Conceptualizing and Testing the Model of Ambidextrous Leadership:

Evidence from a Multi-Method Research Study

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ABSTRACT

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While leaders are constantly called to manage conflicting priorities in today's fast-changing environments, there is little research that examines how leaders can effectively explore new opportunities while simultaneously exploiting current advantages. Yet, management researchers have long shown that organizations that are ambidextrous—by balancing exploration and exploitation activities—are more innovative and successful. However, this concept of ambidexterity has not been investigated at the leadership level to a great extent, which poses limited practical implications for organizations. Further, there has been a lack of clarity around what constitutes and how to operationalize ambidexterity in the literature. The current research attempts to address these gaps by proposing a preliminary model of ambidextrous leadership. This model is then embedded in a leadership process model to help understand the underlying process of what may predict and result from ambidextrous leadership.

The pilot and Study 1 leveraged self-report and experimental vignette survey methods, and the results from these studies provided preliminary evidence for the validity of the two constructs, exploration and exploitation. The results also demonstrated the impact of a promotion and prevention regulatory focus on exploration and exploitation, respectively, while showing almost no support for the effects of switching on leadership perceptions. The results from Study 2—which leveraged CEOs' letters to shareholders in the annual reports of S&P 500 companies—provided limited support for the positive effects of achieving high levels of exploration and

exploitation compared to being high on only one of them or low on both. Finally, based on the findings from three studies, theoretical and practical implications are discussed.

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CHAPTER 1

General Introduction

Organizations face constant challenges to maintain relevance and competitiveness, in a rapidly changing world of shifting geopolitics, global talent gaps, increasing automation and on-demand work, and big data. Underlying these demands is an ever-increasing technology curve (Manyika, 2017; Meehan, 2016). The constant pressure of today's economy has resulted in very few organizations surviving into the new century; only 12 percent of Fortune 500 companies that were operating in 1955 are still in existence today (Bersin, Pelster, Schwartz, & van der Vyver, 2017).

One of the key ways that organizations can protect their longevity is through constant innovation. For instance, companies with broader missions, like Google, have identities that allow them to remain agile and evolve to fit what their customers most need (McGrath, 2013; Tushman, Smith, & Binns, 2011). These companies are able to both build on their current business and seek out new ways to build a stronger brand. In other words, many successful, entrepreneurial firms are ambidextrous—they maximize profits in their current market while constantly being adaptive to changes (Raisch & Birkinshaw, 2008; Tushman & O'Reilly, 1996). Ambidexterity is a function of both exploration (searching for new, useful adaptations, opportunity-seeking) and exploitation (use and propagation of known adaptations, advantage-seeking) (Fang, Lee, & Schilling, 2010; Mihalache, Jansen, Van den Bosch, & Volberda, 2014). Research has shown that companies that engage highly in both exploration and exploitation are also more innovative (Zacher, Robinson, & Rosing, 2016), because they can be better prepared "to reconfigure existing assets and develop the new skills needed to address emerging threats and opportunities" (O'Reilly & Tushman, 2011, p. 5). But how can organizations become

ambidextrous?

While it has been well demonstrated that organizational ambidexterity is an important antecedent to organizational innovation and performance, far less has been studied about *those who lead* ambidextrous organizations. In many companies, it may be the top management team's responsibility to balance exploration and exploitation; according to O'Reilly and Tushman (2011), "ambidexterity embodies...the ability of senior leadership to orchestrate the complex trade-offs that the simultaneous pursuit of exploration and exploitation requires" (p. 6). Further, in order to sustain ambidexterity, O'Reilly and Tushman (2016) argued that there needs to be "a vision, values, and a culture that provide for a common identity across the explore-and-exploit units" (p. 175). Considering that setting a vision, values and a culture are key responsibilities of organizational leaders, it is ultimately individual leaders who can ensure their organizations maintain a healthy balance between exploration and exploitation.

In addition to addressing the gaps in the current literature, studying ambidexterity at the individual level has several important practical implications. First, as Bersin and colleagues (2017) proposed, ambidextrous leaders may be better able to bridge the gap between the pace at which new technology is developing and the pace at which organizations can discover how to best leverage new technological tools. Second, we believe that leaders at all levels will need to be equipped with ambidexterity skills in the future, not just the top management, as organizations become less and less hierarchical, and more and more networked (Bersin, 2016; Good & Michel, 2013). Third, the more dynamic and unpredictable the business context becomes, the more individual ambidexterity is necessary for future success (Davis, Eisenhardt, & Bingham, 2009). As the business context in which we are living is becoming increasingly complex, studying ambidexterity at the leadership level will set the foundation for helping leaders become more

ambidextrous.

The purpose of this dissertation is multi-fold. First, it proposes a preliminary model of ambidextrous leadership to better understand what constitutes ambidexterity at the leadership level. Building on the work of Rosing and Zacher (2016), we posit that ambidexterity at the leadership level can be operationalized as both a balance between exploration and exploitation and switching between the two types of activities. Second, it embeds ambidextrous leadership into an overall leadership process model to understand what may predict and result from ambidextrous leadership. Third, in testing these ideas, a set of behavioral indicators for exploration and exploitation are developed and tested for reliability and validity. Finally, it discusses implications for both researchers and practitioners based on the findings.

Overview of Dissertation Chapters

The remainder of this dissertation consists of three main chapters. Chapter 2 reviews prior research on ambidexterity in a greater depth to identify the gaps in the current literature. Based on the review, we present the model of ambidextrous leadership, embedded in an overall process model, to help clarify conceptualization and operationalization of ambidexterity at the leadership level. In Chapter 3, we test the proposed ambidextrous leadership process model in three separate studies. Finally, based on the results from the studies, a general discussion and implications for researchers and practitioners are presented in Chapter 4.

CHAPTER 2

Ambidexterity and Leadership

Literature Review

While the concept of ambidexterity was first introduced more than 40 years ago by Duncan (1976), it was not until the late-1990s when it started to receive growing attention from the research community. Following a seminal article by March (1991) that first theorized the distinction between exploration and exploitation activities, subsequent studies adopted this dual-interest framework for studying organizational ambidexterity and argued that organizations need to "balance" the two types of activities to achieve superior performance, which spurred a great deal of interest from organizations (Benner & Tushman, 2003; Gibson & Birkinshaw, 2004; He & Wong, 2004; Tushman & O'Reilly, 1996). In other words, ambidextrous organizations engage in both exploration (searching for novelty, risk-taking, experimenting, discovery, organic, loosely-coupled systems) and exploitation (refining, efficiency, mechanistic, implementation, tightly-coupled systems) processes in order to secure short-term returns and ensure long-term success and financial sustainability. A substantial number of empirical studies across a wide range of contexts and industries have been conducted to date to support this notion (e.g., Han & Celly, 2008; Kristal, Huang, & Roth, 2010; Lubatkin, Simsek, Ling, & Veiga, 2006; Morgan & Berthon 2008). For example, in a study of 70 Canadian international new ventures, Han and Celly (2008) showed that firms that pursue strategic ambidexterity—which embraces both innovation (exploration-based) and standardization (exploitation-based) strategies—achieve superior performance in terms of growth and profit. Please see Raisch and Birkinshaw (2008) for a more complete review of organizational ambidexterity.

Despite intense scholarly work on ambidexterity, there is a glaring lack of research that examines how the concept can be applied at the leadership level (Gupta, Smith, & Shalley, 2006; Rosing, Frese, & Bausch, 2011; Turner et al., 2013). Most prior research on ambidexterity has been conducted at a firm- or business-unit level, although ambidexterity at these levels may inherently originate from individual leaders' exploration and exploitation activities (Lubatkin et al., 2006; Mom, Van Den Bosch, & Volberda, 2007). After reviewing 85 empirical studies and categorizing ambidexterity mechanisms at each level of an organization, Turner et al. (2013) concluded that "ambidexterity is not yet fully established as an explicit managerial strategy, and the higher-level concepts in the literature are not sufficient to explain the realities of modern organizations" (p.324) since "these studies fully explain neither how such micro-mechanisms enable ambidexterity nor exactly how ambidexterity leads to organizational benefit" (p. 328). Similarly, upon reviewing the current state of the literature, Wilden, Hohberger, Devinney, and Lavie (2018) called for reconnecting to the behavioral roots of March's (1991) seminal article, by integrating psychology, economics, and management theories to study ambidexterity as a 'behavioral strategy' and by uncovering the micro-foundations of exploration and exploitation.

One of the few earlier attempts to address this gap was a theoretical paper by Rosing et al. (2011), in which the authors explicitly interposed leadership behaviors with different aspects of innovation. In their conceptualization of ambidextrous leadership—"the ability to foster both explorative and exploitative behaviors in followers by increasing or reducing variance in their behavior and flexibly switching between those behaviors" (p. 957)—, an ambidextrous leader not only engages in opening and closing behaviors, which are positively related to follower explorative and exploitative activities, respectively, but also switches flexibly between those behaviors as the current situation requires. In this view, opening behaviors are related to an

increase in variance by allowing for different ways of accomplishing a task and allowing for errors, whereas closing behaviors are related to a reduction in variance by monitoring and controlling goal attainment, sanctioning errors, and establishing routines. In line with this framework, Zacher and Wilden (2014) analyzed daily diaries of 113 employees who evaluated their interactions with supervisors and found that an interaction between leaders' daily opening and closing behaviors (i.e., ambidexterity) was significantly related to self-reported innovative performance. These findings were replicated when Zacher and Rosing (2015) surveyed 123 participants from architectural and interior design firms. They found that team innovation was the highest when both opening and closing leadership behaviors were high, but lower when only one or neither of these behaviors was high.

However, it is important to note that in both of these studies, ambidexterity was operationalized as an interaction between opening and closing behaviors. While this is based on an assumption that the two constructs are independent from each other, there has been an ongoing debate around what ambidexterity really entails in conjunction with exploration and exploitation. When March (1991) first introduced the concept of duality in ambidexterity, he viewed exploration and exploitation as two ends of a single continuum. He argued that firms inevitably need to make trade-offs between these conflicting priorities, and thus, it is desirable to achieve an appropriate balance between the two. In this view, ambidexterity is often operationalized as an absolute difference score (e.g., He & Wong, 2004). On the other hand, several researchers have characterized exploration and exploitation as independent activities, such that firms can be high on both at the same time; thus, ambidexterity concerns the combined magnitude of exploration and exploitation (Gibson & Birkinshaw, 2004; Gupta et al., 2006; Lubatkin et al., 2006).

In general, there is a growing consensus that exploration and exploitation are independent (Cao, Gedajlovic, & Zhang, 2009; Turner et al., 2013). However, there is still a lack of clarity around how these two constructs should be assessed to meaningfully capture the level of ambidexterity, especially at the leadership level. In particular, switching—a key component of Rosing et al.'s (2011) ambidextrous leadership theory—has not been fully examined in the existing conceptualization and operationalization of ambidexterity. Further, we believe that it is still imperative to examine a leader's ability to balance between exploration and exploitation, even if they are two independent constructs.

Moreover, in the above studies where the proposed the model of ambidextrous leadership basically argues that it is leaders' opening and closing behaviors that lead to employees' exploration and exploitation behaviors, respectively (e.g., Zacher, Robinson, & Rosing, 2016; Zacher & Rosing, 2015, Zacher & Wilden, 2014), such a distinction between the leader and employee level behaviors makes it difficult to delineate what the construct really entails for leaders who are also employees. This distinction also somewhat contradicts the idea that ambidexterity is a multilevel construct embracing the contextual approach that recognizes that individuals at the all levels of hierarchy make some day-to-day choices about exploration and exploitation (Birkinshaw & Gupta, 2013). This contrasts with a structural approach, which argues that only certain units should focus on exploration while the other units focus on exploitation, and that it is the top management team's responsibility to hold those units together (Duncan, 1976; Tushman & O'Reilly, 1996). While this debate surrounding a structural versus contextual approach remains unresolved and often seems overlooked by researchers, we believe that it can never always be about one thing within an organizational unit, since leaders face all types of challenges. Accordingly, in order to make the concept of ambidexterity useful for

organizations, we argue that ambidexterity is a multilevel construct that necessitates both explorative and exploitative behaviors at all levels of the hierarchy, supporting a contextual approach in the literature.

In sum, reviewing prior research on ambidexterity reveals two main issues with the current literature. First, there is an insufficient amount of research examining ambidexterity at the leadership level. While findings from previous macro-level studies have shed light on the importance of ambidexterity in driving organizational performance, they are limited in translating the implications for business leaders who seek to become more ambidextrous in their own teams. Second, there is a lack of clarity how to conceptualize and operationalize ambidexterity. While exploration and exploitation have begun to be viewed as independent constructs, it is still unclear as to what level of analysis ambidexterity should be focused on (structural vs. contextual approach). This issue further complicates how exploration and exploitation should be combined in order to assess ambidexterity. These problems become even more prevalent at the leadership level, because almost no research to date has explicitly identified the ways to conceptualize ambidextrous leadership as a combination of exploration and exploitation.

Conceptualizing Ambidextrous Leadership

To address the gaps in the current literature, we propose a preliminary model of ambidexterity, which is illustrated in Figure 1. In line with prior research, we argue that exploration and exploitation are two independent, orthogonal constructs that comprise ambidexterity. What makes the model unique is that it depicts a global view of a leader's behaviors. Overall, a leader can reside in one of the four quadrants, based on the combination of the levels of engagement in exploration and exploitation: balanced ambidextrous leadership

(Quadrant I), unbalanced explorative and exploitative leadership (Quadrant IV and II), and disengaged leadership (Quadrant III). Temporarily, a leader can move between these quadrants; in fact, being able to switch between exploration and exploitation as situational demands arise characterizes one important aspect of ambidexterity. However, it is equally important to maintain an overall balance between the two constructs to truly remain ambidextrous. Here, a desired balance is achieved by being high on exploration and exploitation (Quadrant I) rather than being low on both (Quadrant III), although both signify a balance. Hence, in our current conceptualization, we view ambidextrous leadership as: a) switching between exploitation and exploration based on situational demands; and b) maintaining an overall balance between exploration and exploitation over time.

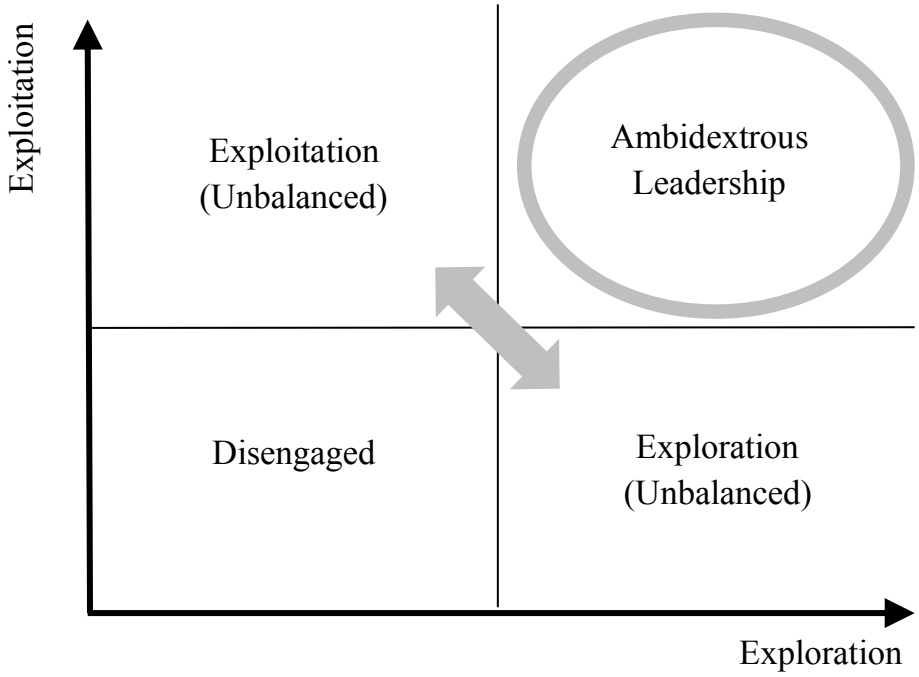


Figure 1. A Model of Ambidextrous Leadership.

On the notion of switching and balancing. There are few points to be made about switching and balancing, two ways ambidexterity is being defined in this study. First, it is important to note that the concept of switching and balancing between exploration and exploitation is aligned with the temporal sequence versus simultaneity paradigm in the ambidexterity literature (Good & Michel, 2013; Venkatraman, Lee, & Iyer, 2007). For example, when studies examine explorative or exploitative behaviors separately by looking at how engaged individuals or organizations are in each domain (e.g., Siggelkow & Levinthal 2003), there is a more emphasis on "temporal sequencing of routines for exploration and exploitation" (Raisch, Birkinshaw, Probst, & Tushman, 2009, p. 688), but less on the simultaneous pursuit of both. However, Good and Michel (2013) concluded that "whether it is actually simultaneous or rapidly sequential, individuals need to be able to flexibly cycle between the differing modes within environments that are changing" (p. 437). That is, successful leaders would understand when to switch behaviors based on the environment, while maintaining an overall simultaneity. Therefore, in the current research, we argue that both temporal sequence and simultaneity are the essential elements of effective ambidextrous leadership.

Second, one may argue that not all switching behaviors are equal, since there can be variance in terms of how appropriately and easily leaders can switch between exploration and exploitation. It might be obvious that only appropriate switching (not inappropriate switching) will likely be perceived as effective; yet, it is difficult to assume whether leaders who can switch more easily will be perceived as more effective as well. This ability to switch—and manage conflicting priorities—is related to what researchers have referred to as behavioral complexity, "an individual's capacity to exhibit a broad array of contrasting behaviors" (Lawrence, Lenk, & Quinn, 2009, p. 87). Recognizing a range of multiple roles that leaders have to play and a

paradox that comes with it (Hooijberg, Hunt, & Dodge, 1997; Mintzberg,1975), the theory of behavioral complexity argues that leaders who are able to perform and balance the competing roles—as defined by the Competing Values Framework (CVF; Quinn & Rohrbaugh, 1981)—will be more effective (Denison, Hooijberg, & Quinn, 1995; Lawrence et al. , 2009). As such, Rosing et al. (2011) proposed that behavioral complexity is one of the important antecedents that enable ambidextrous leadership.

