actor.

Hypothesis 1: Process accountability (but not outcome accountability) will interact with availability of a process norm, such that there will be a positive effect of process accountability on exploratory search when there is no process norm and a negative effect when there is a process norm.

Openness To Experience and Accountability Focus

A large body of research has shown that personality can have substantial effects on task performance (Barrick & Mount, 1991; Salgado, 1997). Although the research with regard to outcomes in the realm of innovation and innovation processes is more limited, several studies have found effects of specific personality factors on outcomes such as creativity and divergent thinking (Shalley et al., 2004). The most consistent finding is that people high in openness to experience tend to be more creative, while for other personality factors no, or less consistent, relationships are found (Feist, 1998; Furnham & Bachtiar, 2008; LePine, Colquitt, & Erez, 2000; McCrae, 1987). This is not surprising, since openness is conceptually closely related to innovation-related processes as it is described with such terms as intellectually curious, imaginative, amendable to new and unconventional ideas (Barrick & Mount, 1991; McCrae, 1987). As such, openness is the personality characteristic that best represents an innate tendency to explore new ideas instead of following tried-and-true paths.

However, research also suggests that personality can act as a moderator to change the effects of contextual factors (e.g., Chatman, Caldwell, & O'Reilly, 1999). The idea that certain traits will be more or less activated under different circumstances is the central tenet of Trait Activation Theory (Tett & Burnett, 2003; Tett & Guterman, 2000; Tett, Simonet, & Walser, 2013). In this theoretical framework, traits are conceptualized as latent propensities to behave in a certain way, but are only expressed when there are trait-relevant cues in the environment. In other words, traits will be more or less activated under various contextual factors. For

example, while high attention to detail may have generally positive effects on task performance, the effect may not be present (or even negative) when a task environment holds cues for ‘quick and dirty’ decision-making. An empirical application of trait activation theory can be found with Farh, Seo and Tesluk (2012). These researchers found that the positive effect of managers’ high emotional intelligence on teamwork effectiveness was only present in a context with high managerial work demands. The authors argue that managerial work demands constitute cues for the necessity of emotional interventions by managers.

The same may hold true for innovation-related processes, like exploratory search. Some of the earlier research has shown that openness to experience only has a positive effect on creative behavior when the task context stimulates people to be creative, via open-ended tasks and positive supervisor feedback (George & Zhou, 2001). Similarly, Madrid and colleagues used a 10-week diary study method to show that openness interacts with support for innovation to predict innovative behavior (Madrid, Patterson, Birdi, Leiva, & Kausel, 2014), again suggesting that openness only has a positive effect on innovation processes when the task context promotes the natural tendencies towards innovative behaviors that openness produces.

In this paper, we examine how the contextual factor of accountability focus interacts with openness to predict exploratory search. To date, there has been very limited research on the interaction effects of accountability with personality factors (see Frink & Ferris, 1999, for an exception) and no research examining the role of accountability focus with regard to personality (Hall et al., in press). We argue in this paper that accountability can act as a salient cue to activate openness to experience, after which it can amplify the effect of accountability on exploratory search. However, whether or not openness is activated will depend on the accountability focus.

Specifically, we propose that the effect of process accountability will be positively moderated by openness to experience. As previously discussed, process accountability is predicted to stimulate the allocation of attention and cognitive resources to a task, resulting in a systematic information processing that favors exploring alternative solutions. This kind of cognitive mindset is expected to activate openness to experience, as the same kind of behavioral consequences are associated with this personality factor. As both process accountability and openness result in a strong task engagement and congruent cognitive responses, they are expected to amplify each other's effect. In this way, process accountability not only activates openness, there is also a fit between the preferred cognitive processes of the actor and the ones favored by the accountability focus (Chan, 1996).

On the other hand, different results may be expected under outcome accountability. Because outcomes are not directly changeable by the actor, this accountability focus leads the attention away from the task itself and instead steers attention towards the consequences or results of the task (Beilock & Carr, 2005; Beilock, Kulp, Holt, & Carr, 2004). As a result, we expect that outcome accountability will not activate openness to experience and do not hypothesize an interaction effect there. To the extent that openness would be activated for actors working under outcome accountability, there may even be a negative interaction, as a misfit between the cognitive processes that are induced by outcome accountability and those favored by individuals high in openness exists.

Hypothesis 2: Openness to experience will interact with accountability focus, such that process accountability and high openness will lead to higher exploratory search compared to low openness.

Figure 1

METHOD

Sample

170 undergraduate business students participated in a session where they could try out tests used in job recruitment settings. The experimental procedure was the last part of the session and participants received an oral debrief on the purpose of the study directly after the session and received written feedback (scores) after the fact. They were informed that the data that they provided could also be used (anonymously) for the purpose of academic research and they signed an informed consent form to this effect. Their age varied between 19 and 24, with an average of 20.7 years. 59% were female.

Procedure and manipulations

Participants took part in a short business simulation, adapted from Ederer and Manso (2013). In this simulation, participants take the role of the manager of a lemonade stand for which they need to make business decisions over the course of 20 rounds. In every round participants have to set a number of parameters (price, sugar, color of the lemonade, etc.) and based on their decisions the profit for that round is calculated. All participants are told that the goal is to maximize their total profit, over the 20 rounds. Consistent with the original experiment (Ederer & Manso, 2013), the instructions also included a letter ostensibly from the previous manager of the lemonade stand. This letter contained information about how the previous manager set the parameters (and these settings were the default choices in the first

round). This way, participants had the opportunity to exploit the current settings or explore new ones.

In the experiment, accountability focus and process norm availability were manipulated. First, in line with earlier research (and with chapter 2 in this dissertation), accountability focus was manipulated by adding an extra section to the instructions in which information was given about the evaluation (de Langhe et al., 2011; Siegel-Jacobs & Yates, 1996). All participants were told that, after the task, they would have to go to another room and meet with another researcher. They were told that they would have to justify their results (outcome accountability) or the strategy that they used to achieve their results (process accountability) to this researcher.

The second factor that was manipulated was whether or not there was a norm about the to-follow procedure. The availability of a process norm was manipulated by adding a statement to the previous manager's letter that explains how that manager thinks his successor should handle the task. In conditions with a process norm this read: "From now on it is up to you to decide where you go from here, but I think it would be best if you continue experimenting with making small adjustments to sugar, fruit and price". The first part of this sentence was included so to make sure people knew that this was a suggestion, but that they ultimately could decide what to do. In conditions without a process norm it just said: "From now on it is up to you to decide where you go from here".

Measures

Exploratory search

Following the procedures detailed by Ederer and Manso (2013) and chapter 2, we define an exploratory search round as one in which a participant makes significant changes to at least one of the continuous variables (price, sugar or fruit) or to the color while in a location that is

not the starting location (the business center). A significant change in the continuous variables is set at values above 0.5, on the scale that goes from zero to ten and where changes can be as small as a tenth of a unit. Using this definition, every round is coded as either an exploratory search round ('1') or not ('0'). In further reporting, we will provide results for the total rounds of exploratory search and for the rounds per quarter (of 5 rounds). This way, both an overall view and a more detailed analysis of exploratory search throughout the task are provided. In addition, this allows for the use of more flexible parametric statistical tests. However, a full overview of the results per round is reported in appendix 1.

Openness to experience

Openness was measured using the 10-item scale by Goldberg (1992). Sample items are “I have a vivid imagination” and “I am not interested in abstract ideas” (reversed). Participants used a 5 point scale ranging from “totally disagree” to “totally agree”. Reliability was adequate at $\alpha = .77$.

Control variables

Two variables are included as control variables. First, *gender*, because previous research has shown differences in men and women’s reactions to pressure and competition, particularly with regard to creativity and innovation (Baer, Vadera, Leenders, & Oldham, 2013). Second, intrinsic motivation is measured using four items from (Eisenberger & Aselage, 2009). Intrinsic motivation, liking the task for the sake of the task itself, is often considered a major driver of creativity (and thus perhaps also of exploratory search) (Amabile, 1996). Although empirical research on this relationship has not garnered consistent results (Grant & Berry, 2011), it can still be expected that participants with a greater intrinsic liking for the task would be more likely to engage in more exploratory search. People were asked to indicate to which extent they

believed the task to be enjoyable, interesting, boring, and unpleasant on a seven-point scale ('totally disagree' to 'totally agree'). Reliability was high with $\alpha = .84$.

Manipulation checks

To make sure that participants fully read and understood the manipulations, several manipulation checks were included. For accountability, two items were included to test whether or not the manipulation was successful. Participants were asked to indicate to what extent two statements were true for them: "you will have to justify your results (profits) to a researcher" (outcome accountability) and "you will have to justify your strategy to a researcher" (process accountability). Participants used a seven-point scale from 'Totally false' to 'Totally true'. For norm availability, one item was added: "the previous owner gave his opinion about how I should continue". The response scale was the same as the accountability items.

RESULTS

Manipulation Checks and Descriptive statistics

170 master students joined the experiment. The results show that participants in the norm conditions scored higher on the item to check norm availability (with norm :Process = 3.81, $SD = .16$, Outcome = 3.86, $SD = .16$ and without norm = Process = 3.33, $SD = .15$; Outcome = 3.26; $SD = .15$; $t_{(83)} = 14.27$, $p < .000$ for process conditions and $t_{(83)} = 17.84$, $p < .000$ for outcome conditions). Similarly, the manipulation checks for outcome and process accountability showed results that indicate the manipulation worked well, for the outcome item (Outcome with norm condition = 3.83, $SD = .82$ and Process with norm = 2.95, $SD = 1.34$, resulting in $t_{(82)} = 3.45$, $p = .001$); Outcome no norm = 3.56, $SD = 1.16$ and Process no norm =

2.81, $SD = 1.18$, resulting in $t_{(84)} = 2.97$, $p = .004$) as well as for the process item (Outcome with norm condition = 3.07, $SD = 1.22$ and Process with norm = 4.07, $SD = .92$, resulting in $t_{(82)} = 4.24$, $p < .000$; Outcome no norm = 3.23, $SD = 1.32$ and Process no norm = 4.28, $SD = .70$, resulting in $t_{(82)} = 4.55$, $p < .000$). However, the two-item manipulation check also allowed to check if any participants rated the “wrong” accountability condition (e.g., scored higher on the process accountability item than the outcome accountability item in an outcome accountability condition). A difference score was calculated to check this and this revealed that 17 participants failed this test. Hence, they are not included in subsequent analyses (even though the results do not significantly change when they are left in). The remaining participants have an average age of 20.68 ($SD = .92$) and 40.6% were female.

Correlations, means and standard deviations for all variables are presented in table 1. As can be seen in table 1, there is a significant yet modest correlation between exploratory search and total profit. This suggests that exploration on average, yet not necessarily always, leads to a higher task performance. The results also show a negative correlation between the exploratory search measures and availability of a process norm, in line with our expectations. However, no significant relations were found between openness and the dependent variables, except for total profit. Overall, intrinsic motivation did not show any correlation with exploratory search (except a relatively small one during Q2).

Table 1

Hypothesis Testing

The sample sizes, means and standard deviations for all conditions on exploratory search (in the four quarters) are shown in table 2. The table reveals that the highest levels of exploratory search can be found in the first part of the task (with Q1 having the highest exploratory search, with $p < .000$ for all comparisons). The results in table 3 also show that the independent variables explain the highest variance during the first two quarters. This can be understood by looking at the characteristics of the task, in which only a limited set of parameters could be changed. Hence, it can be expected that search (and potential differences in search) will be the most pronounced during the early stages of the task. As a result, we will focus our reporting on the results for Q1, although we also report the result for the other quarters in the tables. Table 3 shows that the models with only the control variables do not explain a significant amount of the variance for Q1 ($F_{(2, 152)} = .31, p = .735$) and for total exploratory search ($F_{(2, 152)} = 2.48, p = .087$), although there is a borderline negative effect of gender (lower for women) for the latter ($\beta = -.15, t_{(150)} = -1.80, p = .074$). The models in the final step do show significant amount of explained variance for Q1 ($R^2 = .14, F_{(7, 152)} = 3.43, p = .002$), total exploratory search ($R^2 = .14, F_{(7, 152)} = 2.99, p = .005$), and also for Q2 ($R^2 = .13, F_{(7, 152)} = 2.96, p = .006$).