However, we suggest that ambidextrous leadership itself is a variation of behavioral complexity theory, with several differences. Scholars have argued that effective leaders are better able to diversify or balance across the eight roles in the CVF, and behavioral complexity has generally been operationalized as being high on these competing roles (e.g., Hart & Quinn, 1993). This notion of performing all the roles simultaneously, but with discretion, is ultimately embedded in the current operationalization of ambidextrous leadership. However, there has been a lack of empirical research demonstrating the validity of the circumplex model (Denison et al., 1995). Further, the current theory has a clearer focus on the behaviors only, without the roles, along with clarity and parsimony of the dimensions. In essence, the proposed ambidextrous leadership model is simply behavioral in nature, without underlying assumptions about whether leaders consciously or subconsciously choose to embody certain roles or whether they feel actually conflicted about these competing roles.

That said, we believe that it is not behavioral complexity itself that will ease the process of switching, but rather certain factors that could lead to one's ability to switch, such as cognitive complexity. The theory of behavioral complexity was in fact built upon the concept of cognitive complexity, which allows for appropriate responses to a wide range of situations that may require contradicting behaviors (Denison et al., 1995). Although it is out of scope of the current research,

conceptually separating cognitive complexity from behavioral complexity enables us to think about certain individual characteristics that can actually lead to variance in switching behaviors and examine if those who can switch more easily will be indeed perceived as more effective.

Finally, the notion of an overall balance is not new and has been described by several researchers previously. For example, Birkinshaw and Gupta (2013) described the version of efficiency frontier that has exploration and exploitation on x and y- axes, building upon Gulati and Puranam (2009). They explained that firms could be lying far behind or on the efficiency frontier and that they could change their position depending on the organizational circumstances to avoid being on one side all the time. However, with the efficiency frontier model, it is still unclear whether there is a desirable position to sit and how to calculate ambidexterity (product or sum). Stettner and Lavie (2013) also argued that firms that "balance exploration and exploitation…can enjoy the complementary benefits of exploration and exploitation" (p. 1907). But in their conceptualization, they operationalized exploration and exploitation to be the ends of a single continuum, which does not align with the recent consolidations around how ambidexterity is viewed. In contrast to these studies, we argue that exploration and exploitation are independent constructs whose effects on relevant outcomes may increase as you do more of both behaviors, which will not necessarily be bounded by the efficiency frontier. This is related to the idea of complementarity between exploration and exploitation in Boumgarden, Nickerson, and Zenger (2012), where complementarity is defined as "the property that doing more of one activity raises the marginal performance return of the other" (p. 592). Thus, they specifically argued that doing more of exploration and exploitation would lead to better outcomes[1]—one of the focal research questions of this dissertation.

[1] Boumgarden et al. (2012) also added that there could be diminishing returns to scale in this assumption; specifically, the marginal increase in performance benefits due to increased exploration and exploitation are positive

Relationship with transformational leadership theory. Among an array of behavioral leadership theories that became dominant since the 1970s, transformational leadership theory (Bass, 1985, 1996) has generated a substantial research and interest among scholars and practitioners. Simply put, transformational leaders exhibit behaviors that make followers feel trust and respect toward the leader, see a higher vision, and do beyond expectations. Its dimensions include individual consideration, intellectual stimulation, idealized influence (charisma), and inspirational motivation. On the other hand, transactional leaders focus on exchanges with followers to accomplish performance objectives, through such behaviors as contingent rewards and management by exception (Bass & Avolio, 1993).

Transformational and transactional leadership may bear some resemblance to exploration and exploitation, respectively, at a first glance; yet, we believe that ambidextrous leadership is distinct from transformational leadership in several ways. First, transformational leadership theory generally focuses on the effects on followers' emotions and values. While this raised an awareness of an importance of recognizing emotions and meaningfulness in followers within the leadership literature, the process of how transformational leadership emotionally influences followers and outcomes has been vague (Yukl, 1999). For example, what does it exactly mean by 'performing beyond expectations' or 'showing individual consideration'? Or what happens to followers under transactional leaders in terms of their emotions? The general emphasis on emotions has made it difficult to clearly explicate the types and processes of transformational leadership. Ambidextrous leadership, on the other hand, is not entirely focused on followers' emotions and values—it rather focuses on leader behaviors themselves, which can be perceived

but with diminishing returns, making the overall performance landscape concave. While testing this notion of diminishing returns to scale is out of scope of the current research, it is an important assumption to be tested in future research.

as strategically effective (or ineffective) in achieving organizational goals. In other words, the theory has a deeper emphasis on strategic and rational processes of leader behaviors, which influence followers' perceptions of their leaders' effectiveness.

The second distinction may be more noteworthy. While transformational leadership has been originally thought to influence followers beyond the effects of transactional leadership (Bass, 1997), this augmentation hypothesis has neither been tested extensively nor made the conceptual linkages between transformational and transactional leadership clearer (Wang, Oh, Courtright, & Colbert, 2011). It is unclear whether the theory argues that leaders who are high on transformational leadership but low on transactional leadership are effective or whether they should be high on both to be more effective. Yet, ambidextrous leadership theory explicitly draws connections between exploration and exploitation by arguing that leaders should engage in both behaviors, depending on situational demands. In other words, the current research not only differentiates two types of behaviors, but also takes into account the notion of switching between the two.

To summarize, while transformational and transactional leader behaviors may seem similar to explorative and exploitative behaviors, respectively, there are a number of conceptual and practical differences between the two theories. In the current research, we will test for (non)redundancy of the proposed theory by examining its relationship with an established measure of transformational and transactional leadership, as part of the validation efforts for the new measure.

Overall Process Model of Ambidextrous Leadership

Studying leadership has been a difficult task not only for researchers but also for practitioners and organizations. While the contemporary academic literature has made significant

progress in developing our understanding of what may account for persistent differences in leadership behaviors, the literature itself has been fragmented in terms of conceptual models and relevant constructs (Tuncdogan, Acar, & Stam, 2017). In an attempt to build a simple, but powerful model of leadership that encompasses antecedents, processes, and outcomes, Tuncdogan et al. (2017) revised the original leadership process model by Antonakis, Day, and Schyns (2012). In this revised model, the authors argue that leader traits (e.g., physiological, psychological, and background) influence proximal predictors of leader and follower behaviors, moderated by situation and follower traits, and that effects on followers, in turn, influence multilevel outcomes. This process model is a parsimonious and comprehensive way of categorizing various factors involved in leadership processes, to demonstrate how leaders' individual differences can influence outcomes at various levels. Thus, the model is not just limited to the top management team, but can be applied to any level of the organization to study the overall process of leadership.

Starting from the left of the process model, while there may be a vast array of individual differences that can lead to ambidextrous leadership behaviors[2], we propose that regulatory focus has an especially important impact on leaders' general tendencies toward explorative and exploitative behaviors (Tuncdogan, Van Den Bosch, & Volberda, 2015). The following section introduces regulatory focus theory and how this may influence one's ambidextrous leadership behaviors.

Regulatory Focus Theory

Regulatory focus theory (RFT) stems from a central question that has concerned social

[2] As discussed earlier, cognitive complexity may be an important antecedent to one's ambidexterity. While the impact of cognitive complexity is not investigated in the current study, future research should incorporate cognitive complexity as an important leader trait that can lead to variance in ambidextrous behaviors.

and organizational psychologists for centuries: how are individuals motivated? Proposed by Higgins (1998), RFT builds on the work of philosophers, biologists, and psychology predecessors, questioning the mechanisms behind *how* individuals are motivated by desired end states. According to the theory, behavior is driven by either approaching pleasure (promotion focus) or by avoiding failure or pain (prevention focus). For instance, Student A may study hard for an exam because s/he wants to get an A in the course; on the other hand, Student B may study hard for an exam because s/he wants to avoid failing the course. Although both students may do equally well on the exam, their differing end-goals signify two distinct ways to regulate motivation. In addition, Higgins (1998) connects RFT to self-discrepancy theory, proposing that a promotion focus is related to goals expressed in the form of the ideal self, individual hopes, and what they would like to achieve. In contrast, a prevention focus is related to a sense of duty and obligation, and what an individual ought to do. These two motivational mindsets are independent, meaning that being high on one does not necessitate being low on the other.

Promotion and prevention foci have been shown to relate to a wide array of workplace behaviors. When Lanaj, Chang, and Johnson (2012) performed a meta-analysis on the relationship between regulatory focus and job performance, they found that a promotion focus was positively correlated to task performance, organizational citizenship behaviors, and innovative performance, while a prevention focus was positively correlated to safety performance. In addition, having a promotion focus has been linked to openness to new ideas (Friedman & Forster, 2001), willingness to consider a wide range of alternatives as opposed to following existing best practices (Ahmadi, Khanagha, Berchicci, & Jansen, 2017), transformational leadership (Kark & van Dijk, 2007), and increased employee creativity (Wu, McMullen, Neubert, & Yi, 2008). On the other hand, individuals with a prevention focus have

been shown to be good at identifying potential threats to the business and be higher in transactional leadership (Kark & van Dijk, 2007; McMullen, Shepherd, & Patzelt, 2009).

Although RFT has spurred a substantial amount of research in the areas of social and organizational psychology, almost no research to date has drawn explicit connections between regulatory focus and ambidexterity in organizations. One notable exception is a theoretical paper by Tuncdogan, Van Den Bosch, and Volberda (2015), in which the authors argued that regulatory focus influences ambidextrous leadership. Specifically, they proposed that a promotion focus is a primary driver of exploration, because those with a promotion focus are likely to be high on risk-taking, aspire for novelty and knowledge creation, and be willing to change—all of which conform to the characteristics of exploration activities. Likewise, they argued that having a prevention focus will likely be associated with lower risk-taking, preferring tried-and-true methods, knowledge application, and desire for stability, and these are aligned with the characteristics of exploitation. As such, they claimed that although both regulatory foci can induce exploration and exploitation, a promotion focus would have a stronger effect on exploration than a prevention focus, and a prevention focus would have a stronger effect on exploitation than a promotion focus.

However, we draw our attention to a subtle difference between prevention and exploitation. While exploitation certainly involves behaviors that aim to avoid losing by being risk-aversive and relying on the tried-and-true methods, another essential aspect of exploitation is an ability to 'refine and improve' existing products and a knowledge base. After reviewing a series of studies on the definitions of the two constructs, Gupta et al. (2006) argued that "…in all of these studies, learning, improvement, and acquisition of new knowledge are central to both exploitation and exploration" (p. 694). Thus, while exploitation is about staying within the same

trajectory, rather than finding a completely new one, it still involves refining and improving that trajectory, which essentially require both promotion and prevention foci. Therefore, we propose that both promotion and prevention may comparably influence exploitative behaviors.[3]

Further, it is important to note that Tuncdogan et al. (2017) viewed regulatory focus as an endogenous variable influenced by other chronic personality-related variables. In Higgins' (1998) original conception of regulatory focus, promotion and prevention foci could be viewed as both a consistent, chronic trait and a more temporary state affected by the environment. A chronic, trait-like focus is a stable component of an individual's behavior based on upbringing, whereas a situation-specific focus can be affected by the context in which an individual operates, and therefore, is less stable. For example, in organizational settings, a constant emphasis on safety in a group could induce a prevention focus (Wallace & Chen, 2006). Integrating both aspects of regulatory focus, Lanaj et al. (2012) posited that individuals have a work-specific regulatory focus, which mediates the effects of distal personality antecedents on work behaviors and attitudes. After meta-analyzing 97 relevant articles, they found that work-specific regulatory focus—influenced by personality antecedents both at the general trait level and in a situated work context—tended to explain more variance in outcomes than general chronic regulatory foci. Following this line of reasoning, we view one's regulatory focus in workplace as a psychological variable that is a function of both chronic, trait differences and work contexts.

[3] One may also draw similarities between RFT and Dweck's (1986) theory of intelligence and goal orientation in relation to exploration and exploitation. Indeed, one can argue that incremental theory (growth mindset) could lead to a learning goal that seems more aligned with exploration, whereas entity theory (fixed mindset) could lead to a performance goal that seems more aligned with exploitation. While the distinctions between RFT and goal orientation have not been extensively studied, Johnson, Shull, and Wallace (2011) suggested that goal orientation theory centers on the *types* of goals (i.e., goal choice), while RFT is about goal-striving processes explaining *how* goal-choice relates to performance. Similarly, we argue that exploration and exploitation are equally important management *strategies* that allow the firm to achieve the ultimate goal of surviving, and thus, they are not the end-goals of the firm. Therefore, we believe that there is a closer relationship between RFT and ambidexterity. However, future research should examine how leaders' distal characteristics, including goal orientation, may influence motivational and behavioral processes in relation to ambidexterity.

Thus, we specifically focus on how regulatory focus, as a proximal motivational predictor of work outcomes, may influence explorative and exploitative behaviors.

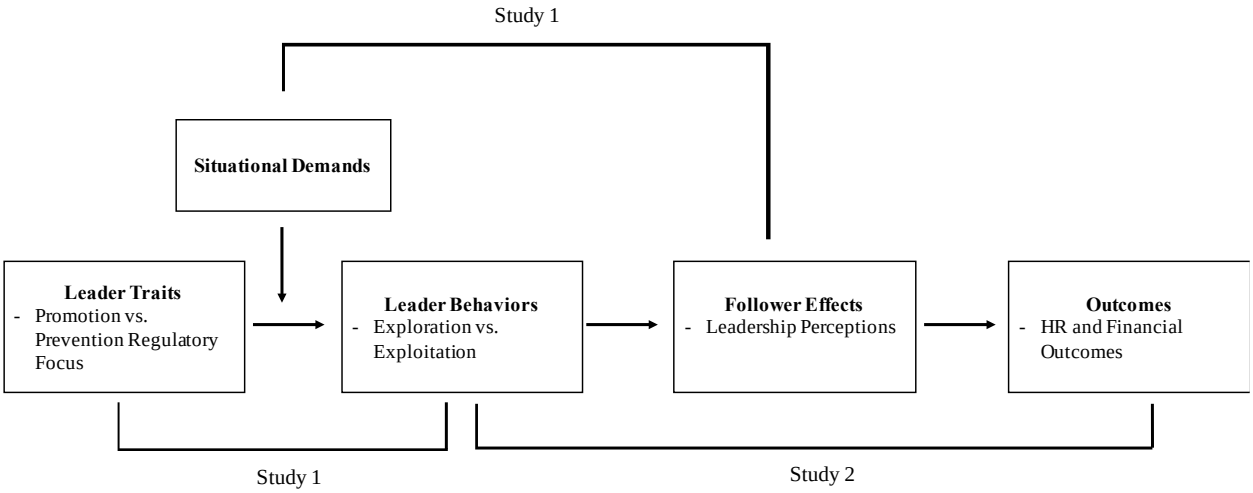


Figure 2. Ambidextrous Leadership Process Model.

Putting everything together, we study regulatory focus as an important leader individual variable that is predictive of ambidextrous leader behaviors. We further test our model of ambidextrous leadership by examining the impact of switching and an overall balance between exploration and exploitation on relevant outcomes. The overall process model tested in the current research is shown in Figure 2. The current research does not test the relationships represented in this figure at once to test the entire model, because it is focused more on testing the construct definition of ambidextrous leadership. However, in line with the original leadership process model, we basically argue that work regulatory focus can be an important leader trait influencing one's tendency toward ambidextrous leadership behaviors, which in turn, influence followers' perceptions of leadership effectiveness. While we only study followers' leadership evaluations among the various immediate outcomes of leader behaviors, research has shown that followers' attitudes toward leaders are associated with their daily engagement and behaviors at

work, which ultimately affect individual and organizational performance (e.g., Boerner, Eisenbeiss, & Griesser, 2007; Hunter et al., 2013). Thus, if followers deem leaders' behaviors to be effective by being ambidextrous, they would engage in behaviors that would lead to more positive organizational outcomes.

CHAPTER 3

Testing the Ambidextrous Leadership Process Model

Based on a review of the current literature, the previous chapter proposed a preliminary model of ambidextrous leadership, which is then embedded in an overall process model to help understand what may predict, moderate, and result from ambidextrous leadership. We tested the proposed model in three separate studies (see Table 1 for a summary of purpose and setting). In this chapter, we describe each study in turn.

Pilot Study

The main purposes of the pilot study were: a) to establish reliability and validity of the behavioral indicators of ambidextrous leadership and b) to test and revise the stimulus materials for the experimental vignette study on leader switching behaviors. We saw this as an important first step of the entire research to ensure the materials being used can reliably operationalize the variables of interest. Specifically, as part of the validation efforts of ambidextrous leadership, we examined the relationships between the ambidextrous leadership and transformational leadership measures. As previously explained, while the constructs of the two theories may be related, their relationships may not be strong enough to claim that they are essentially the same constructs. In other words, we hypothesized that they would be related with each other, but only to a modest extent. We also administered the ethical leadership measure, which should be theoretically unrelated to the specific dimensions of ambidextrous leadership. Ethical leadership, defined as "the demonstration of normatively appropriate conduct through personal actions and interpersonal relationships, and the promotion of such conduct to followers through two-way communication, reinforcement, and decision-making" (Brown, Trevino, & Harrison, 2005, p. 120), has gained a great deal of attention as an important leadership theory over the past decade

due to several ethical scandals, such as Enron. Together, the relationships among ambidextrous leadership, transformational and transactional leadership, and ethical leadership would provide preliminary evidence on convergent and discriminant validity of the newly developed measure.

In the current research, we operationalized ambidexterity as switching between explorative and exploitative behaviors as well as an overall balance between the two. The second part of the pilot study focused on the former, by examining whether switching indeed has an impact on relevant outcomes such as follower perceptions of leaders. While switching was a key component of Rosing et al.'s (2011) conceptualization of ambidextrous leadership, there is no research, to our knowledge, that has actually investigated switching behavior itself. However, switching has important practical implications since individual leaders, unlike an organization as a whole, likely find it difficult to engage in two conflicting processes at the same time, and thus, have to constantly switch back and forth depending on situational needs.

Therefore, the present research attempted to validate switching as a meaningful aspect of studying ambidextrous leadership through a manipulation of leader behaviors in an experimental vignette study. Specifically, we hypothesized that if a leader responds to situational demands appropriately and engages in switching, followers would perceive him/her as being more effective. To test this idea, we designed a three-factor study including leaders' behavioral tendencies (exploration vs. exploitation; within-subject), leaders' present behaviors (exploration vs. exploitation; within-subject) and situational demands (exploration vs. exploitation goals; between-subject). If situational demands call for explorative behaviors, leaders with a tendency to engage in explorative behaviors may not find it difficult to exhibit those behaviors, whereas leaders with a tendency to engage in exploitative behaviors may have to do so more deliberately by switching from their general tendency. Yet, if they do switch, followers may view them even

more effectively for being an agile and adaptive leader, compared to those who already have a tendency for explorative behaviors. Similarly, leaders who have a tendency for exploration but are able to engage in exploitative behaviors due to situational demands would be more positively viewed by followers. An example of the expected results is shown in Figure 3. In this pilot study, we focused on the exploration goal only, since the same materials are used across both exploration and exploitation goal conditions.

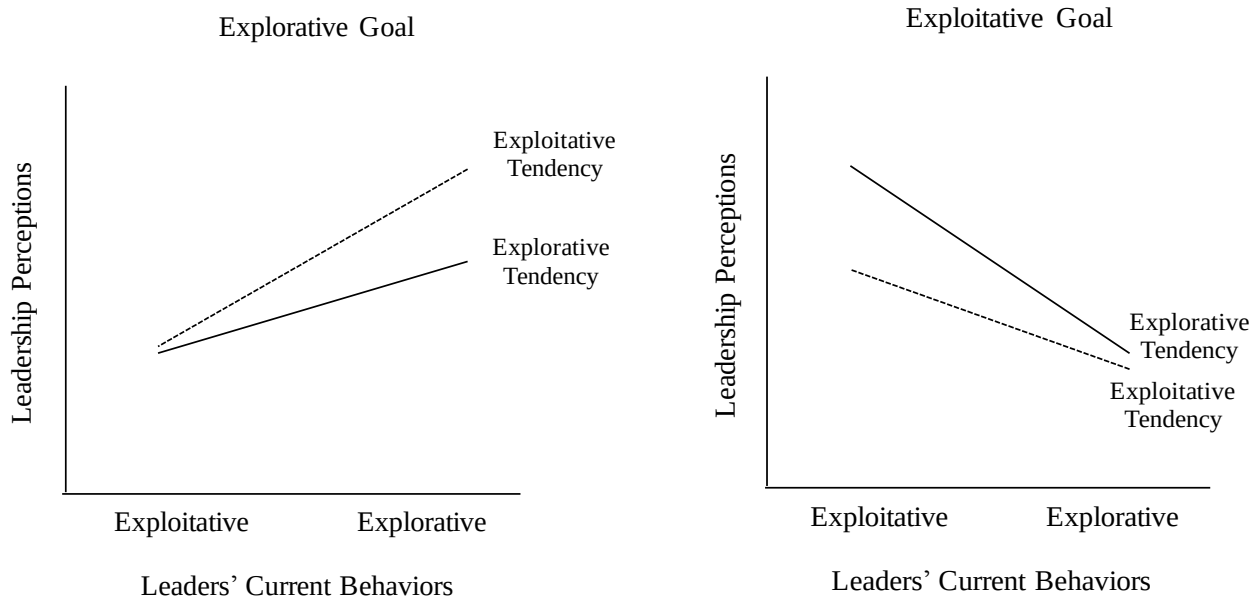


Figure 3. Expected Results on Leadership Perceptions.

Pilot Study Method

Participants and procedure. Participants were recruited through Amazon Mechanical Turk (MTurk). Participants who only meet the pre-defined criteria could take the survey (e.g., at least 95% HIT approval rate, only English speaking countries). Upon reading the description of

the study that the study is about exploring individual attitudes and behaviors in the workplace, individuals who chose to participate were instructed to follow a link to the survey platform.

The pilot study consisted of two parts. First, participants engaged in the experimental vignette study in which switching was manipulated. Among the four leaders in the vignettes, two leaders switch their behaviors, but only one of them actually switches appropriately. Although some may raise generalizability concerns of the online convenience sample (e.g., MTurk), especially considering that the topic of interest involves leadership, having participants get exposed to multiple conditions at least within the same organizational goal allows us to control for individual differences and to uncover judgment processes based on changes within individuals (Aguinis & Bradley, 2014). Four conditions within each goal were counterbalanced. The design for the experimental vignette study is summarized in Appendix A.

As participants entered the study, it was explained to them that they are a first-level manager at a large consulting company. A consulting company was chosen because it was important to pick an industry that is more generic and neutral rather than specific industries that can evoke certain emotions from participants. After a brief description of the company, including an organization's new goal, they were presented with four vignettes containing a description of each leader they are dealing with. Each vignette explained a leader's behaviors, using either exploration- or exploitation-related words. Participants then evaluated leadership effectiveness after each vignette, so that they would not make comparisons between the four leaders. This task was expected to take approximately 15 minutes to complete.

Upon completion of the vignette study, participants were asked to complete a series of survey questions. They were asked to imagine themselves as a mid-level manager of a team of five people, which has been tasked with a new six-month project. As a manager, participants

were asked how they would like to exercise their leadership by indicating the extent to which they would engage in certain behaviors, which were ambidextrous leadership and ethical leadership items. This was followed by a transformational/transactional leadership instrument, as well as a set of demographic questions. Upon completion, they were compensated for $4 if they passed quality checks, including attention items, manipulation checks, and completion time.

Materials.

Manipulation. In this pilot study, all participants were assigned to an explorative organizational goal condition. To explain the organizational goal, participants were provided with a brief description of the company and the new project that requires exploration of new ideas and opportunities. Then, they were provided with four vignettes describing four different leaders, in a counterbalancing fashion. Each vignette first explained the leader (under a gender-neutral name) using either explorative or exploitative descriptors. This initial description was followed by a transition sentence that read: "With [COMPANY'S NAME]'s new initiatives through the taskforce, [LEADER'S NAME] has made the following statements in meetings and emails." The statements contained behaviors that were either explorative or exploitative, but more contextualized to the business context in the case.

Leadership perceptions. Two items were adapted from the General Leadership Impression (GLI) scale (Cronshaw & Lord, 1987). Participants were asked to rate a leader on a five-point Likert scale by answering the questions: "How willing would you be to have this person as your formal direct boss?" and "To what extent did this person exhibit appropriate leadership behaviors?" Further, one item from Tate (2008) was modified: "To what extent did this person act as an effective leader?" Ratings on all three items were averaged to get an overall leadership perceptions score.

Manipulation checks. To ensure that manipulation had intended effects on participants, two manipulation checks were used. First, they were asked to indicate the type of an organizational goal they received, after reading a brief description of exploration and exploitation. Then, they were asked to indicate which two leaders changed their behavioral tendencies due to the new organizational project. Participants who picked completely two other leaders were considered to fail this manipulation check. People who failed both manipulation checks were excluded. When administering the pilot study, 23 people completely failed both manipulation checks, and thus, they did not get paid and were not included in the initial dataset.

Ambidexterity. Developing a reliable and valid way of assessing explorative and exploitative behaviors was an essential part of this study. We first examined a range of relevant studies that spoke to ambidextrous leadership behaviors (e.g., Rosing et al., 2011; Turner et al., 2013; Volery, Muller, & Siemens, 2015; Zacher & Rosing, 2015). Based on a review, we developed a set of behavioral indicators for each exploration and exploitation dimension. An example for each dimension includes: "Exploring different ways of doing things" (exploration) and "Using tried-and-true methods to get things done" (exploitation). Each behavioral indicator was assessed on a five-point Likert scale from 1 = Very Unlikely to 5 = Very Likely.

Transformational and transactional leadership. The items from the Multifactor Leadership Questionnaire (MLQ) 5X by Bass and Avolio (1995) were administered to assess transformational and transactional leadership. The 45-item instrument had four dimensions: transformational leadership, transactional leadership, passive/avoidant leadership, and outcomes of leadership. There were several subscales for each dimension, and each subscale generally had three or four items. It is important to note that there has been a debate surrounding the factor structure of the instrument, especially around what belongs to transactional and passive/avoidant

leadership (Hartog, Muijen, & Koopman, 1997; Yukl, 1999). The current study adopted the dimension and subscale structure as recommended by the provider.

Ethical leadership. The Ethical Leadership Scale (ELS) by Brown et al. (2005) was adapted. Among the original ten items, two of them were excluded since they became nonsensical when modified into a self-report format. The examples from the remaining eight items include: "Discipline employees who violate ethical standards" and "Set an example of how to do things the right way in terms of ethics." All items were measured on five-point scale from 1 = Highly Unlikely to 5 = Highly Likely.

Demographics. Several demographic questions served as control variables in the current study. First, work experience and leadership experience were controlled for because those idiosyncratic experiences could influence one's preference for specific ambidexterity dimensions. Work experience was measured using one question, "In total, how many years of work experience do you have?" on a five-point scale from 1 = 1~ 2 years to 5 = More than 8 years, and leadership experience was measured by asking "In total, how many years of experience do you have in managing a team or having someone reporting to you at work?" on a six-point scale from 1 = None to 6 = More than 8 years. In addition, the nature of work environment in which respondents were typically situated can affect their preference for certain leadership styles, including exploration versus exploitation. Thus, we also asked for the stability of their work environment: "How would you describe your typical work environment?" on a five-point scale from 1 = Very slow-paced to 5 = Very fast-paced. Further, considering that gender, age, and education have been shown to significantly influence leadership styles (e.g., Barbuto, Fritz, Matkin, & Marx, 2007), these variables had to be controlled as well. Participants were asked to indicate their: gender ("Please indicate your gender.") among four options (0 =

Male, 1 = Female, 2 = Other, 3 = Prefer not to answer); age ("Please indicate your age") on a ten-point scale from 1 = under 25 to 10 = 65 or older; and education ("Please indicate the highest degree or level of school you have completed.") on a seven-point scale from 1 = Less than high school to 7 = Doctorate degree.

Pilot Study Results

After collecting the pilot data, the responses were further examined for response invariance to ensure the quality of the data, in addition to removing the cases based on attention and manipulation checks. In the pilot, if the participants chose the same rating option for more than 60 times, it was considered that the participant did not pay a close attention to each item. Fourteen responses were removed as a result. The final dataset included 137 individuals, with 32 in the first counterbalancing condition, 34 in the second, 38 in the third, and 33 in the fourth. The demographic characteristics of the pilot study participants are summarized in Table 2.

Descriptive statistics and correlations. Table 3 shows the basic descriptive statistics and correlations among the important study variables. Based on the current version of the MLQ (Form 5X-Short), transactional and passive-avoidant leadership were examined separately, although they can be argued to be part of the same construct due to inconsistencies in the factor structure of the MLQ scales (Yukl, 1999). The correlations showed that the relationships between exploration—transformational ($r = .56$, $p < .001$) and exploitation—transactional ($r = .45$, $p < .001$) leadership were stronger than the exploration—transactional ($r = .36$, $p < .05$) and exploitation—transformational leadership ($r = .17$, $p < .05$), respectively. In order to better understand how exploration and exploitation are related to other survey scales, the correlations at the subscale level have been visualized in Figure 4. The figure shows that all transformational leadership subscales were more strongly related to exploration than exploitation, as expected, but

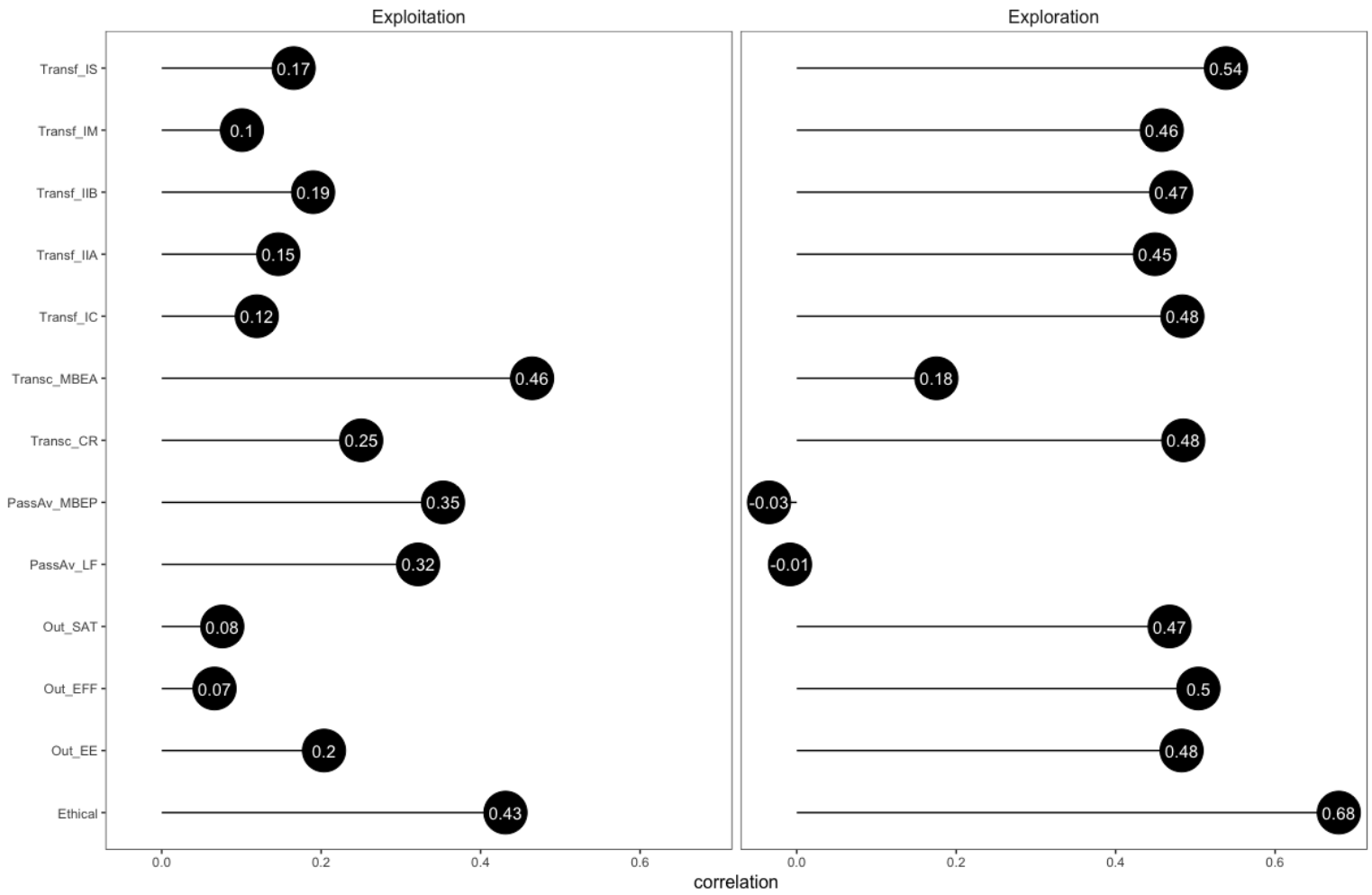


Figure 4. Correlations between Two Ambidextrous Leadership Scales and Other Survey Scales in the Pilot.

Note. **Transformational Leadership Scales:** Transf_IS = Intellectual Stimulation, Transf_IM = Inspirational Motivation, Transf_IIB = Idealized Behaviors, Transf_IIA = Idealized Attributes, Transf_IC = Individual Consideration; **Transactional Leadership Scales:** Transc_MBEA = Management by Exception (Active), Transc_CR = Contingent Reward; **Passive Avoidant Scales:** PassAV_MBEP = Management by Exception (Passive), PassAv_LF = Laissez-Faire; **Outcome Scales:** Out_SAT = Satisfaction, Out_EFF = Effectiveness , Out_EE = Extra Effort; **Ethical Leadership Scale** = Ethical

such correlations were not high enough to claim that they were the same construct. Similarly, the transactional and passive-avoidant leadership subscales were more strongly related to exploitation than to exploration, with an exception of the Contingent Reward scale. Based on a close examination of the items, we suspect that the respondents might have reacted to an aspect of 'achieving performance goals' more so than to an aspect of 'getting rewarded' for achieving goals within the Contingent Reward scale.

To evaluate whether the variables correlate too highly or not, Field (2009) recommended the correlation with an absolute value of .80 as a cut-off point where it becomes concerning and impossible to determine unique contribution of a variable. Overall, in this pilot study, the modest size of the correlations of exploration—transformational leadership and exploitation—transactional leadership relationships provide preliminary evidence for distinctiveness between ambidextrous leadership theory and transformational leadership theory, thus demonstrating discriminant validity.

However, both exploration and exploitation were found to be correlated with ethical leadership more strongly than expected (r = .68 and r = .43, respectively), which makes it difficult to determine the discriminant validity of ambidextrous leadership from ethical leadership. This could be due to the fact that all items from both ambidextrous leadership and ethical leadership measures were positively worded, with higher scores indicating more effective leadership behaviors. When the heterotrait-monotrait ratio (HTMT) of the correlations were used to better assess discriminant validity between the constructs (Henseler, Ringle, & Sarstedt, 2015), the HTMT values between ethical leadership and exploration (.78) and exploitation (.53) were higher than that between exploration and exploitation (.39). This indicates that while exploration and exploitation can be indeed argued as distinct constructs, exploration and ethical

leadership might share a greater variance than expected, although this is still lower than the criterion values set by Henseler et al. (2015) (i.e., .85 or .90).

Reliability and exploratory factor analysis. Reliability analysis results on all survey scales are summarized in Table 4. Most of them had a Cronbach's alpha coefficient of .70 or above, indicating a sufficient level of internal consistency of the items (Nunally, 1978). A few subscales from the MLQ had a relatively low reliability coefficient below .70. In particular, the Extra Effort scale, one of the outcome scales, had a low coefficient of .35. This could be because these outcome items were difficult to respond to when participants themselves were not real leaders, which could have contributed to greater randomness in their responses. For these reasons, we decided not to conduct any further analyses involving the outcome measures.