Table 2

Table 3

The hypotheses were tested using hierarchical regressions for which the results are summarized in table 3. In a first step in the regression only the control variables are included, in the second step the main effects of accountability focus and norm availability are added and in the third step the interaction effects are entered. First, with regard to main effects, the results show a significant negative effect of norm availability on exploratory search (step 2) ($\beta = -.26$, $t_{(147)} = -3.19$, $p = .002$), meaning that when there was a process norm available, this was, on average, associated with lower exploratory search.

Next, the results in step 3 show that this main effect disappears as the interaction effects are introduced in the model. The interaction of accountability focus with norm availability shows a significant negative effect on exploratory search ($\beta = -.29$, $t_{(145)} = -2.09$, $p = .039$), indicating that the combination of process accountability and an available process norm are associated with lower exploratory search. To be able to better interpret this interaction, it was plotted in figure 2. Consistent with the hypothesis, these results show that communicating a process norm has a negative effect on exploratory search for people working under process accountability, but no effect for participants under outcome accountability. The estimated marginal means for exploratory search (controlling for intrinsic motivation and gender) show that there is significantly less exploratory search in the process accountability/norm condition compared to the process accountability/no norm condition (mean difference = 1.02, $t_{(75)} = 3.45$, $p < .001$), but there is no significant difference in exploratory search between the outcome accountability/norm and no norm conditions (mean difference = .29, $t_{(74)} = .90$, $p = .372$). Hence, hypothesis 1 is supported by the data.

Figure 2

Hypothesis 2 proposed that there would be a positive interaction effect of openness to experience with process accountability. The results in step 2 show that openness to experience does not have a significant main effect on exploratory search. However, results do show that there is a significant positive interaction effect. Again, to interpret the results, figure 3 plots the estimates for high and low values of openness to experience (+1 and -1 SD of the mean). This graph suggests that under outcome accountability a negative relationship exists between openness and exploratory search and under process accountability a positive one. A simple slopes analysis confirms the positive interaction effect with process accountability (gradient = .73, $t_{(145)} = 2.38$, $p = .02$). However, the negative slope for outcome accountability is not significant (gradient = -.58, $t_{(145)} = -1.53$, $p = .13$). Overall, the results show support for an interaction effect of accountability focus with openness to experience, confirming hypothesis 2.

Figure 3

DISCUSSION

Discussion of the Results

In the present study, the aim was to examine how accountability focus and process norm availability and openness to experience interact. Results showed that when there was a process norm available, participants in the experiment engaged less in exploratory search. This is consistent with overall conformity theory and research (Bandura, 1986; Cialdini & Goldstein, 2004) and specifically fits with the predictions of the Social Contingency Model (Tetlock, 1992), which predicts that under accountability, actors will be motivated to follow any procedure that helps them to reduce the risk of not being able to justify their work afterwards (Tetlock et al., 1989). Also, consistent with our hypotheses, we found that having a process norm hurt exploratory search under process accountability and, even though there was a negative trend, did not significantly reduce exploratory search under outcome accountability. When a salient norm is presented to participants, they have the opportunity to exploit this existing solution and under process accountability they are also motivated to do so. This same motivation is lacking under outcome accountability, because there following the salient norm will not help to relieve the accountability pressure as the focus is on the result. As a result, we find no significant difference between outcome accountability with and without a salient process norm. With regard to the role of openness to experience, we again found a significant interaction effect with accountability focus. Specifically, a combination of process accountability with high openness resulted in significant higher exploratory search. The slope for the interaction with outcome accountability was not significant.

It should be noted, however, that the results do not support a main effect of accountability focus. In the conditions without a salient process norm, there was no significant difference between outcome and process accountability (mean difference = .10, $t(69) = .34$, p

= .74). This is contrary to the findings in the previous chapter in this dissertation and also not in line with earlier research which has found consistently that under process accountability people took a more systematic task strategy (e.g., de Langhe et al., 2011; Siegel-Jacobs & Yates, 1996). The absence of the effect can on the one hand be seen as an illustration of the importance of taking an interactionist perspective. On the other hand, it may also be explained by the setting of this experiment. The experiment was conducted as part of a voluntary job selection test-battery that students could participate in. This may have resulted in overall higher motivation to systematically engage in the task and find the best solution, reducing the relative advantage participants under process accountability have.

Post-Hoc Analyses

The hypotheses provide a broad perspective on the role of norm availability, openness to experience, and accountability focus. However, there are two additional questions that could be examined, but were not proposed beforehand. These relate to the possibility of a three-way interaction and about the role of the other personality factors. First, a three-way interaction between process norm availability, openness, and accountability focus could be expected, such that the highest exploratory search would be found for individuals high in openness, without a process norm, under process accountability. However, an additional regression analysis where the three-way product term was included revealed no significant three-way interaction ($\beta = -.16, t_{(144)} = -.96, p = .340$), which may be due to sample size restrictions (Dawson & Richter, 2006).

We also examined the potential effect of other personality factors (extraversion, conscientiousness, emotional stability, and agreeableness; McCrae & Costa, 1987). Given that the setting of this experiment was a job selection test simulation, we included a full measure for the five factors of personality, although we did not formulate hypotheses regarding the other

personality factors in the Five Factor model. Post-hoc analyses revealed that the other factors played a limited role in predicting exploratory search. The only significant effect was a positive interaction effect of conscientiousness with process accountability ($\beta = .25$, $t_{(145)} = 2.17$, $p = .032$). However, simple slopes analyses revealed that the slopes were not significantly different from zero (gradient = .19, $t_{(145)} = 1.29$, $p = .200$ for process accountability and gradient = -.28, $t = -1.71$, $p = .089$ for outcome accountability), just significantly different from each other.

Theoretical Implications

The present study built on several theoretical models and the findings provide additional support for all these theories and models. First, in general terms, this study fits within the interactionist perspective on creativity and innovation (Woodman et al., 1993), which emphasized how individual and contextual factors may interact to predict creativity and innovation behavior. Although the focus here is not on innovation or creativity as an outcome, but rather on exploratory search as an innovation process, the results support an interactionist perspective for understanding of how contextual factors, task characteristics, and personal characteristics interact to predict this important innovation process.

The study also provides support for the Social Contingency Model (Tetlock, 1992) as a framework to understand how accountability affects behavior, where previous research with regard to accountability focus, has almost exclusively employed theorizing based on Conflict Theory (Janis & Mann, 1977; Siegel-Jacobs & Yates, 1996). Not only does the Social Contingency Model provide a rich framework to make predictions about outcome and process accountability, it specifically is well-suited to design propositions about innovation-related behavior and decision-making. That is, the coping-paths that the model proposes (acceptability heuristic, preemptive self-criticism, and defensive bolstering, although this last one was not

relevant to the discussion in this paper), have clear implications for actors' decisions to take risks or stick to safe solutions (Patil et al., 2014).

Third, the result is in line with a trait activation perspective, which proposes that the effects of individual traits can be inhibited or amplified based on contextual variables (Tett & Burnett, 2003; Tett et al., 2013). People who are high in openness to experience will have a natural inclination to focus on the content of a task and will try to look at the task from various angles. However, whether or not this innate tendency can be realized will depend on the inhibiting or facilitating characteristics of the context. In the present paper, it was made clear that the type of accountability can shape the context in such a way that the effect of personality changes. Specifically, process accountability proved to be a contextual factor that fosters a facilitating environment for openness to experience (and, based on the post-hoc analysis, to some extent conscientiousness).

Limitations and Avenues for Future Research

Even though the present study has several theoretical implications, there are also several limitations to the research and open questions that need to be addressed in future research. First, the limitations related to the task that were mentioned in the first paper also apply here. Specifically, the operationalization of exploratory search could be considered fairly narrow in scope, as there is only a limited amount of parameters that can be altered. The opportunities for exploratory search are thus relatively low, which likely explains why exploratory search (and differences between conditions) are mostly found in the early stages of the task. Future research could employ a task where exploration of alternatives is unconstrained. For example, in a more traditional idea generation task, participants could be almost completely free in what kind of solutions they come up with.

In addition, similar to the first experiment in the previous chapter, this study uses a relatively soft accountability manipulation. While this can also be considered a testament to the robustness of the effects, it could also mask effects that would have been found if a stronger accountability was imposed. Future research could include the elements that were used in the replication in chapter 2, such as constant reminders of the post-task justification throughout the task and the inclusion of a financial incentive linked to the justification.

Also, future research could address additional questions concerning the mediation mechanisms that are at play. While the results of the current experiment are in line with the theoretical suggestion that personality, norm availability, and accountability focus each induce a certain way of approaching the task (more or less systematic, resulting in differences in exploratory search), there were no direct measures of these mediating mechanisms included.

A final limitation is the reliance on a single method, an experiment. While an experiment provides the best opportunity to examine causal effects and allows us to flexibly manipulate and measure various variables, generalizing the results to a real organizational setting may not be straightforward. For example, while in a student sample it can be assumed that a full range of personality factors may be found, in an organization the range of certain personality factors may be strongly inhibited via selection. In addition, in an experiment it is easy to manipulate the salience of a process norm, but in a work context norms about what is expected and how to do things are fluid and implicit (Bowen & Ostroff, 2004). Therefore, the interaction effects may not translate easily to (all) real life organizational settings. In the next paper in this dissertation, we aim to tackle this issue by examining the role of accountability focus in relation to exploratory search in a field study.

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Table 1: Means, Standard deviations, and correlations for the main study variables

	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10
1. Expl search Q1	3.35	1.37										
2. Expl search Q2	2.27	1.84	.52**									
3. Expl search Q3	2.24	1.64	.18*	.49**								
4. Expl search Q4	1.59	1.58	.33**	.44**	.49**							
5. Total expl search	9.46	4.83	.65**	.84**	.74**	.75**						
6. Total profit	2000	477	.22**	.28**	.24**	.21**	.32**					
7. Accountability focus ^a	.54	.50	-.08	.02	.01	-.04	-.02	.01				
8. Norm availability ^b	.50	.50	-.24**	-.21*	-.05	.03	-.15	-.11	-.03			
9. Openness to experience	3.50	.47	.05	-.07	-.06	-.06	-.05	.31**	.03	.13		
10. Gender ^c	.59	.49	-.06	-.09	-.12	-.16*	-.15	-.18*	-.13	-.05	-.36**	
11. Intrinsic Motivation	3.80	.62	.02	.16*	.05	.06	.11	.15	.05	.01	.20*	-.01

^a = dummy coded with process accountability as 1; ^b = dummy coded with norm available as 1; ^c = dummy coded with female as 1

N = 153

* $p \leq .05$; ** $p \leq .01$

Table 2: Mean exploratory search for the different conditions and quartiles

Conditions	<i>Q1</i>	<i>Q2</i>	<i>Q3</i>	<i>Q4</i>	<i>Total exploratory search</i>	<i>n</i>
PA with norm	2.75 (1.63)	1.78 (1.72)	2.03 (1.64)	1.60 (1.63)	8.15 (4.66)	40
OA with norm	3.32 (1.20)	2.03 (1.72)	2.32 (1.67)	1.68 (1.63)	9.35 (5.06)	37
PA without norm	3.74 (1.08)	2.81 (1.80)	2.48 (1.60)	1.48 (1.53)	10.50 (4.46)	42
OA without norm	3.62 (1.33)	2.44 (2.00)	2.12 (1.70)	1.65 (1.59)	9.82 (5.06)	34
Total	3.35 (1.37)	2.27 (1.84)	2.24 (1.64)	1.59 (1.58)	9.46 (4.83)	153

Note: Standard deviation in parentheses

Table 3: Hierarchical Regression Results

	Q1			Q2			Q3			Q4			Total exploratory search		
	Step 1	Step 2	Step 3	Step 1	Step 2	Step 3	Step 1	Step 2	Step 3	Step 1	Step 2	Step 3	Step 1	Step 2	Step 3
Gender	-0.06	-0.06	-0.07	-0.09	-0.15	-0.15	-.12	-.17*	-.17*	-.16*	-.23*	-.22*	-.15†	-.21*	-.21*
Intrinsic motivation	0.02	0.02	0.06	0.16*	0.19*	0.22*	.05	.08	.11	.06	.09	.12	.10	.14†	.19*
Accountability focus ^a		-0.1	0.07		-0.12	0.09		-0.01	.10		-0.07	-0.07		-0.06	.07
Norm availability ^b		-.26**	-0.11		-.20**	-0.11		-.04	.06		.03	.01		-.15†	-.05
Openness to Experience		0.06	-0.2		-.14	-0.33*		-.13	-.34*		-.16	-.33		-.13	-.30†
Accountability focus X Norm availability			-.29*			-0.17			-.20			.011			-.20
Accountability focus X Openness			.36**			0.25*			.29*			.21			.35**
R2	0	.08*	.14**	.04	.10*	.13**	.02	.03	.07	.03	.06	.07	.03†	.08*	.14*
ΔR2		.07*	.07**		.06*	.03		.02	.04*		.03	.02		.04†	.07*

Note: Standardized coefficients are reported

^a dummy variable with outcome accountability as the reference level

^b dummy variable with 'no norm' as the reference level

† $p < .10$ * $p < .05$; ** $p < .01$

Figure 1

Overview of hypotheses

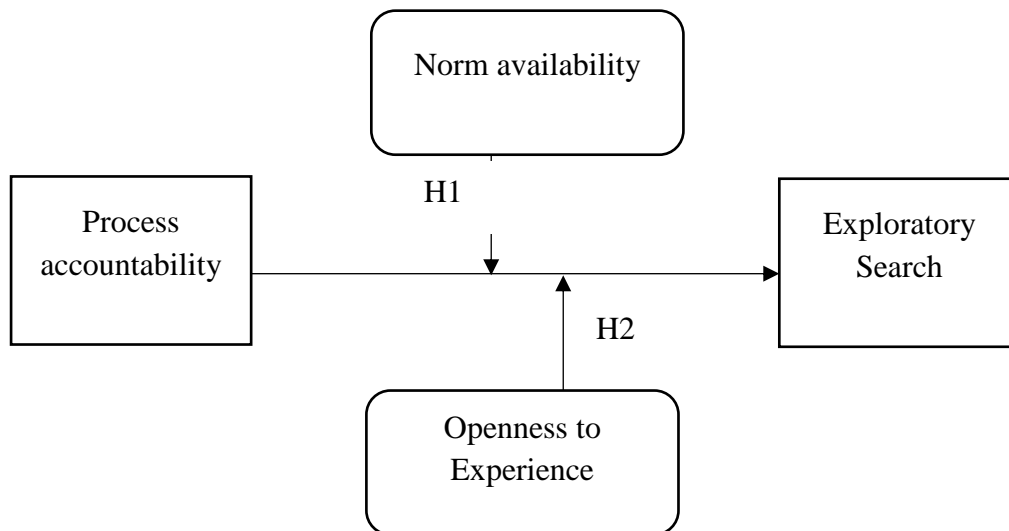


Figure 2

Interaction of norm availability and accountability focus

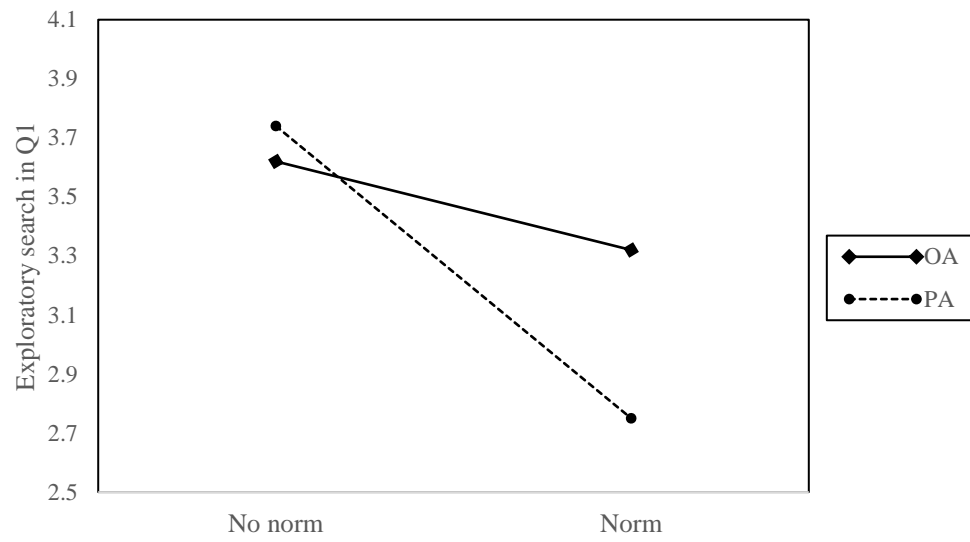
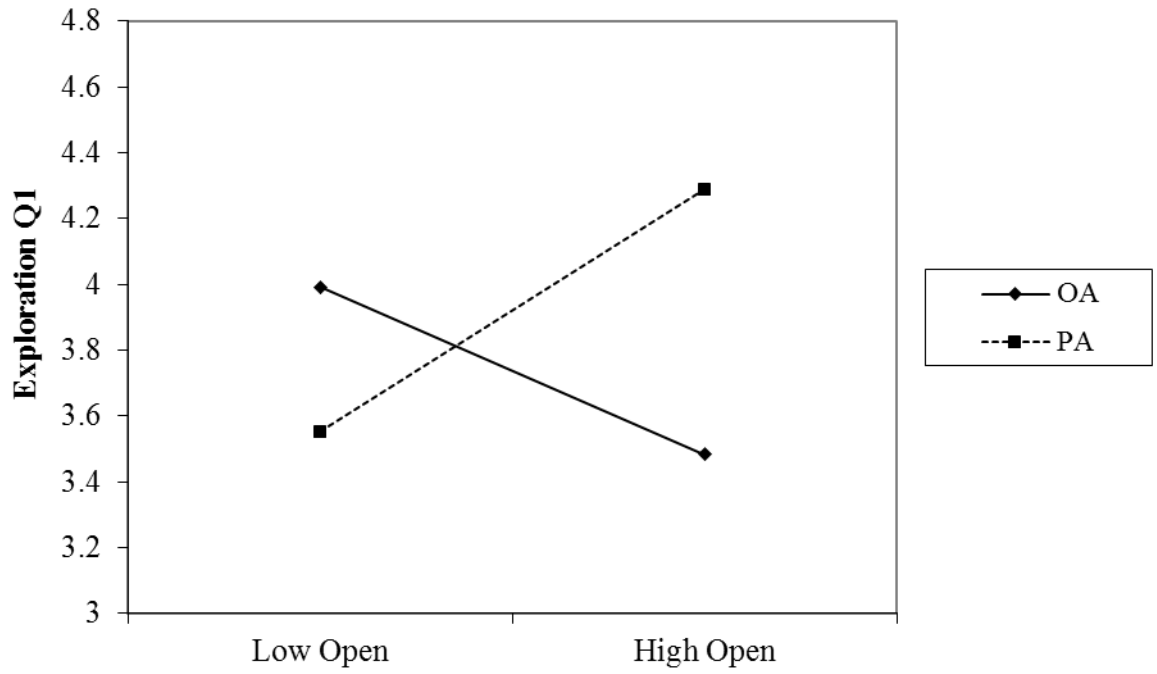


Figure 3

Interaction of openness to experience and accountability focus



Appendix 1: Estimated marginal means for the different manipulations and model fit tests, per round

Round	Outcome accountability		Process accountability		χ^2 (df = 6)	<i>p</i>	H&L χ^2	<i>p</i>	Cox & Snell R^2	Nagelkerke R^2
	No norm	Norm	No norm	Norm						
1	.81 (.10)	.71 (.06)	.77 (.06)	.67 (.09)	14.95	.02	4.16	.84	.09	.14
2	.85 (.10)	.70 (.06)	.81 (.06)	.65 (.09)	16.09	.01	15.49	.05	.10	.15
3	.66 (.10)	.69 (.07)	.75 (.06)	.77 (.10)	7.16	.31	10.62	.22	.05	.07
4	.60 (.11)	.58 (.07)	.64 (.07)	.61 (.11)	5.17	.52	2.73	.95	.03	.05
5	.49 (.11)	.44 (.07)	.65 (.07)	.61 (.10)	11.12	.09	6.14	.63	.07	.09
6	.47 (.11)	.30 (.07)	.58 (.07)	.41 (.10)	11.17	.08	4.43	.82	.07	.09
7	.30 (.11)	.35 (.07)	.57 (.07)	.62 (.11)	11.07	.09	2.35	.97	.07	.09
8	.42 (.11)	.41 (.07)	.56 (.07)	.55 (.11)	13.75	.03	9.98	.27	.09	.12
9	.48 (.11)	.39 (.07)	.53 (.07)	.44 (.10)	23.54	<.01	7.79	.45	.14	.19
10	.66 (.11)	.48 (.07)	.45 (.07)	.26 (.10)	21.84	<.01	3.91	.87	.13	.18
11	.48 (.12)	.44 (.07)	.51 (.07)	.47 (.07)	3.30	.77	11.99	.15	.02	.03
12	.34 (.11)	.44 (.07)	.58 (.07)	.68 (.10)	18.43	<.01	6.05	.64	.11	.15
13	.43 (.11)	.48 (.07)	.43 (.07)	.48 (.11)	5.40	.49	15.69	.05	.04	.05
14	.45 (.12)	.42 (.07)	.48 (.07)	.45 (.11)	1.72	.94	.87	.99	.01	.02
15	.30 (.11)	.43 (.07)	.35 (.07)	.48 (.10)	4.79	.57	4.84	.78	.03	.04
16	.37 (.11)	.36 (.07)	.41 (.07)	.41 (.10)	6.92	.33	8.07	.43	.04	.06
17	.44 (.11)	.33 (.07)	.34 (.06)	.23 (.10)	5.41	.49	5.21	.74	.04	.05
18	.39 (.10)	.43 (.07)	.27 (.06)	.30 (.10)	7.31	.29	5.77	.67	.05	.07
19	.27 (.10)	.33 (.07)	.25 (.06)	.31 (.10)	2.93	.82	9.80	.28	.02	.03
20	.28 (.10)	.35 (.07)	.27 (.06)	.33 (.10)	.92	.99	7.58	.48	.01	.01

Note: Proportions are estimated marginal means, controlling for intrinsic motivation and gender; Standard Errors in parentheses;

For the Hosmer and Lemeshow Test (H&L), a non-significant p-value indicates good model fit.

Chapter IV

FELT PROCESS ACCOUNTABILITY AND EXPLORATORY SEARCH UNDER DIFFERENT LEVELS OF ROUTINIZATION: A FIELD STUDY

**CHAPTER IV - FELT PROCESS ACCOUNTABILITY AND EXPLORATORY
SEARCH UNDER DIFFERENT LEVELS OF ROUTINIZATION: A FIELD STUDY.**

ABSTRACT

In this paper, we explore how accountability focus (outcome vs. process accountability) differentially affects employee engagement in exploratory search. Drawing from Conflict Theory and the Social Contingency Model, we hypothesize that felt outcome accountability would have negative effects, and process accountability positive effects on exploratory search. Moreover, we predicted that process accountability would interact with the type of job (level of routine) that someone holds. We use a survey study to investigate the effects of accountability focus in a large consultancy organization. Results do not provide support for the main effects of accountability foci, but do support the interaction effect of process accountability and type of job, such that for non-routine jobs, process accountability shows a positive relationship with employee exploratory search.

INTRODUCTION

When individuals perceive a gap between current task performance and aspired performance, they can choose to experiment with new task approaches and attempt to bridge this gap. This experimentation with the aim of improving performance has been called creative or exploratory search (Adler & Obstfeld, 2007; Knight, 2015), and is considered an important part of the innovation process and a driver for organizational success (Katila & Ahuja, 2002; Zhang & Bartol, 2010a). Consequently, organizational leaders are interested to understand why their organizational members differ in the degree to which they engage in exploratory search (Barsh, Capozzi, & Davidson, 2008; Mumford, Scott, Gaddis, & Strange, 2002).