Exploratory factor analysis (EFA) on explorative and exploitative items was run using an oblimin rotation. The KMO measure of sampling adequacy was .87, above the commonly recommended value of .6 (Cerny & Kaiser, 1977; Field, 2009) to extract factors. The final EFA results are summarized in Table 5. Two factors that emerged perfectly matched with the exploration and exploitation dimension, each explaining 18.4% and 23.9% of the variance, respectively. According to Hair, Black, Babin, and Anderson (2014), the interpretation of factor loadings should be dependent on a sample size, and they argued that a loading of .50 and .45 are necessary to be significant when the sample size is 120 and 150, respectively, in order to obtain a power level of 80%. Considering the sample size of 137, we deemed that the necessary factor loading is around .47, which two explorative items and one exploitative item did not meet. However, to keep the number of items consistent across the two factors, we decided to remove one item from each, while revising the exploration item with the second lowest loading. Thus, we revised the item that read "Experimenting with different ideas" to "Experimenting with a

variety of ideas to achieve goals." In addition, we made minor revisions to all other items to further improve their clarity.

Vignette study results. In order to assess whether switching between exploration and exploitation influences perceptions of leadership effectiveness, the participants were asked to evaluate leadership effectiveness of the four leaders that either switched or did not switch their behaviors based on the organizational goal. The four leader vignettes were presented in a counterbalancing fashion. However, this counterbalancing design was cyclic, meaning one vignette always followed another (e.g., B always comes after A, regardless of the counterbalancing condition). Thus, in addition to including a counterbalance condition as a control variable in our analysis, the vignette study design was slightly revised for the next study (Study 1).

The final data across the Tendency and Current Behavior factors are visualized in Figure 5. The figure illustrates the interaction effect between the two factors, showing that the leader with an explorative tendency got punished more by showing exploitative current behaviors while benefitting more by showing explorative current behaviors, compared to the leader with an exploitative tendency. This result is interesting as we expected the steeper change for the exploitative tendency because the leader with the exploitative tendency would benefit more from exhibiting explorative behaviors, signifying a greater effort to match with the new organization goal by switching from the opposite tendency.

To test whether the interaction is indeed significant after controlling for other variables, a linear mixed-effects model (LMM) analysis was conducted by treating subjects as a level-two random factor. Specifically, to test the hypothesis, both Tendency and Current Behavior factors, as well as their interaction, were entered into a model as both fixed and random effects, in a

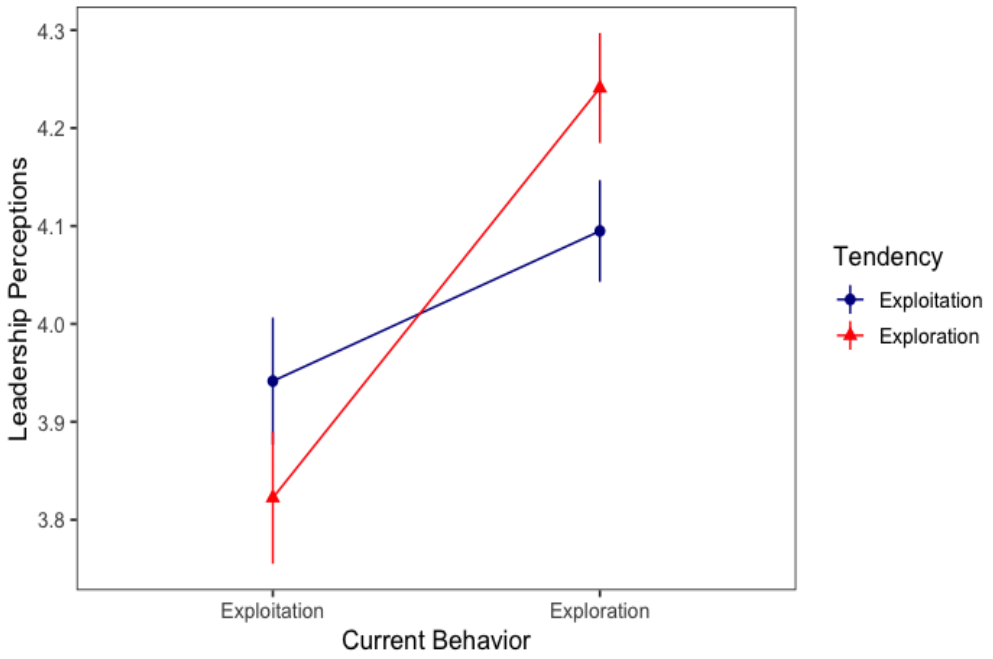


Figure 5. Experimental Vignette Study Results from the Pilot.

hierarchical fashion. The use of LMM has become popular among researchers using experimental vignette surveys because of their less strict assumptions and flexibility to estimate the slopes of the factors of interest, compared to a traditional repeated-measures ANOVA approach (Atzmüller & Steiner, 2010).

Before conducting the analyses, the response variable—perceived leadership effectiveness—was winsorized by replacing the most extreme values with the next less extreme value, in order to help normalize the data and reduce the influence of outliers (Adams, Haynga, Mansi, Reeb, & Verardi, 2018). In this study, the values below 2.5 and above 97.5 percentiles were winsorized. To compare the models, maximum likelihood (ML) estimation method was used. The results are summarized in Table 6. The initial random intercept model (Model 1) indicates that individuals explained a modest proportion of variance in the dependent variable, with an intra-class correlation (ICC) of .31.

In Model 2, the control variables were entered into the model as fixed effects. The significant result of the likelihood ratio test (LRT) using a chi-square distribution showed that Model 2 was favorable ($\chi^2(9) = 19.21$, $p < .05$). In Model 3a, Tendency and Current Behaviors were entered into the model as both fixed and random effects to estimate their main effects. The LRT result showed that Model 3a was favorable to Model 2 ($\chi^2(7) = 44.05$, $p < .001$). Finally, the interaction between Tendency and Current Behaviors was entered into the model, as both fixed and random effects, which significantly improved the model ($\chi^2(5) = 19.07$, $p < .001$). Therefore, we retain Model 3b as a final model for both theoretical reasons and the LRT results. It is important to note that this conclusion is consistent with the decreasing AIC values, but not with the increasing BIC values. Yet, considering that BIC penalizes for the number of parameters more so than AIC does (Kuha, 2004), which seems to be reflected in this case, the last model still remains as our favored model. When the diagnostic plots were examined to see if the final model met the assumptions, they did not indicate the presence of any patterns that were concerning. Finally, the comparable results were obtained when the final model (3b) was re-estimated with restricted maximum likelihood (REML), which does not introduce bias in estimating variance components, unlike the ML estimator (Swallow & Monahan, 1984).

Pilot Study Discussion

Overall, the results from the pilot study provided initial evidence for the reliability and validity of the two ambidextrous leadership constructs, exploration and exploitation. The two factors emerged from EFA well mapped onto the exploration and exploitation items, although there were few items with higher cross-loadings. These items were either removed or revised, while revising the other items. The correlations with transformational leadership instrument and ethical leadership scale also demonstrated general support for convergent and discriminant

validity, except for the higher-than-expected correlations with the Contingent Reward subscale from the MLQ and ethical leadership measure. Based on these results, we would further examine reliability and validity of the revised exploration and exploitation items in Study 1, by examining their relationships with the work regulatory focus and Big Five personality measures.

The linear mixed-effects model analysis for the experimental vignette study showed some promising results, with a higher mean rating when a leader's current behaviors were explorative than exploitative, given the new explorative organizational goal. However, while we found the significant interaction effect between exploration and exploitation on the evaluations of leadership effectiveness, the interaction showed the steeper slope for the explorative tendency than the exploitative tendency. Based on a closer examination of the study materials, we suspected that the participants might have reacted more strongly to the current behaviors, because a) they were always presented after the tendency behaviors and b) they were in the bullet point format, unlike the tendency behaviors that were presented in sentences. Therefore, we revised the format and wording of the vignettes for consistency and improved clarity.

Study 1

Based on the results of the pilot study, the ambidextrous leadership scale and stimulus materials for the vignette study were revised. Using the revised materials, Study 1 attempted to: a) evaluate the linkages between regulatory focus and ambidextrous leadership and b) examine if switching has a positive impact on follower leadership perceptions.

By investigating the relationships between regulatory focus and ambidextrous leadership, we explored whether an individual's motivational mindset influences his/her tendency to engage in certain leadership behaviors, which bears important practical and research implications. As reviewed in Chapter 2, we argue that a promotion focus will be more positively related to

explorative behaviors due to its association with high risk-taking, distant future orientation, and willingness for change than a prevention focus. On the other hand, promotion and prevention foci will comparably influence exploitative behaviors because exploitation involves improving and building on the existing trajectory. Thus, the following hypotheses were tested.

Hypothesis 1a: *A promotion regulatory focus will be positively and more strongly related to explorative behaviors compared to a prevention focus.*

Hypothesis 1b: *Both promotion and prevention regulatory foci will be positively related to exploitative behaviors to a similar degree.*

Although not part of the formal hypothesis, we also explored if personality traits would be related to explorative and exploitative behaviors. Specifically, it would be interesting to examine if the Openness to Experience and Extraversion dimensions from the Big Five model are positively correlated to exploration, whereas Neuroticism is positively related to exploitation. The findings could shed light on the potential impact of personality traits on ambidextrous leadership behaviors, which has not been examined in the literature to date.

Based on the revised manipulation materials, Study 1 employed a full three-way design between Tendency, Current Behaviors, and Organizational Goal, in order to test the impact of switching on relevant outcomes. While only the four conditions under the explorative goal situation were used in the pilot study, all eight conditions were used in Study 1. If the manipulation materials work properly, it was expected that participants would perceive those who switch appropriately as more effective. Thus, we tested the following hypotheses, and again, an example of the expected results is illustrated in Figure 3 on page 23.

Hypothesis 2a: *When situation demands call for an explorative goal, leaders with a tendency for exploitation will be more positively evaluated by exhibiting explorative behaviors compared to those who already have a tendency for exploration.*

Hypothesis 2b: *When situation demands call for an exploitative goal, leaders with a tendency for exploration will be more positively evaluated by exhibiting exploitative behaviors compared to those who already have a tendency for exploitation.*

Study 1 Method

Participants and procedure. Similarly to the pilot study, participants were recruited from Amazon Mechanical Turk (MTurk) and were allowed to participate in the study only if they met the pre-defined criteria. Further, individuals who participated in the pilot study were restricted from taking part in Study 1.

After explaining that the study is about exploring individual attitudes and behaviors at workplace, participants were directed to the experimental vignette portion of the study, in which they were randomly assigned to one of the eight conditions (four counterbalancing conditions within each organizational goal). To better control for the order effects that could have arisen in the pilot, a balanced Latin-square design was used to create the four counterbalancing conditions. The procedure within the vignette study remained the same as the pilot study, which was expected to take approximately 15-20 minutes to complete.

After completing the vignette survey, participants were presented with a set of questionnaires, including work regulatory focus, ambidextrous leadership, and personality items, all of which would take 10-15 minutes to complete on average. This was followed by the demographic questions. Upon completion, they were compensated for $3 if they passed quality checks, including attention checks, manipulation checks, and completion time.

Materials.

Manipulation. The manipulation materials from the pilot study were revised for use in Study 1. The final sample vignettes can be found in Appendix B.

Leadership perceptions. The same three items from the pilot study were used in Study 1.

Manipulation checks. The two manipulation check items from the pilot study were revised to improve clarity and to better discern those who paid attention from those who did not. While the first item essentially stayed similar, by asking participants to indicate the type of an organizational goal they received earlier, the second question asked them to indicate which of the four leaders exhibited explorative behaviors after the new taskforce was initiated. The response options were in the same order as the vignettes were presented to minimize confusion. Participants who picked completely two other leaders were considered to fail this manipulation check. Those who failed both manipulation checks were excluded from further analysis. When administering Study 1, 46 people completely failed both manipulation checks, and thus, they did not get paid and were not included in the initial dataset.

Regulatory focus. The 18 items from the Work Regulatory Focus (WRF) Scale (Neubert, Kacmar, Carlson, Chonko, & Roberts, 2008) were used to measure individuals' promotion and prevention foci at the workplace. Neubert et al. (2008) showed that the WRF measure explained a significant variance above and beyond what the chronic regulatory focus measure provided. The instrument has six different subscales, three of which assess either a promotion (Achievement, Gains, Ideals) or prevention (Security, Losses, Oughts) focus. All items were measured on a five-point Likert scale from 1 = Strongly Disagree to 5 = Strongly Agree.

Ambidexterity. Twenty items administered in the pilot study were revised and removed based on the results. The final set included nine behavioral indicators for each dimension.

Sample items include: “Exploring different ways of doing things” (exploration) and “Using tried-and-true methods to get things done” (exploitation). Each behavioral indicator was assessed on a five-point Likert scale from 1 = Very Unlikely to 5 = Very Likely.

Big Five personality traits. Individual personality traits were assessed using the 20-Item Mini-IPIP scale from Donnellan, Oswald, Baird, and Lucas (2006). This is a short version of the public 50-item IPIP-FFM inventory (Goldberg, 1999), to capture all facets of the Big Five in an efficient and reliable manner. There are four items for each domain, all assessed on a five-point Likert scale from 1 = Very Inaccurate to 5 = Very Accurate.

Demographics. The same demographic questions from the pilot study were used, to assess the following variables: work experience, leadership experience, nature of work environment, gender, age, and education.

Study 1 Results

Similarly to the pilot study, after participants were evaluated on the data quality using attention and manipulation checks, they were further checked for response invariance. In Study 1, if participants chose the same rating option for 55 times or more, it was considered that they did not pay a close attention to each item. Eight responses were removed as a result. The final dataset included 387 individuals, with 94 in the first counterbalancing condition, 97 in the second, 92 in the third, and 104 in the fourth. Additionally, there were 197 and 190 individuals in the explorative and the exploitative goal condition, respectively. The demographic characteristics of the Study 1 participants are summarized in Table 2.

Descriptive statistics and correlations. While the descriptive statistics and correlations are summarized in Table 7, Figure 6 illustrates the degree of correlations between the two ambidextrous leadership dimensions and other survey scales. As expected, exploration was more

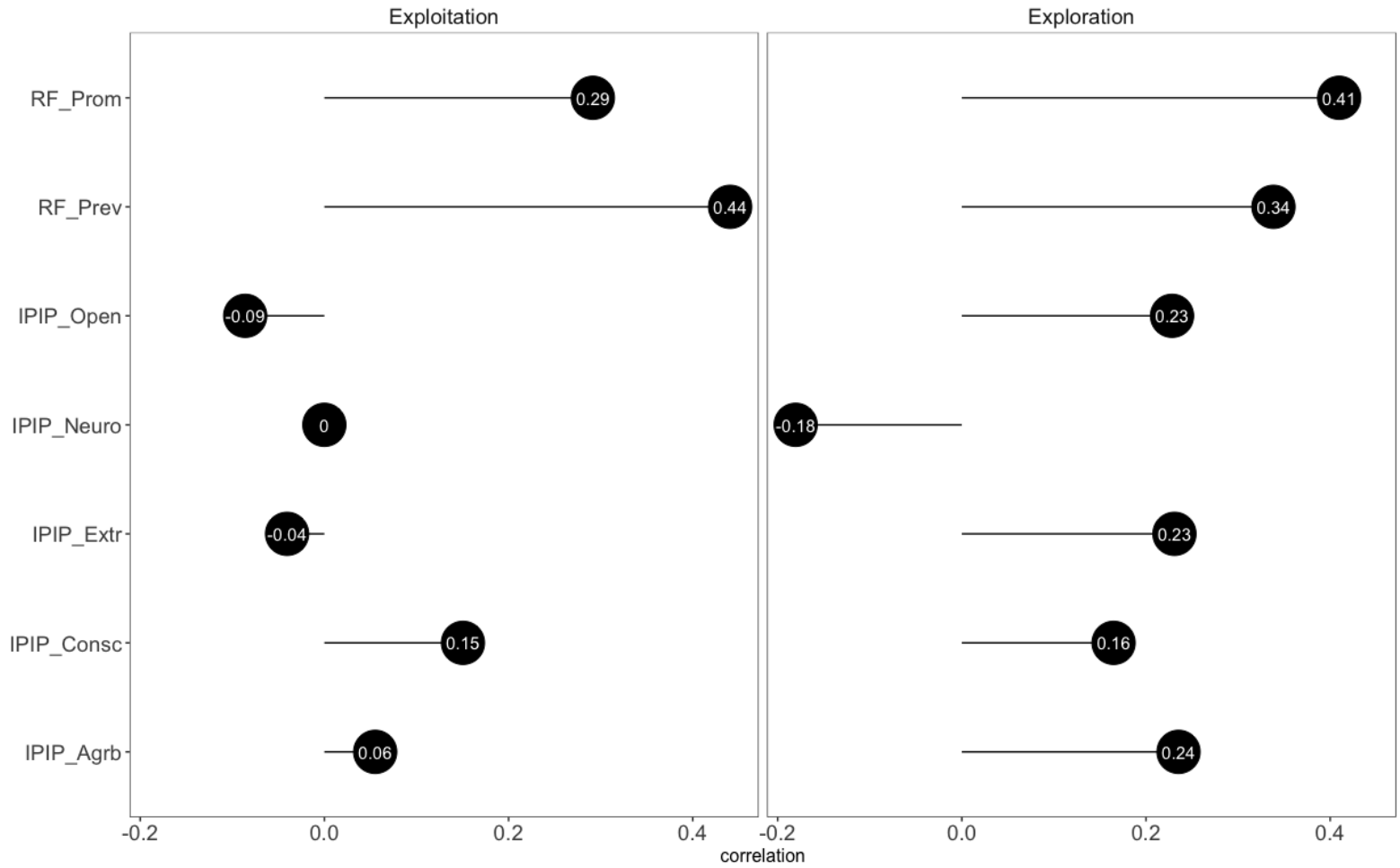


Figure 6. Correlations between Two Ambidextrous Leadership Scales and Other Survey Scales in Study 1.

Note. **Regulatory Focus Scales:** RF_Prom = Promotion Focus, RF_Prev = Prevention Focus; **IPIP Scales:** IPIP_Open = Openness to Experience, IPIP_Neuro = Neuroticism, IPIP_Extr = Extraversion, IPIP_Consc = Conscientiousness, IPIP_Agrb = Agreeableness

strongly related to a promotion focus compared to a prevention focus, supporting H1a. Exploitation, on the other hand, was more strongly correlated to a prevention focus than a promotion focus, although it was expected that exploitation would be correlated to promotion and prevention foci to a similar degree. Thus, H1b was partially supported. Further, the modest level of the correlations between exploration/exploitation and promotion/prevention dimensions indicated the distinctive nature of the ambidextrous leadership theory from the regulatory focus theory, and accordingly, demonstrated construct validity of the new measure (Field, 2009).