Even though there has been a great deal of research on the topics of individual creativity and innovation (Anderson, De Dreu, & Nijstad, 2004; Anderson, Potočnik, & Zhou, 2014; Shalley & Gilson, 2004), for some contextual factors in organizations, we do not know how they affect individuals' propensities to engage in exploratory search. An important contextual factor that has received very little scholarly attention is felt accountability. Felt accountability refers to employees' feeling that their work will be evaluated and that there will be significant consequences attached to that evaluation (Frink & Klimoski, 2004; Lerner & Tetlock, 1999). It can be the results of several management practices, including incentive systems, formal and informal evaluations, and leader or peer monitoring (Ferris, Hochwarter, Buckley, Harrell-Cook, & Frink, 1999), but the focus in this paper is not on these practices, but rather on the individuals' perception of accountability directly.

Feelings of accountability can be different depending on the characteristics of the context. An important differentiation that is made is the one based on the accountability focus: 'for what' is one accountable. Specifically, the literature differentiates between outcome and process accountability as being accountable for results or for how the results were obtained,

respectively (Lerner & Tetlock, 1999; Siegel-Jacobs & Yates, 1996). While accountability focus has clear implications for the design of management practices (e.g., rewarding for inputs vs. outputs), there are several shortcomings in our understanding of how it influences behavior and specifically innovation-related behavior.

This final paper of the dissertation complements the other papers, as well as earlier research, at least in two important ways. First, we will examine accountability, as perceived by actual employees in an actual working environment. Prior studies have been almost exclusively relying on lab experiments, possibly reducing the generalizability of the effects and signaling a need for more field studies (e.g., Patil, Vieider, & Tetlock, 2014). In addition, where papers 1 and 2 operationalized exploratory search in a highly controlled, yet also narrow, experimental setting, here we use the construct of creative process engagement (Zhang & Bartol, 2010a, 2010b) to examine exploratory search as a broader construct and as part of a real work environment. We will argue that creative process engagement (i.e., scanning for opportunities for improvement, gathering relevant information, and generating alternative solutions) can be considered the real-world manifestation of exploratory search and is different from creative or innovative outcomes, in that it focuses on individuals' focus towards, and efforts invested in, the early stages of the innovation process.

Second, in this paper, we will examine the boundary conditions of the effects of accountability focus on creative process engagement. Earlier research has generally proposed (and found) that process accountability would lead to more systematic information processing and, which could explain differences in behavior, including exploratory search behavior. However, drawing from the Social Contingency Model (Tetlock, 1992), it can be argued that process accountability would only lead to beneficial coping strategies (i.e., engaging in creative search) when the task holds little or no cues for standard procedural norms. This suggests that

the effect of accountability focus (and specifically of process accountability) may be limited to jobs that are low in routine. The more routine a task is, the higher the likelihood that standardized procedural norms have developed and the lower the chance that process accountability would motivate engagement in creative processes. This is equivalent to the findings in the second paper, that process norms interact with process accountability to reduce individual exploratory search. However, here we apply these findings and examine the implications for a real-world work context.

In the next sections, we will start by discussing the operationalization of exploratory search as creative process engagement. We will continue by applying Conflict Theory and the Social Contingency Model to propose hypotheses about the effects of accountability focus on individual exploratory search. Subsequently, the method and results of a field study are presented and discussed.

THEORY AND HYPOTHESIS DEVELOPMENT

Individual Exploratory Search in Organizations

Faced with a task at work, individual workers have a choice between continuing to do what has worked in the past *or* they can realize that there may be other (potentially better) solutions, and systematically analyze the situation and generate alternative opportunities. This latter option has been dubbed exploratory or creative search (Adler & Obstfeld, 2007; Knight, 2015). To translate the concept of individual exploratory search from an experimental (cf. the previous studies in this dissertation) to an organizational setting, we use the concept of creative process engagement.

Creative process engagement is the extent to which individuals put effort into creating new and useful solutions to tasks in their jobs. Specifically, it is defined as “employee involvement in creativity-relevant methods or processes, which include (1) problem identification, (2) information searching and encoding, and (3) idea and alternative generation” (Zhang & Bartol, 2010a, p. 108). Previous research has shown that as long as creative process engagement does not prevent an individual from finishing tasks, engaging in creativity increases performance (Zhang & Bartol, 2010a). Although it has been found to be moderately correlated with innovation outcomes, it is considered to be conceptually distinct (e.g., To, Fisher, Ashkanasy, & Rowe, 2012; Zhang & Bartol, 2010b). That is, creative processes may increase the variation in potential solutions to a task, yet the selection and implementation (innovative outcomes) may not always follow (Baer, 2012; Rietzschel, Nijstad, & Stroebe, 2010).

While exploratory search and creative process engagement come from different scientific traditions (predominantly from innovation management and organizational behavior, respectively), we argue in this paper that they describe equivalent processes. They both concern high-effort exploration of alternative solutions to a task or problem at hand and describe the early stages of the innovation process. Specifically, they both pertain to identifying a current solution as (at least potentially) sub-optimal, gathering of information, and generation (yet not selection or implementation) of alternative approaches (Adler & Obstfeld, 2007; Knight, 2015; Zhang & Bartol, 2010b). In that sense, creative process engagement can be seen as an operationalization of exploratory search, similar to Knight's (2015), but at the individual level. Hence, for the remainder of this paper, we will use the term creative process engagement to refer to the dependent variable.

Accountability Focus and Creative Process Engagement

Earlier research suggests that it is hard for employees to engage in creative processes and deviate from a more standard way of working. Research in both social psychology and (strategic) management has found that individuals (as well as the groups or organizations that they make up), have a preference for “exploiting” what has worked in the past over exploring new (and risky) solutions (Audia & Goncalo, 2007; Kohn & Smith, 2011; Levinthal & March, 1993; March, 1991). Especially under high performance pressure, taking a familiar and less risky path is often preferred over trying something new, even when the familiar route leads to suboptimal performance (Litt, Reich, Maymin, & Shiv, 2011).

An important source of performance pressure in organizations is felt accountability (Hochwarter, Perrewé, Hall, & Ferris, 2005). Accountability has been defined as “A real or perceived likelihood that the actions, decisions, or behaviors of an individual, group, or organization will be evaluated by some salient audience, and that there exists the potential for the individual, group, or organization to receive either rewards or sanctions based on this expected evaluation” (Hall et al., 2003, p. 33). It is also important to specify that rewards or sanctions can be tangible (e.g., financial) or intangible (e.g., being reprimanded or praised by a supervisor or colleagues) (Lerner & Tetlock, 1999). Feelings of accountability are common in the workplace, where often a plethora of management practices are explicitly designed to invoke such feelings (Hall, Bowen, Ferris, Royle, & Fitzgibbons, 2007).

Here, we focus specifically on the differences between outcome and process accountability in the workplace, where outcome accountability refers to the feeling that one will have to justify the results of a task and process accountability refers to the feeling that one will have to justify how this result was achieved (Lerner & Tetlock, 1999). There have been several studies that examine the differential effects of outcome and process accountability (e.g.,

de Langhe, van Osselaer, & Wierenga, 2011; Siegel-Jacobs & Yates, 1996; Simonson & Staw, 1992).

Most studies on accountability focus draw from Conflict Theory (Janis & Mann, 1977) to propose that process accountability will lead to differences in epistemic motivation, which refers to the desire to gain a thorough understanding of the situation and it causes individuals to adopt more or less systematic (as opposed to heuristic) information processing (Kruglanski & Webster, 1996; Van Kleef et al., 2009). These differences in information processing are attributed to differences in experienced performance pressure (i.e., “a discomforting perception of the necessity for high performance”, Eisenberger & Aselage, 2009, p. 96). Specifically, under outcome accountability, agents have little direct control over their accountability focus (the result), compared to under process accountability where there is more direct control. For example, a shopkeeper will have direct control over his sales strategy (e.g., design of the store, price policy, being friendly to customer), but he or she will have only indirect control on the actual sales. According to Conflict Theory, this uncontrollability leads to higher performance pressure (Janis & Mann, 1977) and a consequence of high pressure is reduced task engagement resulting in a low-effort heuristic information processing (Byron, Khazanchi, & Nazarian, 2010; Siegel-Jacobs & Yates, 1996). Under process accountability, the more direct control over the accountability focus (the task strategy and processes) is expected to result in lower performance pressure. Consequently, process accountability has been found to lead to more systematic, high-effort, information processing (signaling high epistemic motivation).

Earlier research has confirmed these differences in information processing under different accountability foci. Several experiments have been conducted that consistently show that participants were better at judgement and decision-making tasks under process accountability compared to under outcome accountability (Brtek & Motowidlo, 2002;

Simonson & Staw, 1992). Some of these experiments also explicitly showed that differences in information processing (systematic vs. heuristic) were the cause of the performance differences (de Langhe et al., 2011; Siegel-Jacobs & Yates, 1996). Field studies on the role of accountability focus in individual performance are very rare. To our knowledge, a study by Doney and Armstrong (1996) is the only example. These researchers asked purchasing professionals that were in charge of buying decisions for their organization to think back to one (random) purchasing assignment that they were in charge of and report on their feelings of accountability and their task strategy. The results show that purchasers who felt process accountable also reported using more information to make a decision compared to purchasers who felt outcome accountable, suggesting a similar pattern of results than in the experiments.

In this paper, we focus on the effect of accountability focus on creative process engagement. Not only will process accountability lead to a higher likelihood of identifying sub-optimal solutions (Simonson & Staw, 1992), the more systematic information processing will also result in gathering more relevant data (Siegel-Jacobs & Yates, 1996). Because of the lower performance pressure associated with process accountability, individuals will also be more inclined to pursue new (more risky) alternative solutions, compared to outcome accountability (Litt et al., 2011). Hence, similar to the predictions in paper 1, we hypothesize that perceptions of outcome accountability will result in lower, and process accountability in higher, creative process engagement.

Hypothesis 1: Felt outcome accountability will be negatively related to creative process engagement.

Hypothesis 2: Felt process accountability will be positively related to creative process engagement.

The Moderating Role of Level of Job Routineness

A limitation of Conflict Theory (Janis & Mann, 1977; Siegel-Jacobs & Yates, 1996) in predicting the effects of accountability focus is that it does not take into account task characteristics. For example, in one rare experiment where process accountability did not lead to superior performance (Slaughter, Bagger, & Li, 2006), it was found that process accountability reduced decision accuracy when the task included “decoy” information, that is, information that looks like it could be helpful, but is actually not. Process accountability hurt performance under these circumstances by increasing the tendency to focus on this non-diagnostic information (Slaughter et al., 2006). Presumably, this is the case because participants perceive that they were expected to look at as much information as possible or, in other words, that it would be easy to defend a process that involved including as much information as possible, instead of including just the relevant information.

A theoretical framework that can help to understand the constraining effects of such perceived process expectations is the Social Contingency Model (Tetlock, 1992; Tetlock & Lerner, 1999; Tetlock, Skitka, & Boettger, 1989). Unlike Conflict Theory, this model does not primarily focus on differences in performance pressure that are induced by different accountability foci, but rather concentrates on the context of an accountability situation to predict how actors will cope with the pressure that accountability creates (regardless of how much pressure there is). Because individuals see an accountability situation as a potential threat to their public and private self-image (Quinn & Schlenker, 2002; Schlenker, Britt, Pennington, Murphy, & et al, 1994), accountability reduces the epistemic motivation and results in following the easiest and lowest-risk task strategy (Tetlock, 1992).

Accountability motivates individuals to cope with performance pressures, but situational factors of the accountability context and the task context will determine what kind

of coping strategy is motivated exactly (Quinn & Schlenker, 2002; Tetlock et al., 1989). When actors have a good idea about what way of working is favored by their audience (e.g., supervisors, colleagues, clients, etc.) they have the opportunity to take a low-effort and low-risk strategy of reverting to this default solution, as this will be an easily defensible option. This is referred to as following an ‘acceptability heuristic’. In contrast, when the situation does not hold cues about what would be considered a good way of solving a task, individuals who feel accountable are motivated to engage in increased cognitive complexity and systematically investigate all possible alternative actions. This has been referred to as ‘pre-emptive self-criticism’, as the goal is again to end up with a solution that is likely to be defensible to the relevant audience (Tetlock et al., 1989).