The correlations between the two ambidextrous leadership dimensions and Big Five traits were examined for exploratory purposes. It was found that exploration was more strongly correlated with all Big Five dimensions than exploitation was. The only significant correlation for exploitation was that with Conscientiousness, which was, interestingly, correlated to exploration ($r = .16$, $p < .01$) and exploitation ($r = .15$, $p < .01$) to a similar degree. Openness to Experience was positively related to exploration ($r = .23$, $p < .001$) while Neuroticism was negatively related to it ($r = -.18$, $p < .001$), although their correlations with exploitation were nearly zero.

Multiple regression analysis. To test the idea of how one's regulatory focus might be antecedents to his/her tendency towards either explorative or exploitative behaviors, a multiple linear regression analysis was conducted, as proposed by Tuncdogan et al. (2015). Results showed that when exploration was a dependent variable, both promotion ($b = .21$, $p < .001$) and prevention ($b = .19$, $p < .001$) foci had similarly significant estimates, after controlling for other demographic variables. On the other hand, a prevention focus ($b = .30$, $p < .001$) was a stronger estimate of exploitation than a promotion focus ($b = .08$, $p < .05$). Similarly to a correlational analysis, these partially supported H1a and H1b. The diagnostic plots for each of the regression

models (e.g., residual plots, Q-Q plots, component + residual plots) indicated no particular patterns that were concerning, except for the presence of a few outliers.[4] The final results are summarized in Table 8.

Reliability and confirmatory factor analysis. Table 9 shows that all of the survey subscales had an adequate level of reliability. The obtained Cronbach's alpha coefficients for both exploration (α = . 82) and exploitation (α = . 78) showed sufficient internal consistency in each dimension. Although there were a few subscales from WRF (Oughts, α = . 68) and from IPIP (Conscientiousness, α = . 69; Neuroticism, α = . 67) that had slightly lower levels of reliability, they were not far-off from a desired .70 level (Nunally, 1978). Overall, all survey scales showed a satisfactory level of internal consistency.

Confirmatory factor analysis (CFA) was conducted to ensure construct validity of the newly developed ambidextrous leadership measure. As shown in Figure 7, although most items had a necessary level of factor loading of .30 given the sample size of 387 (Hair et al., 2014), there was one item that had a particularly low loading, Item 6. Item 6 was "Allowing team members to make errors"—an exploration item—which could have been ambiguous due to the negative connotation of the word 'errors.' Item 14 ("Refining the existing knowledge base") also had a relatively low factor loading of .39, which could be due to the ambiguity around the term 'knowledge base.'

In addition to examining the factor loadings, the model fit statistics and modification indices were examined to better understand how the model could be improved. The original

[4] To examine whether such outliers had influence on the obtained estimates, robust regressions were conducted using a MM-estimator. The results indicated no substantial differences between the original OLS estimates and new estimates for each dependent variable. When mean squared error (MSE) for standard OLS was compared with that of robust regressions, the values from OLS were actually lower for both exploration (OLS = .399; robust = .431) and exploitation (OLS = .338; robust = .345) than from robust regressions. Therefore, these analyses show no significant violation of the assumptions of the regression analyses.

overall fit statistics for this two factor model were $\chi^2(134) = 605.76$, $p < .001$, CFI = .771, TLI = .738, AIC = 16722.345, BIC = 16868.807, RMSEA = .095 [.088, .103], SRMR = .104. While these fit statistics were better than the fit statistics when all items were assumed to be part of one overall factor ($\chi^2(135) = 1031.235$, $p < .001$, CFI = .564, TLI = .506, AIC = 17145.821, BIC = 17288.324, RMSEA = .131 [.124, .138], SRMR = .136)—showing that two factors (exploration and exploitation) was still relatively better than having one factor only—, inspecting the modification indices showed that Item 17 and 18 were correlated fairly highly, although they belonged to the same construct (exploitation). Further, Item 14 and 16 shared a greater covariance with exploration than expected. Therefore, it was deemed necessary to remove the two problematic items from the above (Item 6 and 14) and revise Item 16 to "Refining current work norms and structures to make them more efficient." When the model was re-specified after removing Item 6 and 14 and allowing residual correlations between Item 17 and 18, the results showed the improved model fit statistics: $\chi^2(102) = 332.38$, $p < .001$, CFI = .873, TLI = .851, AIC = 14616.76, BIC =14751.35, RMSEA = .076 [.067, .086], SRMR = .078.

Vignette study results. In the vignette portion of Study 1, there was one between-subject factor (Organizational Goal) and two within-subject factors (Tendency and Current Behaviors), all of which had two levels—exploration and exploitation. Before formally testing the hypotheses using a mixed-effects model analysis, the data were visually inspected to understand the relationships among these three factors. As shown in Figure 8(a), the leaders who currently exhibit explorative behaviors were evaluated more positively by the participants, regardless of the goal or leader's previous tendency. When the organizational goal was explorative, the leader with an explorative tendency benefited more than the leader with an exploitative tendency by currently engaging in explorative behaviors. This was contrary to our expectation since we

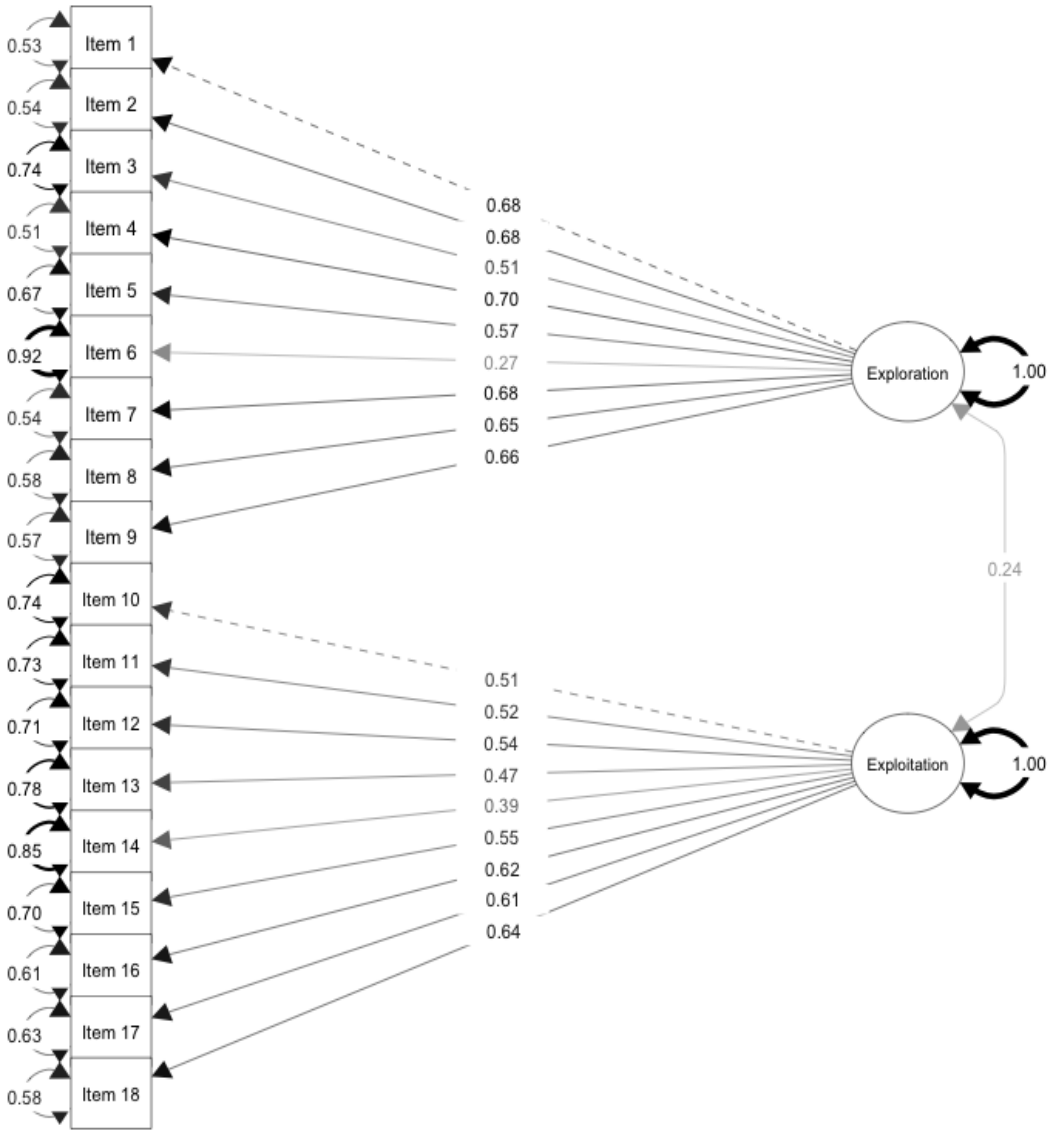


Figure 7. Confirmatory Factor Analysis Results from Study 1.

Note. N = 387. Standardized estimates are reported. **The actual items - Exploration:** Item 1 = "Exploring different ways of doing things"; Item 2 = "Experimenting with a variety of ideas to achieve goals; Item 3 = "Motivating team members to take risks"; Item 4 = "Searching for new work norms and structures"; Item 5 = "Thinking about long-term goals"; Item 6 = "Allowing team members to make errors"; Item 7 = "Creating variety in experiences"; Item 8 = "Seeking out ways to obtain new knowledge"; Item 9 = "Reconsidering existing beliefs and decisions". **The actual items - Exploitation:** Item 10 = "Focusing on short-term goals"; Item 11 = "Creating reliability and consistency in experiences"; Item 12 = "Adhering to rules"; Item 13 = "Discouraging errors"; Item 14 = "Refining the existing knowledge base"; Item 15 = "Using tried-and-true methods to get things done"; Item 16 = "Optimizing and stabilizing current work norms and structures"; Item 17 = "Ensuring team members that they stick to original plans"; Item 18 = "Reinforcing existing beliefs and decisions"

hypothesized that the leader with an exploitative tendency would be perceived to be more effective by switching their behaviors to match with the new goal. Further, when the organizational goal was exploitative, there was no interaction between the Tendency and Current Behaviors factors, with exploration yielding better results for both factors.

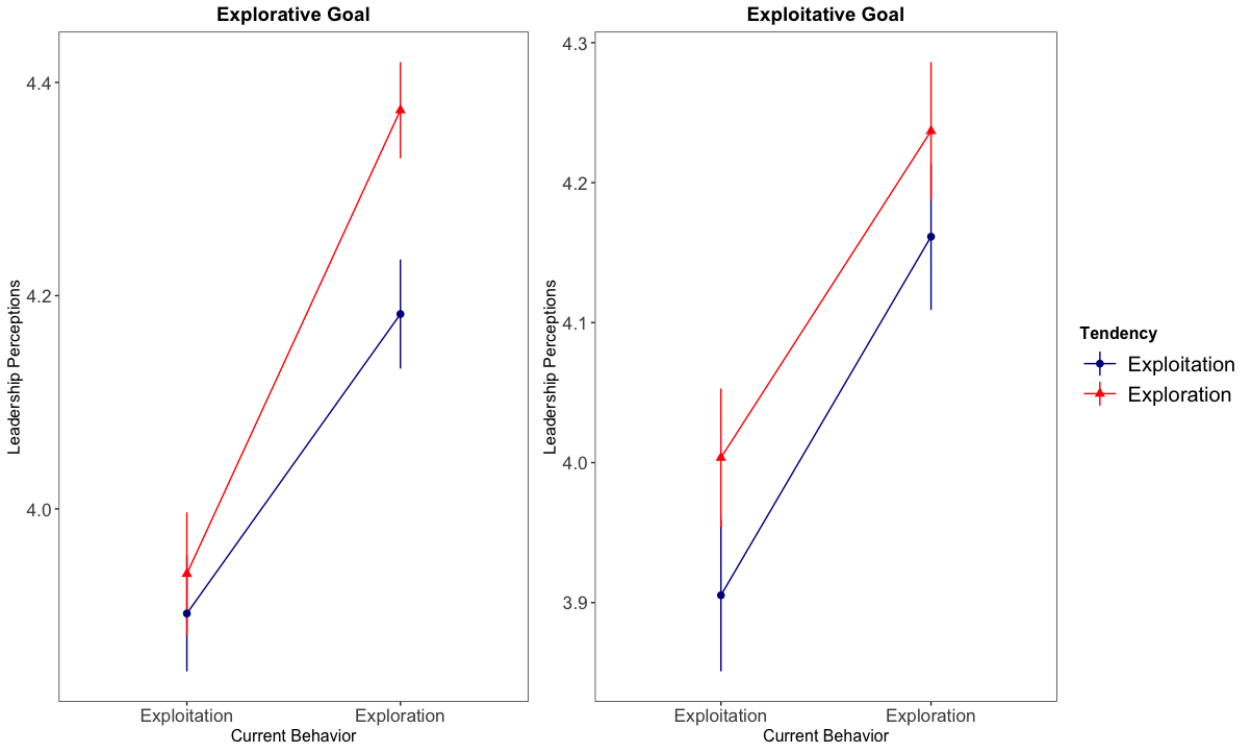
The results from a linear mixed-effects model (LMM) analysis supported the visual inspection of the plots. As in the pilot study, the response variable was winsorized by replacing the extreme values with the 2.5 and 97.5% percentile values before running the analysis. The analysis was done in four steps: Model 1 (random intercept only), Model 2 (random intercept with control variables only), Model 3a (Full random model without interaction terms), and Model 3b (Full random model with interaction terms). The results are summarized in Table 10. The variance components from Model 1 indicated that an intra-class correlation (ICC) was .28. The marginally significant result of the likelihood ratio test (LRT) using a chi-square distribution showed that Model 2 was slightly more favorable ($\chi^2(9) = 14.77$, $p < .10$). In Model 3a, Tendency and Current Behaviors were entered into the model as both fixed and random effects, while Organizational Goal was entered as fixed effect only, to estimate their main effects. The LRT result shows that Model 3a was favorable to Model 2 ($\chi^2(8) = 117.50$, $p < .001$). Finally, all three-way interaction terms were entered into the model, which significantly improved the model ($\chi^2(8) = 15.54$, $p < .05$). Therefore, we retain Model 3b as a final model for both theoretical reasons and the LRT results. As in the pilot study, this conclusion is consistent with the generally decreasing AIC values, but not with the increasing BIC values, which could be because BIC penalizes the number of parameters more so than AIC does (Kuha, 2004). The diagnostic plots of the final model did not indicate the presence of any patterns that were concerning. Finally, the

comparable results were obtained when the final model (3b) was re-estimated with restricted maximum likelihood (REML).

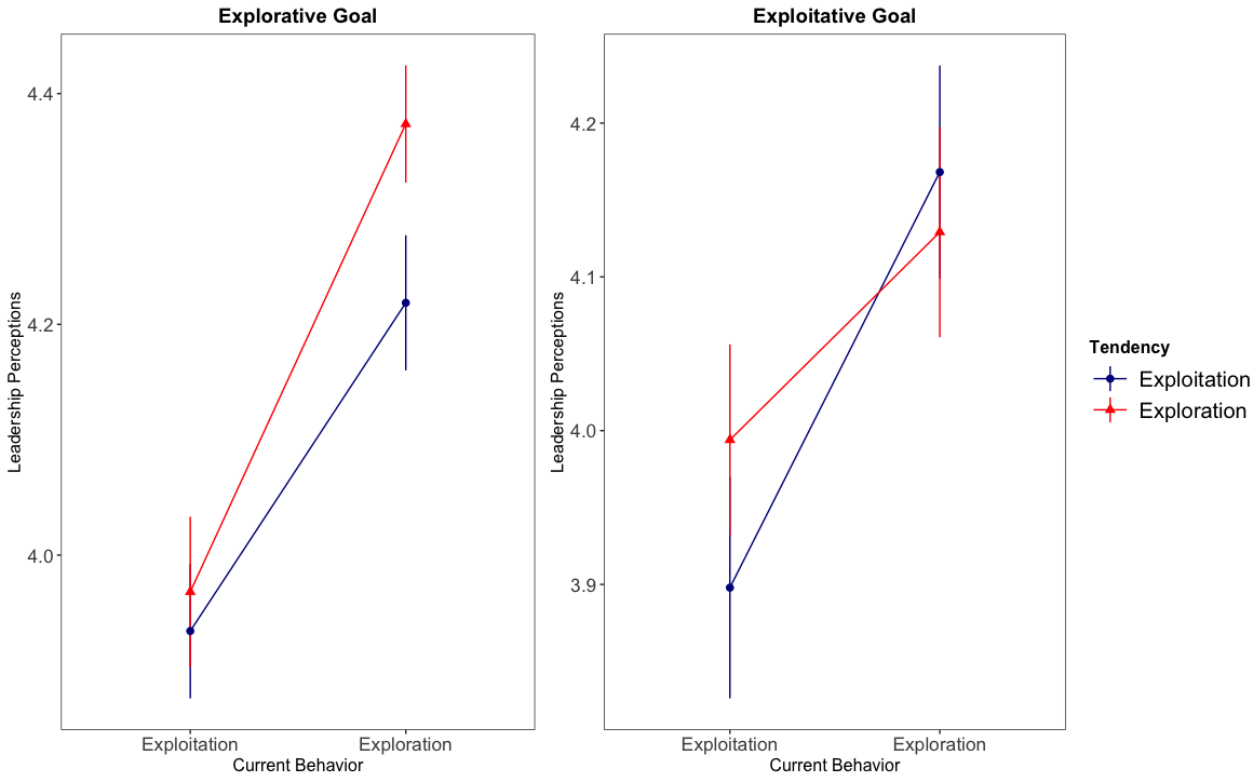
Overall, the final model showed a strong main effect of Current Behaviors ($b = .27$, $p < .001$), whereas none of the interaction terms were significant. We suspected if these findings were due to the participants who failed the organizational goal manipulation, meaning that they did not perceive the given goal as intended, and this could have subsequently influenced how they evaluated effectiveness of the leaders in the vignettes. Thus, we further investigated the results among those who correctly answered the manipulation check on the organizational goal they received. As shown in Figure 8(b), almost the same results were obtained under the explorative goal condition, whereas there was an interaction effect under the exploitative goal condition, with a steeper slope for the exploitative tendency. This was reflected in a marginally significant interaction between the three factors (Goal x Tendency x Current Behavior) when the LMM analysis was applied to this subset of the participants ($b = .228$, $S.E. = .137$, $p < .10$). Yet, being explorative was still considered more effective in the exploitative goal condition, showing that current explorative behaviors was a strong positive driver of leadership perception, regardless of Tendency or Organizational Goal. Therefore, H2a and H2b were not supported.

Study 1 Discussion

Overall, the results from Study 1 demonstrated reliability and validity of exploration and exploitation constructs. While most items within each factor had sufficiently high reliability coefficients as well as factor loadings from CFA, three items were removed or revised based on the CFA results, and the final revised items can be found in Table 11. Further, each dimension was correlated modestly, but significantly, with promotion and prevention regulatory foci. Exploration was more strongly related to promotion, whereas exploitation was more strongly



(a) Original results among all participants in the final dataset (N = 387)



(b) Results among the participants who correctly perceived the goal manipulation (N = 268)

Figure 8. Experimental Vignette Study Results from Study 1.

related to prevention, partially supporting H1. Yet, these results support the original proposition by Tuncdogan et al. (2015). When the relationships with the Big Five personality traits were examined as part of the exploratory analyses, Openness to Experience was more strongly associated to exploration than exploitation, which theoretically makes sense considering the notion of finding new opportunities and experiences inherent in both exploration and Openness to Experience. Further, Neuroticism was negatively related to exploration and was unrelated to exploitation, which is also aligned with the theoretical definitions of the constructs. Overall, these results provide further evidence for reliability and validity of the two ambidextrous leadership constructs.

Study 1 also tested the idea of switching in ambidexterity by using the revised vignette materials from the pilot. The results showed the strong main effect of Current Behaviors, with the leaders currently showing explorative behaviors being rated as more effective regardless of the organization's goal or leader's previous tendency. This was different from what we expected, since we expected that exploitative behaviors would be evaluated more effectively under the exploitative goal condition and that switching from the opposite tendency to match with the goal would lead to better outcomes. There can be several explanations for this. First, it is possible that the leader who already has an explorative tendency and shows explorative behaviors could have been perceived as more authentic, and thus more fitting to the situation, than the leader who has to deliberately change his/her behaviors. Prior research on authenticity finds that leaders who exhibit behaviors considered as being more self-aware, transparent, and consistent are thought to be more effective (Woolley, Caza, & Levy, 2011). This could have led to the steeper slope of the explorative than the exploitative tendency under the explorative goal.

However, this does not fully explain the finding that explorative current behaviors were still perceived to be more effective under the exploitative goal condition. This leads to a second speculation that the general positive sentiment formed around characteristics and behaviors of exploration in today's business environments could have led to more positive evaluations, compared to exploitation. With fast-changing work environments, constant change and experimentation could be deemed more of a norm than simply one way of managing workplace. Thus, the leader showing exploitative behaviors could have been considered as ineffective regardless of the organizational goal, especially in these hypothetical scenarios. Hence, it is imperative to conduct future research that examines leaders' switching behaviors in real organizations that will likely face both explorative and exploitative goals over time, while exploring other important correlates in workplace that can influence leadership perceptions.

Study 2

In the current research, the second aspect of ambidexterity is about maintaining an overall balance between explorative and exploitative behaviors. That is, while it is important that leaders are able to switch between explorative and exploitative behaviors, which Study 1 attempted to show, it is equally important that they maintain an overall balance between the two to truly become ambidextrous in today's fast-changing environments (Rosing & Zacher, 2016). In Figure 1, this refers to those who are in the upper right quadrant where they are high on both exploration and exploitation, not those who are in the Disengaged quadrant, even if it still represents a balance. Hence, Study 2 tested the following hypothesis:

> ***Hypothesis 3:*** *Leaders who show high levels of both exploration and exploitation will enjoy more positive outcomes compared to those are high on only one dimension or low on both.*

Note that it is implicitly assumed in Study 2 that leaders are engaging in certain behaviors in line with the situational demands; in other words, we assume that leaders' engagement in either explorative or exploitative behaviors at any point signal an appropriate response to the specific environmental demands at hand. Testing this assumption was out of scope of Study 2—albeit tangentially examined in Study 1—, as it was specifically focused on examining an overall balance between the two dimensions.

Further, Study 2 attempted to complement Study 1 by utilizing the real-world data. While Study 1 can provide meaningful information about human behaviors under a more controlled environment, human behaviors are not free from the environmental factors, often making the effects observed in labs more accentuated than those in the field (e.g., Benz & Meier, 2008). Therefore, we leveraged the real-world data to ensure that the proposed model is tested in both lab and field settings, which can provide a more rigorous picture of the behaviors under study.

In the current study, we specifically focused on CEO behaviors, which would be most representative of organizational leadership. While we believe that ambidexterity is relevant to any level of leadership within an organization (Birkinshaw & Gupta, 2013), we thought that it would be particularly important to test the validity of the construct at the top management team, which is often involved in making strategic decisions on a daily basis. Capturing the behaviors of the entire top management team, however, would pose great difficulties in data collection. Therefore, we focused on CEO behaviors of large publicly-traded companies as they are likely to be a good representation of the organizations' leadership behaviors, as a preliminary analysis of how leaders' behavioral differences can lead to various outcomes in organizations.

Finally, we also examined the relationships with promotion and prevention focus scores using the regulatory focus dictionary from Gamache, Mcnamara, Mannor, and Johnson (2015).

In general, we expected to see the similar kinds of correlations among the dimensions of ambidexterity and regulatory focus to what was found in Study 1, which then would provide initial evidence for construct validity of the new dictionary. However, given the differences in the methodological approach, we expected lower levels of association compared to that found in Study 1. The details regarding such methodological differences are described in the following Method section.

Study 2 Method

Sample. Studying actual individual leader characteristics and behaviors is an extremely challenging task. We build on prior research that leveraged CEO letters to shareholders (e.g., Gamache et al., 2015; McClelland, Liang, & Baker, 2010) to capture CEO cognitions and behaviors. Although these approaches have limitations, they can offer benefits over traditional methods, such as cross-sectional surveys and interviews, since they provide non-intrusive, consistent information while risks associated with retrospective bias and social desirability can be reduced (Eggers & Kaplan, 2009). Further, several researchers have shown that CEOs themselves write the letters or are heavily involved in the writing process (Bowman, 1984), and that the content from those letters can predict various organizational outcomes, such as innovation (Yadav, Prabhu, & Chandy, 2007), acquisition activities (Gamache et al., 2015), and post-merger performance (Daly, Pouder, & Kabanoff, 2004).

To conduct content analysis of the letters, we began with S&P 500 corporations as an initial sample of publicly traded companies. Similarly to Gamache et al. (2015), we collected the companies' annual reports from 2016 through their websites and online databases (e.g., annualreports.com). The CEO letters from the collected annual reports were extracted, excluding

the captions, figures, quotes, or anything that did not seem to be part of the main content of a letter. There were 389 companies whose letters from 2016 were available.

Independent variables. Before starting to analyze the content of the letters, each letter had to be cleaned for more efficient and reliable processing of the texts. This first involved converting everything into lowercase, followed by removing all the punctuations, numbers, and standard English stop-words (e.g., 'and', 'of', 'at', 'I', 'we'), which are common but uninteresting words. Additional stop-words prevalent in the CEO letters (e.g., 'year', 'shareholder', 'will', 'also') as well as the companies' names were also removed. Then, the words in the letters were lemmatized; lemmatization returns each word's base terms, or *lemmas*, while still retaining the original meaning of the words. For example, a sentence like "It has been an incredible privilege working alongside so many talented and dedicated colleagues on your behalf" was turned into "incredible privilege work alongside many talented dedicate colleague behalf" after the cleaning process. Here, one can see that lemmatization does not return 'talent' for 'talented', because 'talent' and 'talented' have different meanings. This is unlike a popular stemming process, which generally cuts the ends of the words regardless of their meanings; however, we deemed that lemmatization was more appropriate to accurately capture the constructs under study.

To get a score of CEO exploration and exploitation in each letter, we used a dictionary method. Among various types of text mining approaches, a dictionary approach allows a researcher to examine the extent to which certain theoretical constructs are captured in a given text, rather than relying on the data-driven approaches (Short, McKenny, & Reid, 2018). In the current study, we built our dictionary of ambidexterity words using Table 11 and the literature review as a starting point, while revising and updating it based on the data. Specifically, a n-

grams approach was adopted by tokening each letter into a set of contiguous words. For example, a cleaned sentence from the above example ("incredible privilege work alongside many talented dedicate colleague behalf") can be tokenized into a set of unigrams (e.g., "incredible", "privilege", "work", "alongside", "many", "talented"), bigrams (e.g., "incredible privilege", "privilege work", "work alongside", "alongside many", "many talented"), or trigrams (e.g., "incredible privilege work", "privilege work alongside", "work alongside many", "alongside many talented"). In the current study, while bigrams were the main way of capturing exploration and exploitation, several unigrams and trigrams were used if they were necessary to tap into the underlying constructs. Using the final dictionary (see Table 12), the frequencies associated with exploration and exploitation were obtained and divided by the total number of the words in each letter to get a final score of exploration and exploitation. For example, the CEO of General Electric (GE) wrote the following statements in the 2016 annual report:

> "We refocused the company to be in businesses where we can lead while investing in new capability to capture future growth…We continue to leverage scale through horizontal processes. We aim to put 65% of our processes through shared services—what we call global operations—with a target of 25% cost reduction."

This will look like the following after the cleaning process:

> "refocus company business can lead invest **new capability** capture future growth… **continue leverage** scale horizontal process aim put process share service call global operation target **cost reduction**" (27 words)

In this example, the frequency for exploration is one and two for exploitation; when these are divided by the number of words, the respective percentages are 3.7% and 7.4%.

Finally, the dictionary of regulatory focus words (Gamache et al., 2015) was also used to examine their relationships with ambidexterity. However, it is important to note that although Gamache and colleagues essentially used a very similar method by analyzing the CEOs' letters to shareholders in the annual reports, they relied on a unigram approach in constructing the dictionary; in contrast, we used a mix of unigrams, bigrams, and trigrams to more accurately capture the underlying constructs. For example, one of the prevention focus words in their regulatory focus dictionary was 'risk.' However, if the CEO makes a statement like "Our company will take bold risks in upcoming years to push boundaries", we believed it was no longer about prevention focus or exploitation, but rather about promotion focus or exploration. Research has also shown that higher-order n-gram models can greatly improve model prediction by accounting for word context (e.g., Lesher, Moulton, & Higginbotham, 1999). Therefore, while the same approach of text cleaning and analyzing was applied to get the promotion and prevention scores, it is important to note that there was a difference in the nature of the dictionaries used across two theories, ambidextrous leadership and regulatory focus.

Dependent variables. Since we leveraged publicly available data, it was difficult to obtain individual employee data to assess their perceptions and/or performance. Thus, we obtained a range of HR (proximal) and financial (distal) outcomes, in line with the HRM literature (e.g., Boselie, Dietz, & Boon, 2005; Dyer & Reeves, 1995). Although they are not perfectly in the form of a multilevel structure, they still provide the data on both employees' perceptions and overall organizational performance. The following final measures were used.

Glassdoor's Highest Rated CEOs. Glassdoor is one of the largest company review websites. Employees can freely leave their reviews on their employers around the pros and cons of the company, approval of CEO, likelihood to recommend, and future outlook. Glassdoor then

calculates the overall CEO approval ratings, which are used to publish a list of "Highest Rated CEOs" every year. The present study used the list published in 2017 to see if a company's CEO was included in the list or not (1 if listed, 0 otherwise).

Innovation index. Strategy&, a global strategy consulting firm, has been conducting the Global Innovation 1000 study since 2011. Their analysis is based on 1,000 public companies worldwide that have spent the most on R&D during the previous fiscal year and compared against other indices such as financial performance and industry averages. If a company was listed as one of the top innovative companies in 2017, the company received a score of 1, and 0 otherwise.

Financial performance. The financial data from 2017 were obtained from Compustat to calculate the following metrics: Return on Assets (ROA), Return on Equity (ROE), and Gross Profit Margin (GPM).

Control variables. Several control variables were used to minimize their confounding effects on the dependent variables. First, the following individual characteristics of the CEO's were controlled for, because these have been shown to influence leadership styles: gender (0 = male, 1 = female), CEO's age in 2016 (in years), and CEO's tenure in the role (in years). Further, it was deemed important to control for the following variables to account for the impact of organizational-level characteristics on the outcomes of interest: company size (in number of employees) and sector (Energy, Materials, Industrials, Consumer Discretionary, Consumer Staples, Healthcare, Financials, Information Technology, Telecommunication Services, Utilities, Real Estate). All of the data on the control variables were also collected through Compustat's databases, including ExecuComp that provides the data on the executives.

Study 2 Results

Figure 9 shows the word associations from the final letter texts from 2016. While 'business' was the most frequent word in the letters with an occurrence of nearly 3,500 times, it did not necessarily occur frequently in association with other words. Further, before testing the main hypotheses, it was deemed necessary to remove the letters with extreme word counts (Speer, 2018). In the current study, the letters with word counts of below 2 (205 words) or above 98 (2701 words) percentiles were removed, leaving 373 letters in the sample. Further, because the financial data contained some extreme, unrealistic values, these values were also winsorized at the 2.5 percentile level.

Descriptive statistics and correlations. Table 13 shows the basic descriptive statistics and correlations among the study variables, after removing the extreme word counts and winsorizing the financial data. The final sample was fairly evenly distributed across the different sectors with a range of 6 to 16% of the companies in each sector, except for the telecommunication services sector that had only three companies in it (.82%). Table 13 also shows that there were very few companies that were listed in the Glassdoor's Highest Rated CEO list in 2017 (7.5%), which would not lend enough sample size to conduct analyses. Thus, this variable has been excluded from further analysis at this time.

Examining the correlations between the ambidexterity and regulatory focus dimensions revealed that exploitation as more strongly related to a prevention focus ($r = .15$, $p < .05$) than a promotion focus ($r = .11$, $p < .05$), as expected. Interestingly, exploration was negatively associated with both promotion ($r = -.03$, $p > .05$) and prevention ($r = -.12$, $p < .05$) foci. Such negative correlations could be attributed to the methodological differences we described in the above Method section. However, since we expected exploration to be more positively associated

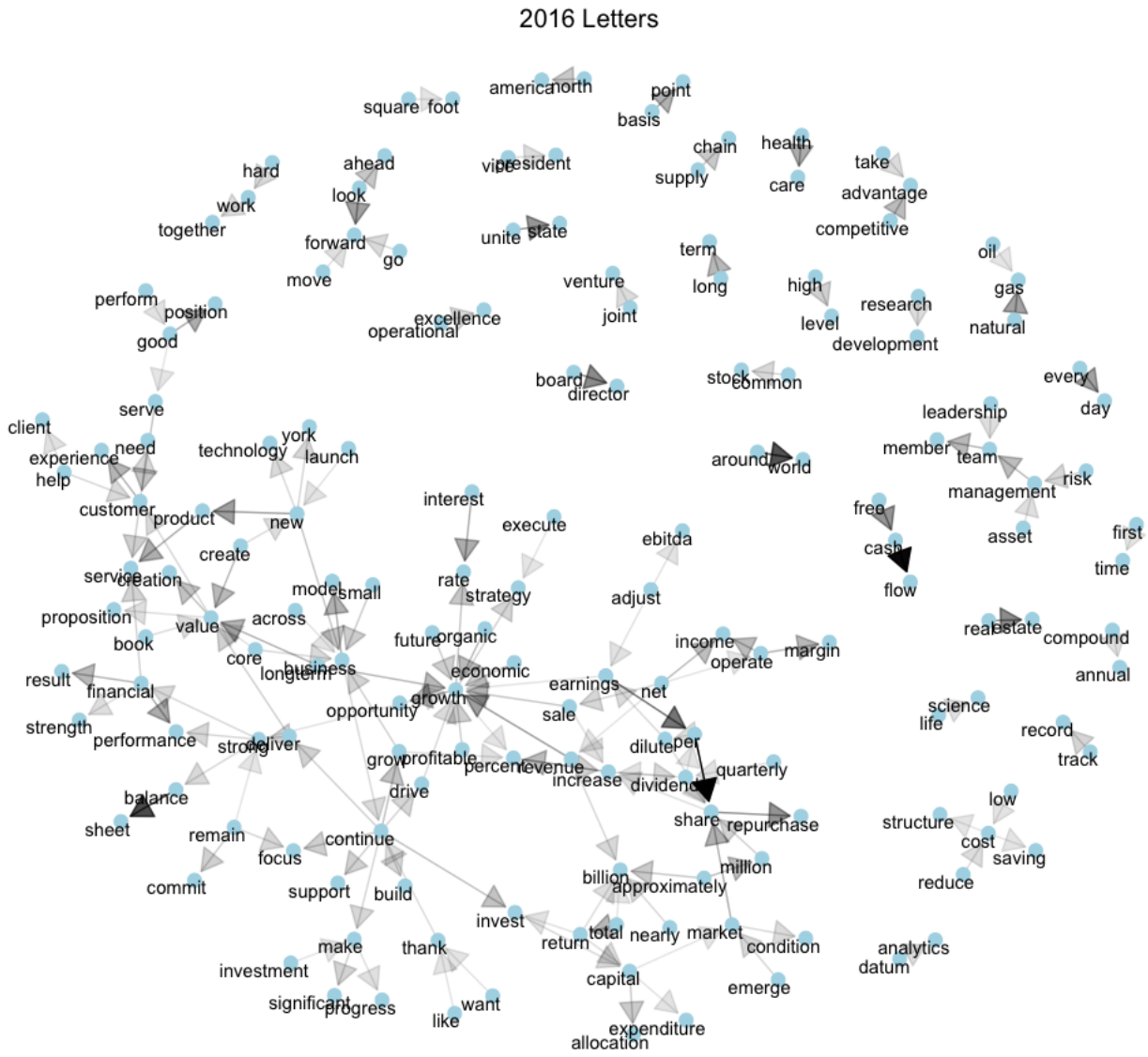


Figure 9. Word Associations in 389 Letters from 2016. Pairs with more than 50 or more occurrences are shown only. The arrows indicate the general direction and strength of the word pairs.

with a promotion than with a prevention focus, the significant and stronger negative relationship with a prevention focus was still in the direction we expected. These correlations show that exploration and exploitation are different constructs from promotion and prevention, respectively, supporting the findings from Study 1.