So, drawing from the Social Contingency Model, it could be argued that process accountability motivates systematic processing because agents believe engaging in critical and systematic analysis of job tasks is perceived as ‘the right thing to do’, according to their audience (e.g., supervisors, colleagues, clients, etc.). At this point, Conflict Theory and the Social Contingency Model are in line in their predictions.

However, and this is where the Social Contingency Model deviates from Conflict Theory, ‘the right thing to do’ may be different for different tasks, and thus accountability may steer behavior in different directions based on the characteristics of the task or job (Patil et al., 2014). For example, in a field experiment in advertising agencies C. L. Brown (1999) found that making researchers and sales profiles accountable resulted in a focus on quantitative and analytical decision styles, favored by their managers, whereas employees working in a creative role used more empathy and personal judgement, presumably favored by their supervisors. Although this study did not differentiate between accountability foci, these results still highlight the central tenet of the Social Contingency Model that agents will follow the path that

will be the easiest to justify. While this can mean that process accountability may result in more systematic and critical task processing, it also suggests that if the actors perceive that their audience favors a task strategy that is focused on doing things that have worked in the past, process accountability will not increase creative process engagement, but could perhaps even reduce it.

We therefore propose that the effect of accountability focus on creative process engagement will be moderated by the kind of job someone holds. Specifically, we differentiate between jobs that are routine or non-routine, where routinization refers to how structured or standardized a specific task or job is (Bacharach, Bamberger, & Conley, 1990).³ A job that is highly routinized will have a higher likelihood of having salient norms about what an acceptable way of working is. This, according to the Social Contingency Model, will lower epistemic motivation and motivate employees to follow the existing procedures under process accountability. In other words, these actors have the opportunity to cope with the accountability using an acceptability heuristic. For outcome accountability the relationship with creative process engagement will likely be unaffected by the routineness of the job. As outcome accountability focuses attention away from the activities of the job towards the results of the job, following a standard procedure is not a valid coping mechanism to deal with accountability pressure.

³ (Low) routinization could be considered closely related to the construct of creative requirement of a job, where creative requirement has been defined as the perception that creative idea generation is central to the job (Unsworth, Wall, & Carter, 2005). However, we do posit that routinization is less concerned with being required to come up with creative ideas directly, but rather the presence of changing circumstance and demands (which may of course lead to a need for creative ideas).

Hypothesis 3: Process accountability and level of routineness will interact, such that there will be a more positive relationship between process accountability and creative process engagement when the job is less routine.

METHOD

Participants and Procedure

Surveys were distributed to all 1092 employees of a consulting company. Useable responses could be collected for 171 respondents, resulting in an effective response rate of 16%. Full responses could be collected from 146 employees (13% response rate). Of those full responses, the average age was 32.76 years ($SD = 8.91$), average tenure in the organization was 7.38 years ($SD = 8.69$), 40% were female. Although the response rate is relatively low, comparisons of the basic descriptive metrics with the same metrics for the total population showed no significant differences (45% female in total population, $\chi^2_{(1)} = 1.30$, $p = .25$ and average age = 32.54, $SD = 9.59$, $t_{(1261)} = .26$, $p = .79$, average tenure = 7.07, $SD = 8.02$, $t = .46$, $p = .64$). Also, a comparison of the respondents with the non-respondents showed no significant differences in age ($t_{(1090)} = 1.88$, $p = .06$) and tenure within the organization ($t_{(1090)} = .60$, $p = .55$), but we did not have data on gender for the full population other than the global proportions. The sample was highly educated with most holding a Master degree (74%) or a Bachelor degree (23%).

Employees were invited to participate in the study via an email (and follow-up emails) from the HR department. Our goal was to collect additional data from the supervisors to be able to also show results for. About two months later, supervisors were invited to provide ratings for the employees that participated. We received supervisor data for 65 employees

(response rate 45%). As a result, we did not have sufficient supervisor data to include these in the regression analyses, but we did use some of the supervisor ratings to validate the self-reported measures (see further details in the ‘measures’ section).

Measures

Creative process engagement

The concept of creative process engagement deals with how individuals exert mental effort towards creatively dealing with tasks, making it a variable that is not externally observable. Therefore, a self-reported measure is considered the best way to capture this construct (To, Fisher, & Ashkanasy, 2015; To et al., 2012; Zhang & Bartol, 2010a, 2010b). We used items developed by Zhang and Bartol (2010a), which measure creative process engagement in three subscales: problem identification, information searching, and idea generation. Because the focus in this study lies on the general concept of engaging in creative or exploratory search, we use a single summary score (Zhang & Bartol, 2010a). We used a shortened six-item version (two items per subscale). This approach is consistent with earlier research (To et al., 2015) and has shown to be highly correlated with the original 11-item version (To et al., 2012). Participants used a five-point scale to, ranging from ‘never’ to ‘very often’ to respond to the items. Example items are: “I spend considerable time trying to understand the nature of the problem” and “I consult a wide variety of information”. Reliability was good with $\alpha = .81$ as can also be seen in table 1 (on the diagonal) for all other scales.

As was done in earlier research that measured creative process engagement (To et al., 2015), we attempted to validate the use of the self-reported measure by obtaining supervisor-

rated creative performance⁴. The supervisors rated the target employee on a three-item idea generation scale (adapted from Janssen, 2000) and this rating correlated significantly with creative process engagement ($r = .27, p = .03, n = 65$). Given the difference focus of the measures (recall the conceptualization of creative process engagement as a process that leads to creative outcomes, but is separate from them), different points in time (there was a summer break in between the employee and supervisor measures) and different sources, this significant, yet modest, correlation provides evidence of the predictive utility of creative process engagement and of the appropriateness of the self-rating methodology (To et al., 2015).

Accountability Focus

Eight items were used to capture perceptions of outcome and process accountability (four items for each). The items were constructed for this study, although the phrasing is based on the measures for perceived accountability used in earlier research (Mero, Guidice, & Werner, 2014). The items for both scales can be found in table 1. Participants used a five-point scale to indicate the extent to which they agreed with the statements (1: totally agree, 5: totally disagree).

Level of routine

To capture the extent to which a job is more (non)routine, we constructed a three-item measure based on the ‘routinization scale’ by Bacharach, Bamberger and Conley (1990). Note that the items were worded in a way that a high score reflects low routinization. This way, the social desirability issue of people feeling uneasy describing their own job as ‘routine’ is

⁴ The original aim was also to be able to examine the effects of the predictors (and creative process engagement) on individuals’ creative performance to complement the results on creative processes. Unfortunately, the response rate for the supervisor ratings was not sufficient to conduct these analyses. Hence, the data was only used to validate the self-reported creative process engagement measure.

avoided (Arnold & Feldman, 1981). Specifically, the items are “There is something different to do here every day” and “For almost every job I do, there is something new happening almost every day” and “My (internal or external) clients regularly ask for new products and services”. Participants used a five-point scale ranging from ‘definitely false’ to ‘definitely true’.

In addition, to validate this measure, we used participants’ official function titles to link it to the O*Net database work activities taxonomy (Peterson et al., 2001). Function titles were obtained through an HR information system and included a variety of positions including receptionist, auditor, junior associate (legal), and Chief financial officer. In total 59 different function titles were found. In the O*Net database, we selected the subscales of thinking creatively, analyzing data or information, and performing administrative activities (reversed). An aggregated score was calculated that showed values between 30.0 and 78.33 (on 100), with an average of 58.32 ($SD = 10.93$). The data further show that the self-reported job type variable correlates significantly with the O*Net data ($r = .33, p < .000$). Given that the same function description may be implemented in different ways, and the same implementation may even lead to different individual interpretations of job activities, this significant correlation suggests that the self-reported job characteristics are at least in line with what these jobs look like in other organizations.

Control variables

Support for innovation, referring to an open and rewarding climate towards creativity and innovation, has been shown in earlier research to be a predictor of individual creativity (Scott & Bruce, 1994). Process accountability and support for innovation both relate to supervisor or organizational focus on work processes and accountability, in general, is also related to organizational reward and recognition practices. Therefore, their effects may be confounded. Therefore, we included 7 items adapted from Scott and Bruce (1994). Example

items are “creativity is encouraged here” and “assistance in developing new ideas is readily available here”.

Learning goal orientation refers to an element of personality that reflects motivation to develop competences, to learn everything there is to learn in a job (Gong, Huang, & Farh, 2009). It is possible that the effects of process accountability and learning orientation are confounded as they both focus on the content of the work. To make sure we capture the effects of accountability regardless of differences in learning orientation, we control for it. We use three items from Elliot and Church (1997). An example item is “I desire to completely master the content of this job” and participants again used a five-point scale ranging from ‘totally disagree’ to ‘totally agree’.

RESULTS

Table 1

Means, standard deviations and correlations for the main study variables and control variables are provided in table 1. The results reveal significant correlations with creative process engagement for outcome and process accountability, level of routine (negative), support for innovation, and learning goal orientation. There is also a high correlation between outcome and process accountability ($r = .72, p < .000$). In addition, an exploratory factor analysis showed that there are considerable cross loadings for several of the items, suggesting that there is a common ‘accountability factor’ that is present in both outcome and process

accountability. Therefore, we opted to run separate regression analysis in order to avoid collinearity issues (although the same pattern of results is found if we do, be it with elevated collinearity statistics).

Table 2

Table 2 reports the results of hierarchical regression analyses (separate analyses with outcome and process accountability as predictor) with the control variables in the first step, the main effects of the accountability foci and job type in the second step, and the interaction effects in the third step. All independent variables were standardized. The results show that for each step, a significant amount of the variance in creative process engagement was explained by the independent variables, with the final model with process accountability at $R^2 = .28$ ($F_{(5, 146)} = 10.98, p < .000$) and with outcome accountability at $R^2 = .26$ ($F_{(5, 146)} = 9.81, p < .000$). Also, each step represents a significant increase in explained variance, except for interaction effect of outcome accountability and job type (step 3 OA; $R^2\Delta = .003, F_{(1,141)} = .58, p = .45$).

First, the results in table 2 show that learning goal orientation is the only one of the control variables that is consistently (and significantly) positively related to creative process engagement. Note that the inclusion or exclusion of the control variables (or of one specific control variable) has only minor effects on the coefficients of the main and interaction effects, and in all cases the pattern of significant effects remains stable.

With regard to the main effects in the second steps, we find a significant negative coefficient for level of routine, meaning that individuals with more routine jobs show less

creative process engagement ($\beta = -.35$, $t_{(141)} = -4.37$, $p < .000$ for the OA model and $\beta = -.34$, $t_{(141)} = -4.19$, $p < .000$ for the PA model). The results do not, however, show a significant main effect of process ($\beta = .02$, $t_{(141)} = .30$, $p = .77$) or outcome accountability ($\beta = .08$, $t_{(141)} = 1.10$, $p = .27$). Hence, hypotheses 1 and 2, which postulated main effects of accountability foci, are not supported by the data.

In the third step, the interaction effects of level of routine with outcome and process accountability are included. As hypothesized, there is a significant negative interaction effect of level of routine with process accountability ($\beta = -.19$, $t_{(140)} = -2.47$, $p = .015$), suggesting that there is a (more) positive relationship between process accountability and creative process engagement, but only for non-routine jobs. No interaction was found for outcome accountability.⁵

The significant interaction of process accountability with job type was further probed using the ‘pick-a-point’ approach (Hayes, 2013; Rogosa & David, 1980), which estimates the slopes of the effect of an independent variable on a dependent variable for diverse values of the moderator. We selected five values that span the full spectrum of job types, corresponding to the 10th, 25th, 50th, 75th, and 90th percentile of the level of routine. The results are presented in table 3 and a plot of the interaction is shown in figure 1, where the level of creative process engagement is calculated at various levels of level of routine and process accountability. The result show a significant positive interaction for the lowest level of routine but not for the other levels, suggesting a positive relationship of process accountability for low levels of routine, but

⁵ Post-hoc analyses were performed to investigate the potential moderating role of support for innovation and learning goal orientation. For learning goal orientation no significant interaction effect was found, but for support for innovation there was a significant positive interaction with both process accountability ($F_{(1, 141)} = 8.14$, $\beta = .21$, $t_{(140)} = 2.85$, $p = .005$) and outcome accountability ($F = 6.23$, $\beta = .18$, $t = 2.50$, $p = .014$). This suggests that high accountability, of any focus, combined with high support for innovation leads to increased creative process engagement.

not necessarily a negative relationship at high levels of routine. Overall, hypothesis 3 is supported by the data.

Table 3

Figure 1

DISCUSSION

When it comes to stimulating innovation, current research on management practices such as management control systems tend to emphasize the need for freedom over processes and accountability for results. The idea is that for tasks or jobs where creativity and innovation are expected, there are no routine procedures that management can make people accountable for, so subtly control the end-results should free people to explore new ways of getting there (Jørgensen & Messner, 2009; Langfield-Smith, 1997; Ouchi, 1979). In the current study, by adopting an accountability lens, we come to different predictions and provide (at least partial) empirical support for them. Specifically, we have examined the concept of accountability focus, outcome vs. process accountability, and hypothesized how they would relate to individuals' tendency to engage in creative processes.

Consistent with prior research on accountability focus, we started by applying Conflict Theory (Janis & Mann, 1977; Siegel-Jacobs & Yates, 1996), which predicts that outcome and

process accountability will lead to different levels of performance pressure, because actors would feel like they have less control over what they are accountable for. Consistent with these propositions, in earlier studies, outcome accountability has been found to lead to a heuristic processing style (quick, automatic, low information use) and process accountability to a more systematic one (slow, deliberate, high information use), resulting in differences in decision-making (Brtek & Motowidlo, 2002; de Langhe et al., 2011; Simonson & Staw, 1992).

Contrary to results in prior studies, in the current study, no main effect of outcome and process accountability was found. To our knowledge, there are only two studies that have measured accountability focus, or closely related concepts, in the field, and those studies also found only partial support for main effects (Doney & Armstrong, 1996; Oliver & Anderson, 1994). However, another explanation for the lack of main effects, may be that they are only present under some circumstances. Because Conflict Theory does not allow to make predictions about contextual factors, we introduced a different theoretical framework: Social contingency theory (Tetlock, 1992; Tetlock & Lerner, 1999).

This model proposes that, under accountability, agents behave like metaphorical politicians. That is, they will follow the course of action that will be easiest to defend to their accountability audience, which may not always be the best course of action (Tetlock et al., 1989). This model points to a moderating role of the characteristics of the job or task (Patil et al., 2014). Specifically, based on the Social Contingency Model, we hypothesized that process accountability would not have a positive effect (perhaps even a negative one) when the job was more routine, more standardized, but would have a positive effect when the job was low on routine. The results confirmed this interaction effect of level or routine with process accountability. Further probing of the interaction showed a positive interaction for (very) low routine and process accountability.

A potential negative interaction of process accountability with high routine was not found. However, the results in table 3 do suggest that the (negative) coefficients become larger for the more extreme values of level of routine. In fact, analyses of the most routine values suggest that there may be a negative interaction effect. Specifically, levels of routine of 4.35 ($B = -.20$, $SE = .10$, $t_{(140)} = -1.98$, $p = .05$) and higher show significant negative interactions. However, these analyses are based on a low number of observations as such extreme values are very rare in the present sample. Although there is significant variation in the level of routine variable, the result of the O*Net job analysis reveal that there are few jobs in the sample that are really highly routinized (with a minimum score of 70 out of 100 on the composite routineness measure we constructed). Future research could try to examine these relationships in a broader set of jobs (with more routine jobs) to further test this negative interaction.

Overall, the results are supportive of using accountability as a lens to make predictions about how management practices may impact employees' engagement in creativity. However, the lack of main effects suggests that more complex theories, like the Social Contingency Model, provide a better framework to understand accountability than more simple models. In this study the type of job (level of routine) proved to be an important moderator, yet other accountability characteristics (e.g., type of audience) may also play a role (Hall et al., 2007).

Limitations and Future Research

Even though this study has provided us with interesting new insights, there are several limitations that should be noted and that could be addressed in future research. First, the reliance on self-report measures is not optimal. Although creative process engagement is a construct that is typically measured in this way (e.g., To et al., 2012; Zhang & Bartol, 2010a, 2010b), and while several independent data sources were included to support the validity of the measures, an ideal setting would still include a variety of data sources for important

variables. For example, in online settings it may be possible to get independent data about individuals' tendency to creatively contribute to tasks or problems (e.g., Jeppesen & Frederiksen, 2006), although the conceptual distinction with creative or innovative results needs to be guarded. Also, by looking at external sources of accountability, rather than at the subjective reporting of accountability which may be influenced by social desirability (Hall et al., 2007), the relationship between the two could be assessed (Hall et al., in press).

An important limitation is the lack of an existing measure of outcome and process accountability perceptions. Field research on accountability has either used the existing scale by Hochwarter, Ferris, and Gavin (2007) for general accountability, or relied on ad-hoc measures of more specific types of accountability (e.g., Mero et al., 2014). Therefore, we had to design new scales for this study, although the phrasing was somewhat based on the items by the scale from Mero et al. (2014) on 'perceived accountability for task' and 'perceived accountability for interpersonal facilitation'. A valuable avenue for future research could be the development of a set of specific measures to address accountability focus, but also other factors of accountability systems like source, salience, and intensity (Hall et al., in press). Such a set of measures will allow researchers to consistently adopt the accountability lens to examine management practices in the field.

Finally, there are inherent shortcomings in every study that relies on a single method (Scandura & Williams, 2000). Both of the issues mentioned above (self-reported measures and the difficulty of measuring accountability focus) would not be issues in an experiment in which accountability would be manipulated and exploratory search could be observed. However, we believe that using a survey methodology was justified given the lack of field studies on accountability focus in previous research. Future research could combine experiments and survey studies to investigate one research question. In that sense, the findings of the second

paper in this dissertation could be combined with the findings in this paper. Or, ideally, researchers could try to set up (quasi) field experiments (Grant & Wall, 2009) in which accountability focus is manipulated in a real organizational setting, where actual work behavior can be measured or observed.

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Table 1:

Items for outcome and process accountability

Outcome accountability	Process accountability
Others in my organization can observe the results or outcomes of my work.	Others in my organization can observe the task processes or strategy that I use in my work.
I am required to justify or explain the results I achieved.	I am required to justify or explain my task processes or strategy I used.
I have to justify my decisions and work results to my supervisor.	I have to justify to my supervisor why I have followed a specific procedure or way of working in a task.
I have the feeling that I am accountable (to my supervisor, colleagues, or others in the organization) for my work results.	I feel that I am accountable (to my supervisor, colleagues, or others in the organization) for my way of working.

Table 2:

Correlations, means and standard deviations of the study variables

	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7
Creative process engagement	3.75	.53	(.81)						
Outcome accountability	3.78	.64	.25**	(.65)					
Process accountability	3.34	.75	.20**	.72**	(.71)				
Level of routine	2.76	.79	-.44**	-.22**	-.25**	(.77)			
Support for innovation	3.07	.72	.23**	.04	.23**	-.39**	(.84)		
Learning goal orientation	4.49	.49	.36**	.25**	.27**	-.28**	.30**	(.73)	
Gender	.53	.50	.07	.07	.06	.01	-.10	-.11	/
Age	32.76	8.91	.11	-.27**	-.11	-.06	.07	-.10	.09

Notes:

** $p < .01$; * $p < .05$ (2-tailed).

$N = 148$ to 172

Values on the diagonal are Cronbach's alpha coefficients.

Table 2:

Regression results

	Step 1		Step 2 (OA)		Step 3 (OA)		Step 2 (PA)		Step 3 (PA)	
	β	p	β	p	β	p	β	p	β	p
Support for innovation	.13	.11	.02	.83	.02	.84	.01	.93	.01	.92
Learning orientation	.32	.00	.24	.00	.24	.00	.26	.00	.26	.00
Level of routine			-.34	.00	-.35	.00	-.35	.00	-.40	.00
Outcome accountability			.08	.27	.08	.28				
Process accountability							.02	.77	.03	.69
OA x job type					-.06	.45				
PA x job type									-.19	.02
R^2	.15	.00	.26	.00	.26	.00	.25	.00	.28	.00
$R^2\Delta$.11	.00	.00	.45	.11	.00	.03	.02

Note: To increase readability, regression weights with p -values $< .05$ are in bold

OA = outcome accountability, PA = process accountability

For R^2 we report the p -value for the appropriate F -test, for the β for a t -test

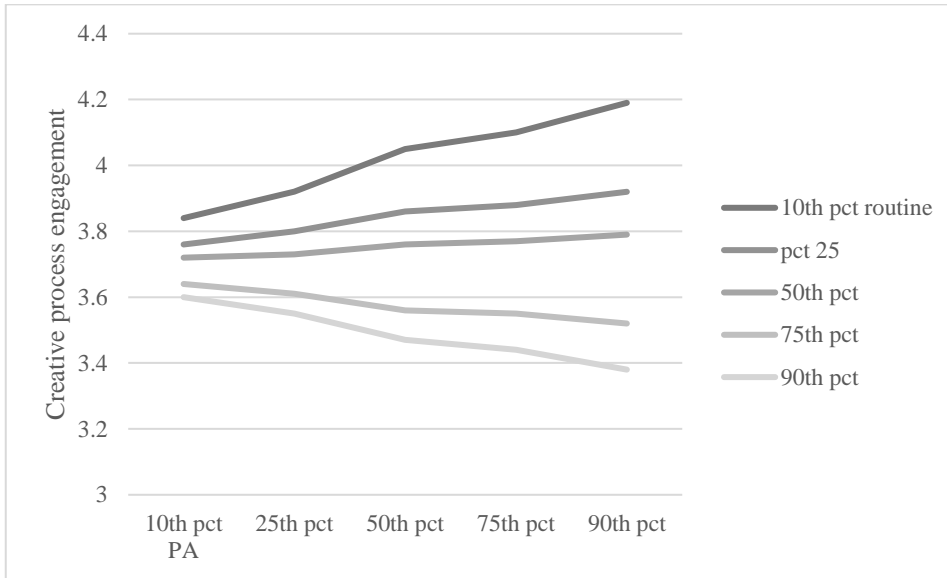
Table 3:

Probing of the interaction effect of level of routine and process accountability

Percentile	Level of routine	Effect	<i>SE</i>	<i>t</i>	<i>p</i>	<i>LLCI</i>	<i>ULCI</i>
10 th	1.67	.18	.08	2.11	.04	.01	.34
25 th	2.33	.08	.06	1.39	.17	-.03	.20
50 th	2.37	.03	.05	.65	.52	-.07	.14
75 th	3.33	-.06	.06	-1.00	.32	-.18	.06
90 th	3.67	-.11	.07	-1.49	.14	-.25	.04

Figure 1:

Effect of process accountability at different percentiles of job routine



Chapter V

EPILOGUE

CHAPTER V - EPILOGUE

Throughout the previous three chapters, several empirical studies have been described that have contributed to our understanding of how accountability focus relates to individuals' tendency to engage in exploratory search. The aim in this epilogue is to take a step back and examine not only what each study teaches us about the research objectives, but also how the studies collectively contribute to the broader literatures on innovation and accountability.

To this end, we will start in the next section by reviewing the results of the empirical studies and how they relate to the research objectives that we set out to tackle. We also provide an overview of the most important, broader, contributions of the research, both at a theoretical and methodological level. Next, several lines of future research that could further enrich our understanding of the relationship between accountability and exploratory search and other innovation processes are outlined. Finally, implications of the findings for practitioners are discussed.

RESEARCH OBJECTIVES AND RESULTS

Research objective 1 – The main effect of accountability focus on exploratory search

In this dissertation, we set out to investigate the effects of accountability focus on individual exploratory search. Primarily based on Conflict Theory (Janis & Mann, 1977; Siegel-Jacobs & Yates, 1996), earlier research has found that accountability focus (outcome vs. process accountability) can lead to differences in performance on judgement and decision-making tasks. No prior research, however, has examined the role of accountability focus with regard to innovation processes, like exploratory search (Hall, Frink, & Buckley, in press; Lerner & Tetlock, 1999; Patil, Vieider, & Tetlock, 2014). Therefore, a first research objective

was to examine the main effect of accountability focus (outcome and process accountability) on individual exploratory search.