Exploration was generally positively associated with the outcome variables, while exploitation was generally negatively associated with the outcome variables. To further examine the relationships among exploration, exploitation, and organizational outcomes, we looked at how the companies were spread across the exploration and exploitation values by creating the four quadrants as in the proposed ambidexterity model, and what the outcomes would look like in each quadrant. Figure 10 shows the summary of the results. When the companies were divided based on the median values of exploration (.49) and exploitation (.22), there were approximately 90 companies in each quadrant: Disengaged (n = 93), Exploitation (n = 95), Exploration (n = 94), and Ambidexterity (n = 91). The mean values for ROA, ROE, and GPM for each quadrant show that those in the Exploration or Ambidexterity group had generally better financial outcomes. This difference became more pronounced when the percentage of companies in the Global Innovation 1000 list was examined, because approximately 40% of the companies in the Ambidexterity or Exploration group were on the list, whereas only 10% - 22% of the companies in the Disengaged or Exploitation group were on the list.[5]

Logistic regression for innovation. To formally test the impact of exploration and exploitation on the outcome variables, a series of regression analyses were conducted. Before

[5] To see if there are significant differences among these groups, multiple comparison tests using Tukey's method were conducted after controlling for other variables. There were no significant group differences in the case of ROA and ROE, but there was a significant difference between Exploration and Disengaged for GPM. When the outcome was Innovation, Ambidexterity and Exploration groups were significant better than Disengaged. Overall, the simple group comparisons provide some but limited evidence for the positive effects of being in the Exploration and Ambidexterity quadrants.

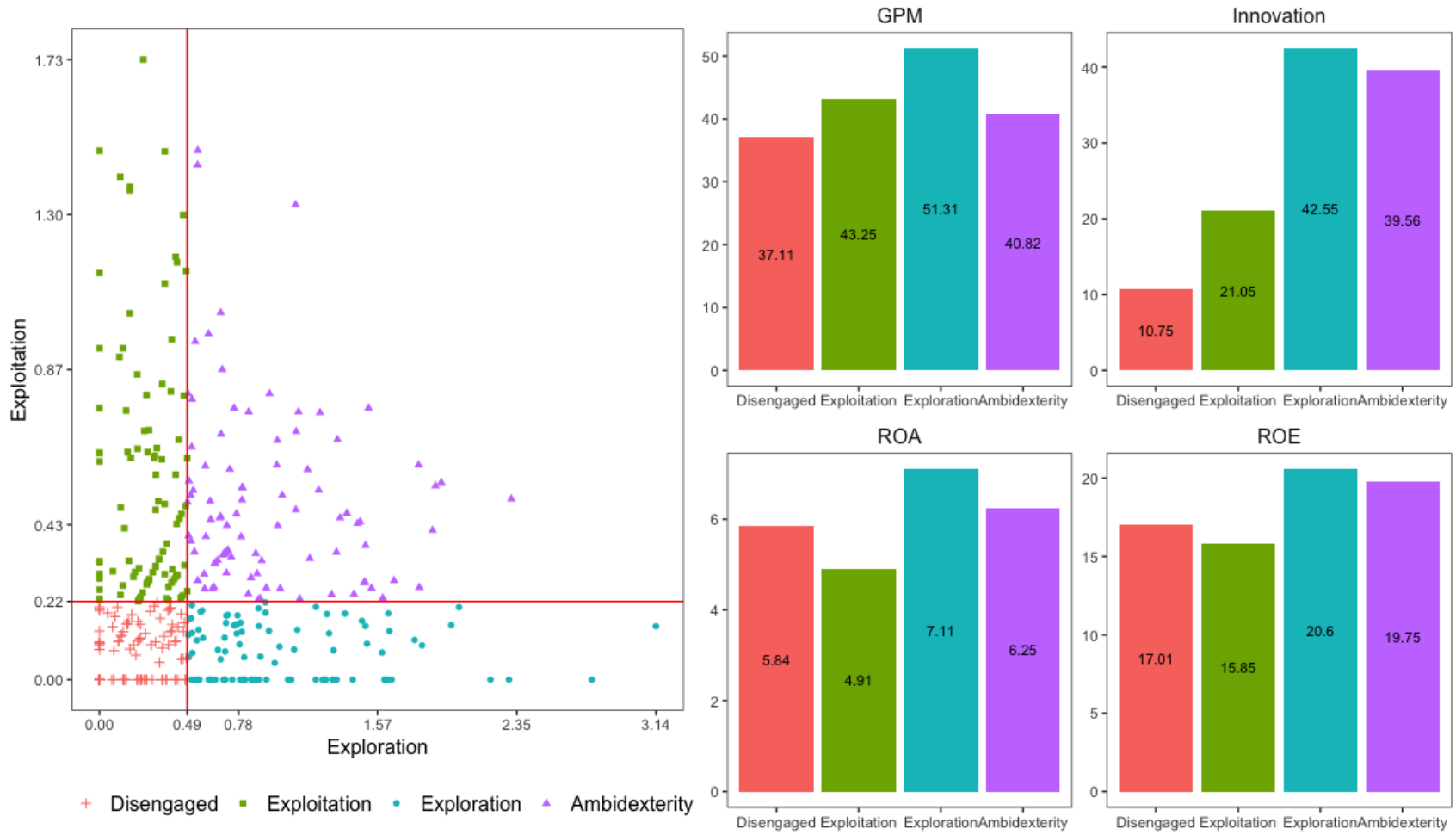


Figure 10. Distribution of Companies Across the Exploration and Exploitation Scores in Study 2.

Note. N = 373. Red lines in the left plot indicate the median score for each variable. Numbers in the bars for ROA, ROE, and GPM indicate the average for each group. Numbers in the bars for Innovation indicate the percentage of companies listed in the Global Top 1000 Innovative Companies for each group.

conducting these analyses, the financial outcomes were square rooted, while taking a log of company size (number of employees) to normalize the data.

First of all, a logistic regression was conducted because innovation was a binary outcome (whether a company was on the list or not). Because none of the companies in the Financial, Real Estate, and Utilities sectors made it to the list, these companies had to be removed before conducting a logistic regression. The results are summarized in Table 14. The older the CEO was, the less likely the company was on the list (b = -.09, p < .01), while being in the Healthcare (b = 2.16, p < .001), Industrials (b = 1.19, p < .05), and Information Technology (b = 2.42, p < .001) sectors increased the chance of being on the list. Although the interaction between exploration and exploitation was not significant (b = .12, p > .05), Figure 11 shows that those in the higher range of exploitation are expected to have greater probabilities of being on the Innovation list compared to those in the lower range, with such a gap widening as exploration increases. Therefore, it supported our hypothesis that being high on both exploration and exploitation would drive more positive outcomes.

To evaluate whether the overall model was good fit, a number of model evaluation tests were conducted. The Hosmer-Lemeshow test yielded a $\chi^2(8)$ of 9.23 and was not significant (p = .32), suggesting that the model was good fit to the data. The area under the receiver operating characteristic (ROC) curve also gives us insight into how well the model can predict, with .50 being a random guess. Using this value, one can calculate Somers' D_{xy} rank correlation and the obtained value of .59 demonstrated that there was a good level of association between the outcome and estimated probability (Peng, Lee, & Ingersoll, 2002).

Polynomial regressions for financial outcomes. The use of polynomial regressions and response surface methodology (RSM) has become increasingly popular among organizational

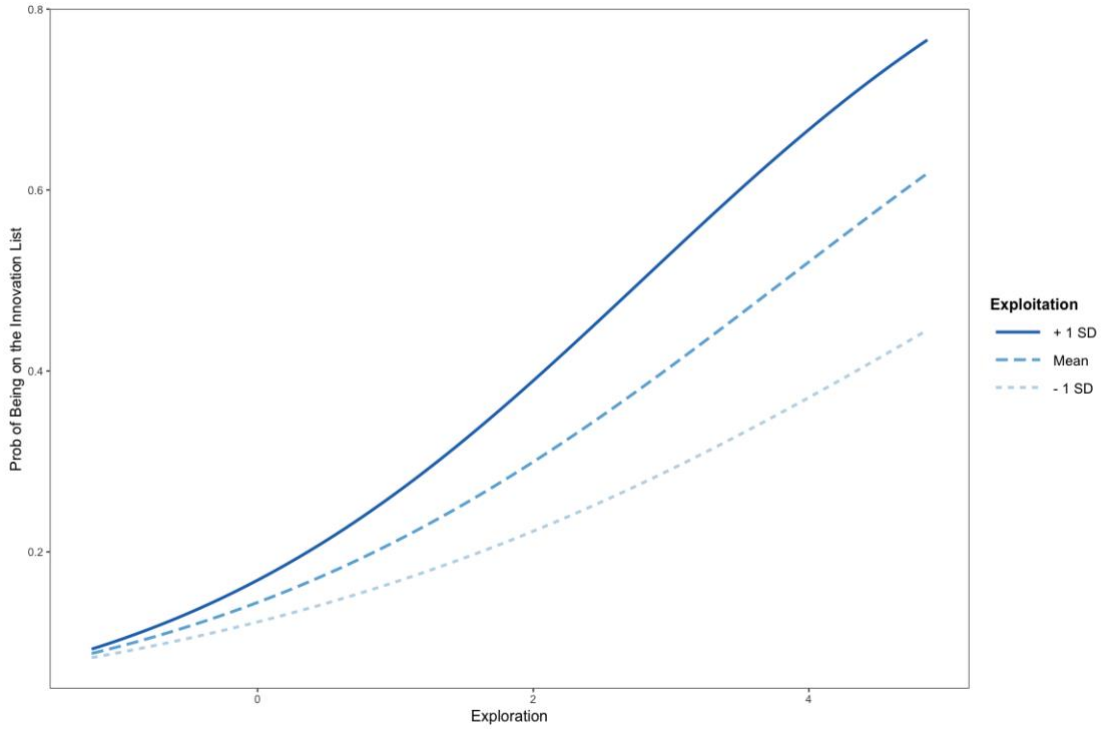


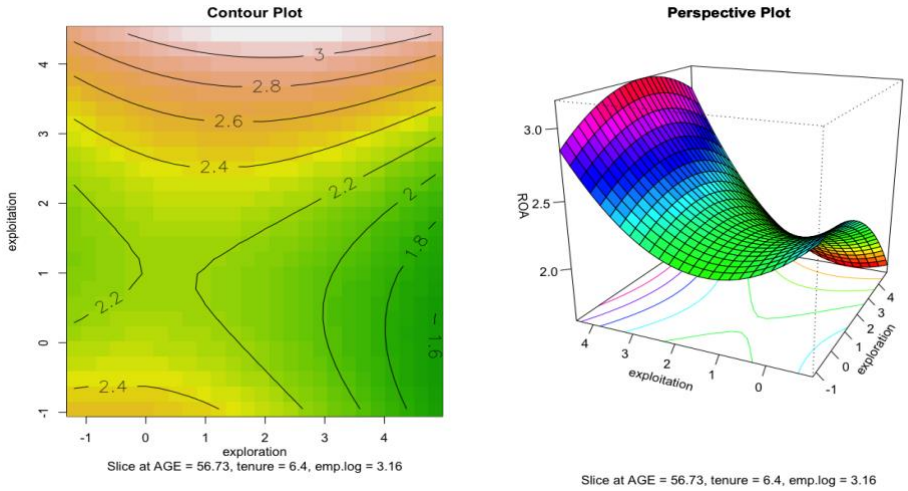
Figure 11. Interaction Between Exploration and Exploitation on Innovation in Study 2.

researchers since the seminal paper by Edwards and Parry (1993) was published. In particular, polynomial regression has been suggested as an alternative to difference scores or profile comparisons in studying congruence between two constructs by accounting for complex relationships of the constructs in relation to an outcome of interest (Cohen, Nahum-Shani, & Doveh, 2010; Edwards & Parry, 1993). Furthermore, in the discussion of how organizations could simultaneously achieve high levels of exploration and exploitation, Boumgarden et al. (2012) presented a three-dimensional performance landscape model that maps exploration and exploitation on the x- and y-axes, while locating an organizational outcome on the z-axis, which essentially follows the basic approach used in polynomial regression and RSM. The authors specifically argued how such a three-dimensional representation of the variables is what satisfies their assumptions about exploration and exploitation, and the two constructs' relation to

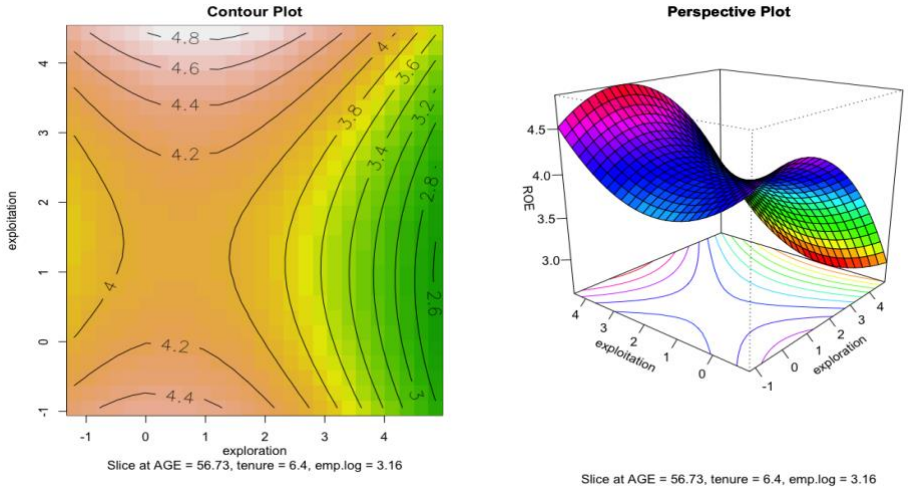
organizational performance. Thus, in line with the current literature, we deemed that the use of polynomial regression and RSM is the most appropriate way to analyze the data.

In the current study, separate analyses were conducted for each of the financial outcomes in two steps: in Step 1, all control variables as well as the centered ratings of the two constructs (exploration and exploitation) were entered as predictors (first order model), and in Step 2, the squares and cross-product of the two were entered as additional predictors (second order model). The diagnostic plots for each second order model generally indicated that the assumptions were met in a satisfactory way, although there was presence of a few outliers and the residuals were not perfectly normal especially when the outcome was ROE.

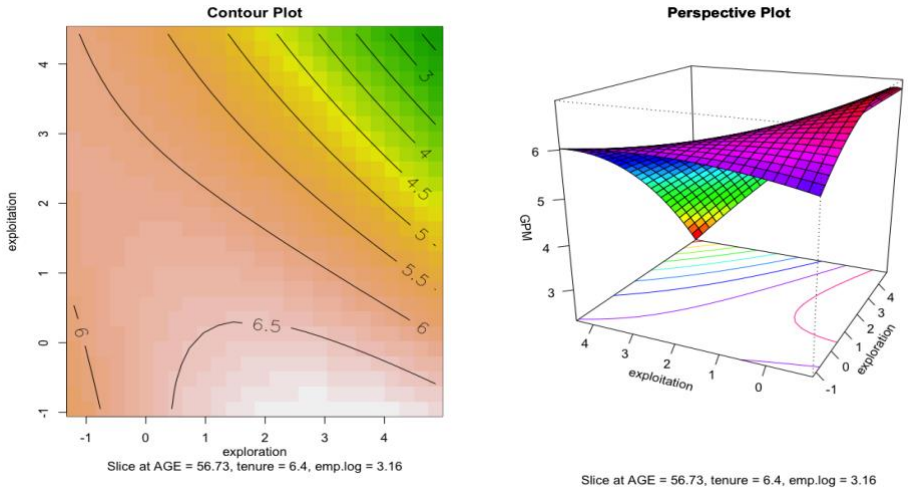
Table 15 summarizes the final polynomial regression and RSM results for each outcome variable, and Figure 12 shows the corresponding contour and perspective plots. The F-test for all models were significant. For ROA, while the regression coefficient for the interaction between exploration and exploitation is positive but not significant ($b = .03$, $p > .05$), Figure 12(a) demonstrates that being high on both exploration and exploitation can lead to higher ROA. The contour plot on the left displays the values of ROA depending on the levels of exploration and exploitation on a 2-dimensional space, and it shows the generally increasing values of ROA toward the top right corner. This visually supports the idea that being high on exploration and exploitation is better than being high on only one or neither of them. Further, given the significant coefficient of exploitation^2 ($b = .07$, $p < .05$), we also examined the curvilinear effects of exploration and exploitation. As shown in Figure 13(a), we found a concave (inverted U-shape) and convex (U-shape) pattern for exploration and exploitation, respectively. However, the F-test result between the first and second order models was not significant ($F(3, 313) = 1.80$, $p > .05$) and the surface tests along the lines of congruence (Y = X) and incongruence (Y = -X)



(a) DV = ROA



(b) DV = ROE



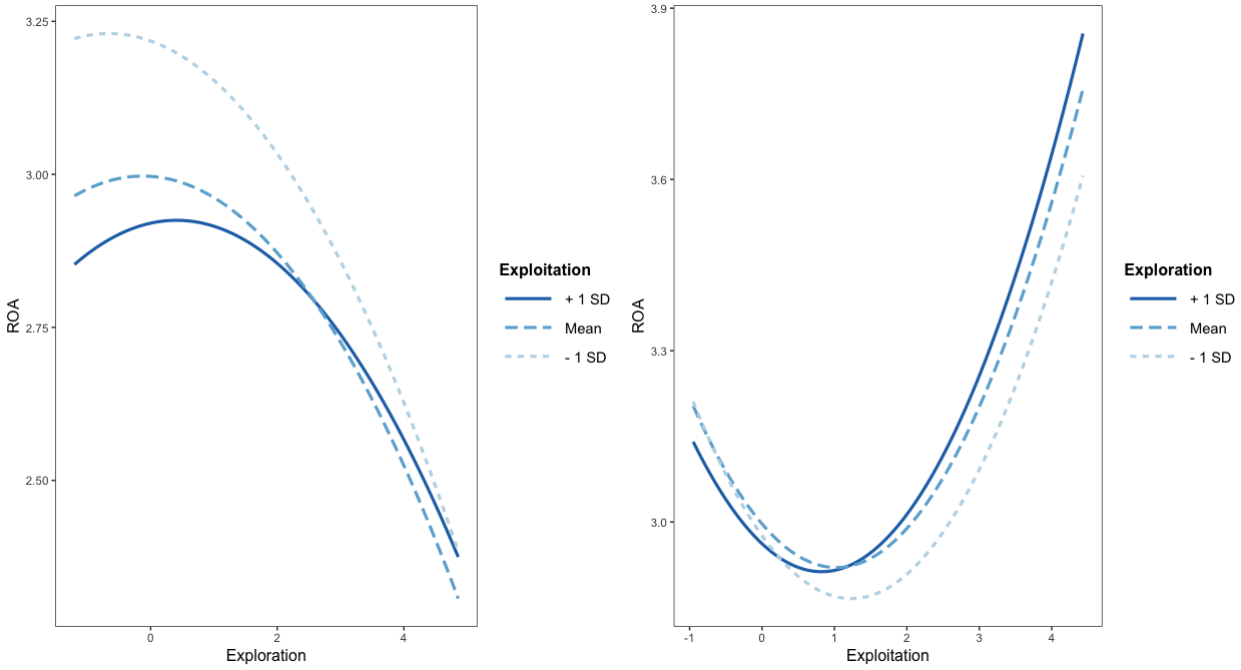
(c) DV = GPM

Figure 12. Contour and Perspective Plots between Exploration and Exploitation from Study 2.