In chapter 2, we mainly drew from Conflict Theory (Janis & Mann, 1977) to predict that outcome and process accountability would lead to differences in performance pressure (Siegel-Jacobs & Yates, 1996). Specifically, according to Conflict Theory, differences in the perceived control over the accountability focus result in different levels of performance pressure. As outcomes are under less direct control compared to processes, it was predicted that outcome accountability would lead to higher performance pressure than process accountability. Subsequently, drawing from activation theory (Gardner & Cummings, 1988), these differences in performance pressure are expected to lead to differences in the depth of information processing. That is, under high pressure, individuals would be motivated to reduce pressure as quickly as possible (in other words, they are low in epistemic motivation), resulting in low-effort, heuristic information processing, which leads to lower exploratory search. Under lower pressure, individuals are highly engaged in the task and motivated to pursue high-effort, systematic information processing (high epistemic motivation), which is conducive to exploratory search.

In chapter 2, we reported the results of two experiments that provided support for the differential effects of accountability focus on exploratory search, yet only partial support for the mediating role of performance pressure. That is, it was found that there was lower performance pressure under process accountability compared to under outcome accountability. However, there was no stable effect of performance pressure on exploratory search. As we will discuss below, this may have been due to methodological limitations with regard to the measurement of performance pressure.

Research objective 2 – The moderating role of task characteristics and personality

Several recent reviews of the literature have called for the investigation of boundary conditions of the effects of accountability focus (Hall et al., in press; Patil et al., 2014). Most of the previous research has found that process accountability leads to superior performance, because it leads to more systematic information processing (Lerner & Tetlock, 1999). Hence, previous research has already shown that positive effects of process accountability are limited to tasks for which systematic processing leads to higher performance (de Langhe, van Osselaer, & Wierenga, 2011). In this dissertation, we aimed to investigate two other moderators of the effect of process accountability, specifically with regard to exploratory search. Specifically, the second research objective was to investigate the moderating role of task characteristics and personality (specifically norm availability and openness to experience).

Although Conflict Theory provided insights into the main effects of accountability focus, we here draw from the Social Contingency Model (Tetlock, 1992) to make inferences about how characteristics of the task may constitute boundary conditions to the positive effect of process accountability. This theory does not start from differences in performance pressure, but rather assumes that, faced with pressure, actors can use different strategies to cope with this pressure. Specifically, based on the Social Contingency Model, we argued in chapter 3 that the positive effects of process accountability would become negative for tasks that have a salient process norm available, because such a norm gives actors an ‘easy way out’. That is, if they perceive that there is an existing process they can follow, they can just stick with that and would not have to take the risk of experimenting with alternative procedures.

At the level of personal characteristics, we drew from research on the five factor model (McCrae & Costa, 1987) and trait activation theory (Tett & Burnett, 2003) to propose that openness to experience positively moderates the effect of process accountability. Openness in

itself has the potential to stimulate a behavioral pattern of experimenting and trying new things, that would be conducive of exploratory search. However, trait activation theory suggests that this will only be the case when the task environment activates the trait, when the situation calls for it. We argued that under process accountability, openness will be activated because both steer attention to the content of the task itself, whereas outcome accountability steers attention away from the task and towards the results and consequences of the task. Hence, we predicted that high openness would amplify the positive effect of process accountability, but have no effect under outcome accountability.

An experiment was conducted in which accountability focus and norm availability were manipulated and openness to experience was measured. The results proved supportive of the hypothesized interaction effects, suggesting important boundary conditions for the positive effects of process accountability and showing that the Social Contingency Model provides a complementary framework to Conflict Theory when theorizing about the effects of accountability focus.

Research objective 3 – The effects of accountability focus on exploratory search in a field setting

Another important limitation of the current literature on accountability and accountability focus lies at the methodological level. Prior research in the field of accountability has predominantly been drawing from experiments. Especially with regard to accountability focus, to our knowledge, there has only been one study that examined their effects for real employees. Therefore, a third research objective is to take the effects of accountability focus on exploratory search out of the lab and also investigate how process accountability may have different effects for different types of jobs.

To this end, in chapter 4, we again examined the main effect of accountability focus, but also examined the moderating role of the type of job that someone holds. Specifically, similar to the moderating role of norm availability in chapter 2, we hypothesized that process accountability would not have a positive effect on exploratory search for jobs that are highly routinized, but that positive relationship would be found for jobs that are non-routine. The results of a survey study reported in chapter 4 reveal no main effect of accountability focus, yet do support the (negative) interaction effect of process accountability with job routinization.

THEORETICAL AND METHODOLOGICAL CONTRIBUTIONS

The studies in this dissertation contain significant theoretical contributions to the previously unlinked fields of innovation and accountability, and also contribute to the methodological toolkits that can be used to investigate research questions in these fields.

Contributions to the Innovation Literature

The dissertation contributes to the innovation literature in three important ways. First, while we do not claim to study multiple steps in the innovation process, we do contribute to the process view by examining the largely unexplored step of exploratory search. Even though various definitions of innovation emphasize that it should be seen as a process (Simonton, 1999; West & Farr, 1991), few empirical studies in the innovation literature have operationalized it as such and the vast majority have focused on innovation as an outcome and disregarded the important early step of exploratory search (Anderson, Potočnik, & Zhou, 2014; Garud, Tuertscher, & Van de Ven, 2013). In contrast, research on innovation in the organizational behavior tradition has focused much more on the early steps in the process (Perry-Smith & Mannucci, 2017). However, this too is not parallel to exploratory search as it

includes both generation and self-selection of ideas (e.g., Woodman et al., 1993), whereas exploratory search explicitly does not include selection. In this dissertation, we examine exploratory search as a specific and important step in the innovation process, that may only be moderately correlated to the eventual innovative outcome (To, Fisher, & Ashkanasy, 2015; Zhang & Bartol, 2010), yet it may be of great importance in determining the potential set-breaking nature of the innovation (Jung & Lee, 2016; Katila & Ahuja, 2002). In conclusion, the dissertation contributes to a process view by acknowledging the central role of exploratory search and examine how differences in exploratory may be predicted.

The dissertation also contributes to the innovation literature by explicitly focusing on the individual level of analysis. The exploration literature is lacking on this level of analysis, notwithstanding several influential calls (e.g., Gupta, Smith & Shalley, 2006). However, the level of the individual manager or employee is important, as organizational exploration and exploitation (and the balance between them) may be fundamentally rooted in the tendencies to engage in exploration of individuals within the organization and understanding how management practices influence individual exploration may thus be paramount to managing organizational innovation (Patel, Messersmith & Lepak, 2013; Prieto & Santana, 2012). Thus, the research in the dissertation, with its focus on individual exploratory search, can be seen as an attempt to investigate how management practices (i.e., through accountability) influence individual exploration, adding to a small but growing literature on the drivers of individual exploration (e.g., Mom, van den Bosch & Volberda, 2009; Laureiro-Martinez, Brusoni, Canessa & Zollo, 2015).

Finally, the innovation literature is furthered by linking accountability focus to differences in exploratory search. Previous literature has found that accountability focus can have effects on all sorts of behaviors, performance in judgment and decision-making, and

affective and attitudinal responses (see Hall et al., in press; Lerner & Tetlock, 1999). This prior research suggested that variables that are important for exploratory search are affected, yet, to our knowledge, no prior research has examined its effects on innovation outcomes or processes (Patil et al., 2014). The present studies thus shed light on this relationship and allow us to make further predictions about the effects of management (control) practices on exploratory search. Importantly, these predictions go beyond those that would have previously been made based on traditional management control theory (Eisenhardt, 1985; Langfield-Smith, 1997; Turner & Makhija, 2006). Especially the finding that highest exploratory search can be expected for individuals working on a task *without* fixed procedures, but *with* process accountability, constitutes an important departure from the current theorizing about the effects of accountability mechanisms on innovation. It suggests that, while shared goals and visions are surely important to drive innovation (e.g., Hülshager, Anderson & Salgado, 2009), making individuals that are working on tasks that require innovativeness accountable for achieving results (e.g., via incentive systems) may in fact be counterproductive.

Contributions to the Accountability Literature

As mentioned in the previous section, this dissertation contributes to the accountability literature by examining the role of accountability (focus) with respect to individual exploratory search. However, there are at least two other ways in which the studies in the dissertation add to the accountability literature.

A first contribution relates to the role of moderators of the effects of accountability focus. In earlier research there had seemingly grown a consensus that process accountability would have universal positive results on performance and decision-making (de Langhe, van Osselaer, & Wierenga, 2011; Frink et al, 2008). However, the positive effects of process accountability may have been consistently found in the vast majority of the previous research,

yet several of this previous work also shows evidence of potential boundary conditions. For example, Siegel-Jacobs and Yates (1996) found that process accountability did not increase accuracy in decision-making when it led to the processing of non-diagnostic information. Similarly, another experiment found that adding useless information could reduce performance on a judgement task under process accountability, but not outcome accountability (Slaughter, Bagger, & Li, 2006). These findings are in line with the Social Contingency Model and suggest that the characteristics of the task could be an important boundary condition of the positive effects of process accountability. Specifically, they suggest that process accountability could lead to a sort of ‘mindless exploration’ of information, at least when the actor believes this will lead to an easily justifiable result (Patil et al., 2014; Tetlock, Skitka, & Boettger, 1989).

Addressing these suggestions, in chapter 3 and 4 we found support for the role of the availability of routine process norms as a negative moderator for process accountability. These results clearly show that the effects of accountability focus have boundary conditions and, specifically that the positive effect of process accountability on exploratory search (and perhaps systematic information processing, in general) may only manifest for task or jobs that are low in routinization. This way, the results are supportive of the Social Contingency Model as a theoretical framework to investigate effects of different types of accountability and show that this model provides insights that go beyond the predictions based on Conflict Theory.

In addition, the results also showed that personality (openness to experience) can be a way to amplify the positive effects of process accountability. Both these findings fit well within the interactionist perspective on creativity and innovation (Woodman, Sawyer, & Griffin, 1993), which suggest that characteristics of the individual actor, the group and the organization will together provide the best predictions about creative and innovative behavior and outcomes. Specifically, the result suggest that accountability systems (e.g., reward, evaluation practices)

would lead to increased exploratory search (and, ultimately, innovation), but only for individuals with a specific personality profile *and* working on non-routine tasks. In that sense, accountability can be considered another factor in the broader interactionist model of organizational innovation.

Another contribution relates to testing the role of Conflict Theory, which has been proposed as the explanatory theory when it comes to differential effects of outcome and process accountability (e.g., de Langhe et al., 2011; Siegel-Jacobs & Yates, 1996), and predicts a mediating role of performance pressure. The results in chapter 2 show that there is a main effect of accountability focus on perceived performance pressure. While this has been suggested in several studies (e.g., Siegel-Jacobs & Yates, 1996), to our knowledge, this is the first study that actually attempts to measure performance pressure under different accountability foci. However, the result also showed no effect of performance pressure on exploratory search, nor a significant indirect (mediation) effect. Although there are methodological limitations related to the measurement of performance pressure, overall, we can conclude that these findings are tentatively critical of Conflict Theory as a model to make prediction about the effects of accountability focus, but that further research is needed.

Given the central role of Conflict Theory and performance pressure in previous research, these findings could have far reaching consequences. That is, to our knowledge, all previous research on the effect of outcome and process accountability pointed towards Conflict Theory, explicitly or implicitly, as the explanatory framework to predict and understand results. Hence, if the theory and the related role of performance pressure are uncertain, we may have to reexamine this previous research and see how the results fit with alternative theoretical frameworks.

Methodological contributions

The dissertation also contributes several methodological considerations that may prove useful for further work in the field of accountability and/or exploratory search. First, the experiment that was used in chapters 2 and 3 proved to be both a close operationalization of the concept of exploratory search and easy to use for a variety of purposes (adapted from Ederer and Manso, 2013). It is easy in use, as it can relatively easily be programmed in lab-experiment programs (the original paper used z-tree) or in online platforms (we used Qualtrics). Even though the task is fairly abstract, formal (measures of intrinsic motivation) and anecdotal evidence (talks with participants during debriefings) suggests that participants rather enjoyed the task activities. In addition, as every decision that is made in the task is captured, the process of exploratory search can be directly and objectively observed, without the need for (self- or other-) rated scores for exploratory search. Besides these practical benefits, the task also provides a good operationalization of the concept of exploratory search, as it allows actors to experiment with different modifications that can be incremental or more disruptive in nature and actors receive instant feedback on the value of the modifications, which is important for experimentation (Adler & Obstfeld, 2007). However, the controlled nature of the task also constitutes a downside of the task. Because there are so few parameters that can be altered, experimentation is relatively constrained. As a result, the task works well for short sessions (e.g., 20 rounds), but it would not work for longer sessions, unless modifications are made. These modifications could include adding parameters that can be changed, or create a sequence of tasks of the same form but with different underlying parameters.

A second contribution relates to the field study where there was an additional challenge pertaining to the measurement of accountability focus. To date, there have been no survey studies that measure perceptions of accountability focus, and as such, we had to design a

measure specifically for this study. This points to the broader issue that is the lack of standard scales for various features of accountability environment (Hall et al., in press). While the measure employed in chapter 4 could be a good starting point, future research needs to focus on developing a (set of) measure for various features of the accountability environment and establish convergent and discriminant validity.

DIRECTIONS FOR FUTURE RESEARCH

The research in the dissertation not only contributes to the literature on accountability and exploratory search, it also points towards several opportunities for future research. The current research has shown that relatively subtle changes in accountability can have significant effects on how individuals perform their work. This begs the question how these changes in accountability focus can impact other outcomes, specifically other phases of the innovation process. Notably, if exploratory search refers to the generation of variations, it is also important to know how accountability focus influences the subsequent selection of a variation for implementation. In addition, the current research was limited to the role of accountability focus. While this is an important feature that changes the interpretation of accountability, there are other features that may have similarly interesting effects, and have not received much research attention in the past (Hall et al., in press).

In conclusion, while the research in the dissertation has provided us with new insights into how accountability relates to exploratory search, it also provides us with insights into yet other research questions that need to be addressed. In this section, we will discuss several of them in some more detail. We do not claim to provide an exhaustive list, yet we aim to provide an overview of the most promising and exciting avenues of future research.

Additional moderators of the accountability – exploratory search relationship

In the dissertation, we focused on one part of the accountability environment, namely the focus. However, the accountability environment (i.e., elements of the task environment that influence the subjective interpretation of felt accountability) may contain other relevant elements. Specifically, the source of accountability ('to whom one feels accountable'), accountability salience ('how important are the outcomes one is accountable for'), and the intensity ('how many different sources or outcomes one is accountable for') have been proposed as additional (potential) moderators (Hall, Bowen, Ferris, Royle, & Fitzgibbons, 2007). All of these features can arguably impact the level of performance pressure that is experienced by an actor. For example, if one is accountable to a high-status supervisor, more pressure may be felt compared to when one is accountable to lower-status peers (Hendricks & Brickman, 1974). Similarly, the amount of constituents to whom one is accountable (intensity) and the importance of the outcome (salience) will likely have a positive relationship with performance pressure. Thus, to the extent that performance pressure explains differences in exploratory search (or other behavioral or cognitive outcomes), these features of the accountability environment may change the effect felt accountability has. However, there has been scant research examining these features and their effects (Hall et al., in press), leaving much room for future investigations.

The effect of accountability (focus) on exploratory selection

In the previous chapters, we focused on exploratory search, which is the experimentation with alternative solutions, which builds a list of potential solutions (Knight, 2015). Although this phase is of vital importance in the innovation process (Katila & Ahuja, 2002), there are other phases that could be focused on in future research. Namely, in a next phase, an individual or group will need to select a solution that will be implemented

(Rietzschel, Nijstad, & Stroebe, 2010; Simonton, 2013). It is possible that outcome and process accountability will again influence the selection phase in a more or less exploratory direction (i.e., the selection of explorative options vs exploitative options). It could be expected that, similar to the effects found for exploratory search, outcome accountability would lead to low-effort, heuristic processing, which may favor solutions that have worked in the past, whereas process accountability would induce systematic processing, resulting in a higher chance that the potential benefits of more unusual (explorative) solutions are considered. However, this difference may become more pronounced with larger numbers of potential solutions from which a selection has to be made. For a small number of options, the benefits of exerting effort to systematically analyze all options may not make much of a difference, because not much effort is needed. When the amount of potential solutions to go through increases, however, increased effort will become more important.

However, a competing hypothesis could also be proposed, drawing from an evolutionary theory of innovation (Campbell, 1960). This theoretical framework proposes that selection (or ‘selective retention’) is a function of the value that a particular solution creates for the entity (be it an individual, group, organization, industry, etc.). This value can be externally determined by trying out, for example, a new product or service and examine how it fairs in the market. However, in most organizations, this option is very costly and therefore internal selection procedures are used (sometimes referred to as ‘vicarious selection’) (Anderson, 1999; Simonton, 2011). The effectiveness of such an internal selection procedure is a function of its resemblance of the real, external, environment (Levinthal & Warglien, 1999). Here, it could be argued, that process accountability may lead to a focus on the internal characteristics of the task itself instead of on the external consequences of the task (cf. Woolley, 2009). Outcome accountability, is suggested to do the opposite: focus on the external pay-out

of the task, at the expense of focusing on the content of the task. Therefore, it could increase the validity of the internal representation of the external environment and allow for better predictions of what kind of solutions would work well. In other words, the systematic task focus that, as we have argued, leads to high exploratory search under process accountability, may reduce exploratory selection. Future research could examine these competing hypotheses and look into potential conditions under which one or the other is true (e.g., complexity of the external environment, number of potential variations created in the search phase).

Accountability focus and exploratory search at the group level

Here, we have focused on the individual level, but it could be argued that similar positive effects of process accountability could be found at the group level (Nijstad & De Dreu, 2012). Specifically, research on group information processing has found that groups (just like individuals) have a tendency to stick to information that has proven its worth in the past and is common knowledge and ignore new and unique information (Stasser & Titus, 2003). It follows, that groups that focus on common knowledge will be less likely to arrive at innovative solutions, as the set of information that they can explore is more limited. Furthermore, this tendency to disregard new and unique information may even be exacerbated by performance pressure (Gardner, 2012).

However, based on the motivated information processing in groups model (De Dreu, Nijstad, Bechtoldt, & Baas, 2011; De Dreu, Nijstad, & van Knippenberg, 2008), it can be argued that process accountability for groups, just like for individuals, leads to lower performance pressure and in fact increases group epistemic motivation. That is, under process accountability, groups are expected to be more motivated to systematically share all information, including unique information. Empirical research on this topic is very limited, yet supportive of a positive effect of process accountability on information sharing (Scholten, van

Knippenberg, Nijstad, & De Dreu, 2007). Future research could apply this reasoning to group exploratory search and other innovation processes.

Antecedents of accountability focus

In the dissertation, we focused on perceptions of accountability and how they influence behavior and cognition, and not on the antecedents of these perceptions. In order to be able to make clear contributions to practice (e.g., the design of reward and evaluation systems), it should also be examined to what extent different types of management practices influence accountability perceptions. In that sense, felt accountability can also be viewed as a mediator between all sorts of management practices and relevant outcomes. Again, relatively little prior research has examined the antecedents of accountability (Hall et al., in press; for an exception, see Mero, Guidice, & Werner, 2014).

Making predictions about the effect of various management practices on outcome and process accountability may often be straightforward. For example, it could be argued that a reward system that turns out bonuses based on results would increase outcome accountability, whereas a system that rewards procedures would increase process accountability (Oliver & Anderson, 1994). However, in real organizations, actors can be accountable to many different constituents and these different constituents may induce conflicting accountability foci. This raises several questions that can be the subject of future research. Can actors hold more than one accountability perception at the same time? And if they cannot, how do they form a single accountability focus perception based on conflicting sources?

One way to answer this question is to examine the possibility that perceptions of outcome and process accountability do not remain stable over time, because constituents become more or less salient at different moments in an organizational calendar. For instance, close to the

annual performance review, the influence of the supervisor may become more important, whereas throughout the year other accountability sources like peers or clients play a greater role. A longitudinal study could be designed, in which periodical measures of accountability foci are administered. If the dominance of outcome and process accountability fluctuates at important moments in the year (e.g., at the end of a month vs in the middle of the month, end-of-year), this would mean that individual actors weight the accountability pressure of various constituents differently at different times.

IMPLICATIONS FOR PRACTICE

In today's management literature, there is much talk about changing performance management in organizations (Cappelli & Tavis, 2016). While this discussion is a more fundamental one (about whether or not we need formal performance management), the findings of the dissertation can inspire development of what performance management in the future should look like, in whatever form we chose to keep it around (formal or informal). To do this, our findings need to be incorporated in what has been called the *accountability lens*, through which management practices can be viewed.

The accountability lens has been defined as “a metaphorical device that captures the formal, informal, internal, external, objective, and subjective-interpretive aspect of accountability in organizations”, and “this lens can be used to understand how systems of accountability can be better conceptualized and designed in organizations.” (Hall et al., 2007, p. 406). In other words, if we better understand how feelings of accountability influence actors' behavior, decision-making, and performance, we can manage such outcomes by managing *accountability systems* (i.e., management practices that lead to specific accountability

perceptions). Formal accountability systems include performance evaluation, incentive systems, and other system typically described as management control mechanisms, explicitly designed to shape employee behavior. In addition, also informal norms and expectations within a workplace can significantly impact accountability perceptions.

Thus, given the findings in this dissertation, a better understanding of the effects of felt accountability can inspire the design of better reward, evaluation, and leadership practices to stimulate exploratory search. Specifically, the findings point towards the use of management practices that induce process accountability over outcome accountability. This is an important recommendation, given that today's systems primarily focus on results, instead of behavior and processes (Gerhart, Rynes, & Fulmer, 2009; Rynes, Gerhart, & Parks, 2005). In fact, management control researchers have long argued that outcome-based systems are the preferred way of stimulating creativity, because when creativity is involved, processes are often not strictly described and cannot be easily measured or otherwise controlled (Ouchi, 1979; Turner & Makhija, 2006). However, the findings in this dissertation suggest that process accountability can not only have a positive effect on exploratory search, they also show that this becomes even *more* important when there are no clear procedural norms.

Related to this last point, the findings also show significant moderating effects, pointing to important boundary conditions and, at a practical level, pointing to specific situations when process accountability is and isn't a good way to stimulate exploratory search. A first one pertains to the type of task or job that someone is working on. The findings in chapter 3 and 4 show that process accountability only has the desired effects when the task has no fixed process norms or the job is non-routine. A second interaction was found for openness to experience, which showed a positive interaction with process accountability. These results suggest that

organizations should restrict process accountability systems to those individuals that work on non-routine tasks *and* are high in openness.

A final consideration that practitioners have to make is that they need to think carefully about how different sources of accountability may send conflicting results, leading to undesired accountability perceptions. Particularly because formal (management control systems), but also informal accountability sources (e.g., supervisor and peer expectations) can play a role, this may be especially difficult to manage through centralized policies alone.

GENERAL CONCLUSION

Explorative innovation is consistently argued to be one of the most important factors that determine organizational success, both by academics (Anderson et al., 2014; Junni, Sarala, Tarba, Liu, & Cooper, 2015) and practitioners (Barsh, Capozzi, & Davidson, 2008). Yet there are many organizational factors for which we do not know how they affect innovation processes. In this dissertation, we set out to shed light on one important innovation process (exploratory search) and a previously unexamined contextual factor (accountability focus) and on how they relate to each other. Specifically, it is demonstrated that different accountability foci, outcome and process accountability, have significant influence on exploratory search, on the amount of alternative solutions to a task that are explored. Contrary to theorizing in management control literature, process accountability proved to have a positive effect on exploratory search, compared to outcome accountability. However, boundary conditions at the level of task or job design (routinization) and personality (openness to experience) have also been addressed, showing that the relationship between accountability and innovation processes is complex and always needs to be contextualized. Future research should go even beyond this

and further build a complete model of accountability, with all its possible features, and exploratory innovation.

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