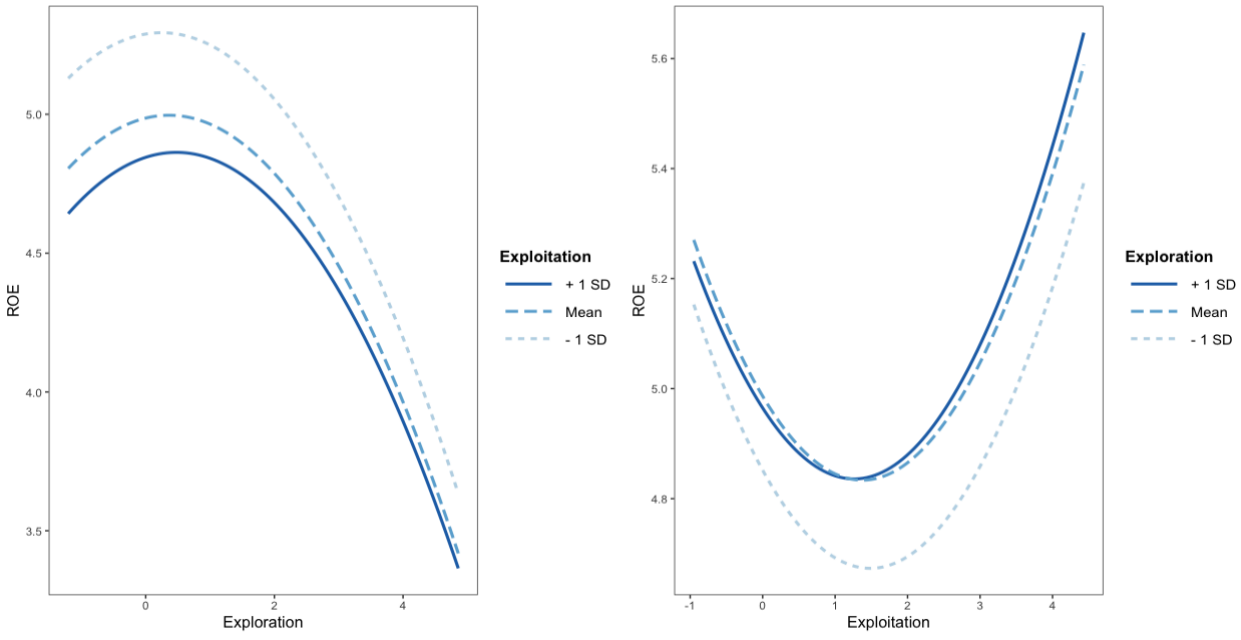
were also not significant, making it difficult to conclude what the true relationships between exploration and exploitation might be in relation to ROA.

While the similar patterns were obtained when ROE was regressed on exploration and exploitation, controlling for other variables, both contour and perspective plots in Figure 12(b) illustrated slightly stronger curvilinear effects of both exploration and exploitation, compared to when ROA was regressed. Similarly to ROA, the negative coefficient for exploration^2 (b = -.07, p > .05) and the positive coefficient for exploitation^2 (b = .08, p > .05) indicated an inverted U-shape and U-shape pattern, respectively. These curvilinear patterns are further illustrated in Figure 13(b), which shows that ROE reach a *maximum* around the mean of exploration, whereas ROE reaches a *minimum* when exploitation is around 1.5 (after centering). These suggest that there might be moderate levels of exploration and/or exploitation that can lead to better outcomes. For example, the contour plot in Figure 12(b) indicates that when exploration is moderately high, the higher values of exploitation seem to lead to better ROE. However, in addition to the statistical insignificance of these squared terms, both the F-test result between the first and second order models (F(3, 302) = 1.07, p > .05) and the surface tests along the lines of congruence (Y = X) and incongruence (Y = -X) were not significant either. Thus, the curvilinear effects of exploration and exploitation are not conclusive. Overall, the results from polynomial regressions and RSM when the outcomes are ROA and ROE provide limited support for H3.

Finally, GPM had drastically different patterns as seen in Figure 12(c). While both exploration^2 and exploitation^2 had negative coefficients indicating inverted-U shapes, the contour and perspective plots show that GPM was generally higher when there was greater incongruence between exploration and exploitation. Further, the positive coefficient for the slope along the line



(a) DV = ROA



(b) DV = ROE

Figure 13. Curvilinear Effects of Exploration and Exploitation in Study 2.

of incongruence (a_3) indicates that GPM would be greater as exploration becomes greater than exploitation, although, again, the surface test results were not significant.

Study 2 Discussion

The purpose of Study 2 was to test the hypothesis that being high on both exploration and exploitation would lead to better outcomes compared to being high on either one of them or low on both. Before conducting formal significance tests, a series of descriptive and correlational analyses showed that exploration was more positively related to organizational outcomes compared to exploitation. Further, the non-significant to modest correlations with promotion and prevention foci demonstrated that the ambidextrous leadership constructs were related but different from the regulatory focus constructs. One reason for such low correlations could be the differences in analytical approaches, because the current study leveraged a mix of low- and higher-order n-grams in contrast to a unigram approach used in the prior research, as explained in the Method section. Overall, these results generally support for the validity of the dictionary method employed in the current study.

Inspecting how outcome values are distributed across the four groups depending on the exploration and exploitation scores revealed that companies that are high on exploration or high on both exploration and exploitation tended to achieve better performance compared to those high on exploitation or low on both exploration and exploitation. To more formally test the hypothesis, a logistic regression and polynomial regression along with response surface methodology (RSM) were used. The results from the logistic regression when the outcome was innovation showed the positive main effect of exploration on the likelihood of being on the Global 1000 Innovation List. Although not statistically significant, the interaction between exploration and exploitation seemed to be positive, with being high on the two increasing the

chance of being on the innovation list. The results from the polynomial regression and RSM showed that achieving high levels of exploration and exploitation would lead to better ROA; yet, the evidence for such effects for ROE and GPM were limited. However, it was interesting to observe that exploration and exploitation had different curvilinear effects, with exploration having an inverted-U shape and exploitation having a U-shape relationship with both ROA and ROE. Hence, the regression coefficients as well as the contour and perspective plots demonstrated that achieving high levels of both exploration and exploitation could have better outcomes—but with possible turning points. It is possible that there are optimal levels of exploration and exploitation that can lead to better outcomes, rather than simply being higher on the two. Yet, given that the F-test results between the first and second order models as well as the surface tests across all three financial outcomes were not significant, these findings need to be interpreted with caution. However, although the second order terms might have not added significant information to these models, we believe that the use of RSM is still a more appropriate way of looking at the relationships between exploration and exploitation in relation to relevant organizational outcomes. Therefore, further research is warranted to more closely examine the nature of the effects of exploration and exploitation on organizational performance.

CHAPTER 4

General Discussion

The purpose of the current research was multi-faceted. First, we attempted to make the definition and operationalization of ambidextrous leadership more explicit, by conceptualizing a model of ambidextrous leadership and embedding it into a leadership process model. Specifically, we conceptualized ambidextrous leadership to consist of two aspects: switching between exploration and exploitation depending on situational demands, and achieving an overall balance between the two over time. Second, we examined whether switching and an overall balance would indeed lead to positive outcomes at both the individual and organizational levels. Third, the role of regulatory focus as a potential antecedent affecting the tendency toward exploration and exploitation was explored, as aligned with the overall process model. Lastly, in order to test the aforementioned hypotheses, a set of behavioral indicators for exploration and exploitation were developed and tested for its reliability and validity.

The results from the pilot and Study 1 demonstrated reliability and overall construct validity of the new behavioral indicators for exploration and exploitation. While the concept of exploration and exploitation may seem closely related to transformational and transactional leadership, respectively, we argued that they are different leadership constructs based on how they are defined and conceptualized. The correlational analyses showed that exploration and exploitation were only modestly related to transformational and transactional leadership. Further, the factor analyses—both exploratory and confirmatory—and reliability statistics generally showed that exploration and exploitation had sufficient levels of factor loadings and internal consistency and supported the two-factor structure of the items. The final set of the indicators included eight items in each dimension. Further, it is important to note that the results quite

consistently showed that exploration and exploitation are independent constructs. The correlation between the two was low to modest across the pilot (r = .31) and Study 1 (r = .17), and it further decreased in Study 2 (r = -.09) when the CEO letters were analyzed. These demonstrate discriminant validity between the two constructs, suggesting that exploration and exploitation are likely to have more of an orthogonal relationship, rather than being on two ends of a single continuum.

The results from Study 1 also showed that promotion and prevention regulatory foci could predict exploration and exploitation, respectively. Regression analyses showed that exploration was more strongly affected by a promotion focus and exploitation was more strongly affected by a prevention focus, after controlling for individual characteristics. Moreover, the study showed that personality traits could influence one's inclination toward exploration versus exploitation behaviors. For example, Openness to Experience and Neuroticism was significantly related to exploration positively and negatively, respectively, which support the theoretical relationships between the constructs. Overall, these findings provide preliminary evidence for how leaders' individual characteristics might influence their behavioral tendencies, as proposed in the original leadership process model.

Nevertheless, the results from the vignette study provided limited evidence for the positive effects of switching. The four vignettes, counterbalanced within the goal condition, contained the descriptions of the four leaders who switched or did not switch their behaviors depending on the new organizational goal, and participants were asked to evaluate their leadership effectiveness. While it was expected that those leaders who switch from the opposite tendency to match with the new organizational goal would benefit the most, the results generally showed the strong main effect of the leaders' current behaviors, with current explorative

behaviors being perceived as more effective regardless of the leader's original tendency or organizational goal.

The aim of Study 2 was to test the hypothesis that being high on both exploration and exploitation would lead to better outcomes than being high on only one or neither of them. The polynomial regression and response surface methodology (RSM) analysis of the CEOs' letters to shareholders in 2016 provided some, but limited, support for the hypothesis. The companies' ROA from 2017 were generally higher as exploration and exploitation increased; yet, this relationship became weaker when ROE and GPM were the outcomes. However, it was interesting to observe similar curvilinear effects across both ROA and ROE, with exploration having an inverted-U shape and exploitation having a U-shape curve. This shows that having higher scores on exploration and exploitation may not necessarily always lead to better outcomes and that there might be optimal levels of exploration and exploitation to obtain the best outcomes. Yet, insignificance of the second order models (which add the squares and cross-product of the two predictors in addition to their main effects) makes these findings inconclusive. On the other hand, the positive main effect of exploration was found when the outcome was innovation. The interaction effect between exploration and exploitation was also positive—albeit not statistically significant—as the likelihood of being included in the Global Top 1000 Innovation list became higher when both exploration and exploitation values became higher.

Overall, these results provided some preliminary support for the proposed model of ambidextrous leadership—but with limitations. While the results demonstrated that regulatory focus can have influence on the tendency towards exploration and exploitation, the results for the positive effects of switching and an overall balance were mixed. In particular, exploration was found to have a strong main effect on leadership perceptions and some of the organizational

outcomes. We believe that such mixed findings present two perspectives in thinking about the study's implications. First, the results could indicate that exploration might indeed be more important leadership behaviors, especially given today's business environment that seemingly requires constant innovation. The rapidly-shifting technological, geopolitical, and demographic changes may require more of explorative than exploitative behaviors from leaders. While this idea may contradict the original idea of ambidexterity, it would be worth considering whether there are different weights that should be placed across exploration and exploitation.

However, given the exploratory nature of this research, it is also difficult to claim with confidence that exploration is more important than exploitation. Thus, another perspective of the current findings is to argue that we should continue collecting more data, especially to more closely examine if there are certain conditions under which exploitation or switching is needed. In Study 1, we created a manipulation on an organizational condition that was explorative or exploitative, but those conditions may have not had substantial manipulation effects on the participants. Thus, to truly understand what ambidexterity entails in relation to both exploration and exploitation and if both are needed for future success, it would be imperative to conduct future research that collects data from real leaders in actual work settings where as they are likely to face various conflicting challenges.

We believe that both perspectives are equally valid and are in fact necessary in thinking about the implications and next steps. Thus, building on these two perspectives, we further discuss theoretical and practical implications of the current research in the following section.

Implications of the Current Research

Theoretical implications. Despite a substantial amount of research in the area of ambidexterity, its definitions and operationalizations have been enormously vague. Because of the ways it had been previously defined, ambidexterity could be seemingly applied to all sorts of organizational contexts where one needs to manage two conflicting priorities; however, as Birkinshaw and Gupta (2013) argued, "if ambidexterity is everything, then perhaps it is also nothing" (p. 291). Thus, it is important to make the scope of the concept narrower to make sure it is a useful leadership concept.

The present research attempted to achieve this goal in several ways. First, we made more explicit connections between ambidexterity and leadership by more clearly defining what ambidextrous leadership entails. We argued that effective ambidextrous leadership is about being able to switch between exploration and exploitation depending on situational demands and achieving high levels of both over time, which provides an overarching conceptualization of the construct. We further embedded this idea into an overall process model to make it clearer how ambidexterity can be studied at the leadership level. Although the notion of switching and balancing was not fully supported by the empirical data in the current research and may still be a high-level conceptualization, we believe that this is one of the first studies that attempted to explicitly improve the clarity of the meaning and operationalization of ambidexterity at the leadership level.

Extending the first implication of the study we just described, we also believe that the current research contributes to the literature by being one of the few empirical studies that explore ambidextrous leadership. In addition to an overall lack of understanding of ambidexterity as a leadership construct, there has been very limited empirical research that explicitly tests

hypotheses around ambidextrous leadership. Further, even among those few empirical studies on this topic, it was not clear as to how ambidextrous leadership was operationalized and/or calculated (e.g., Trong Tuan, 2017). Thus, the current research attempted to empirically test the validity of ambidextrous leadership as a construct in different ways. First, we examined if exploration and exploitation are two independent constructs, rather than two ends of a single continuum. The results consistently showed that exploration and exploitation are more likely to be independent than negatively related, adding empirical evidence to the debate surrounding the nature of the relationship between the two. Second, given the independence between exploration and exploitation, we also tried to test how they are related with each other to define ambidextrous leadership—namely, switching and balancing. In this research, even though the findings provided limited evidence for the effect of switching, they provided some evidence for the positive effects of doing more of exploration and exploitation. Yet, the findings also suggested how there might be more complex relationships between exploration and exploitation in driving more positive organizational outcomes. Specifically, as discussed above, the strong main effect of explorative behaviors was observed across a number of outcome variables, suggesting that exploration might be more important leadership behaviors than exploitation in today's business environment. Or as Study 2 suggested, the effects of exploration and exploitation may not be linear, and that there might be optimal levels of those two non-linear affects to achieve more positive organizational outcomes. Overall, although further research is required to investigate the nature of such effects and relationships given the current mixed findings, the present study adds to the literature by demonstrating how ambidextrous leadership can be examined in a more empirical way.

Further, it is important to reiterate the notion that the proposed ambidextrous leadership theory is a behavioral theory that attempts to distinguish exploration and exploitation activities and define what ambidexterity entails in relation to those two, without making assumptions about what makes one more ambidextrous. As previously discussed in Chapter 2, there might be individual characteristics that could lead to better switching and balancing, such as agility, emotional/social intelligence, and cognitive complexity and agility, but they are the leader traits that can be antecedents to ambidextrous leadership behaviors, not the elements of the ambidextrous leadership model itself. Further, the current study also showed how individual differences (i.e., work regulatory focus and personality traits) can affect behavioral tendencies of leaders, and researchers have called for an attention to studying a wider range of factors that can influence leaders' and firms' ability to explore and exploit, such as integrative thinking, emotional intelligence (Rosing et al., 2011), risk propensity (Wilden et al., 2018), and cognitive flexibility (Good & Michel, 2013). Thus, in line with the overall leadership process model, it is imperative to continue investigating other important constructs related to ambidextrous leadership to further our understanding of what predicts, moderates, and results from ambidextrous leadership.

Finally, on a related note, the results from the current research highlight the importance of continuous modification of the theory. The present findings showed that exploration may have a stronger main effect on relevant outcomes than exploitation, but there might be curvilinear effects of the two—but with limited support. To move the field forward, a continuous theory building to refine the proposed model is warranted to have a more integrated, multilevel approach toward understanding how ambidextrous leadership operates within organizations.

Practical implications. Throughout the dissertation, we have proposed and tested the process model of ambidextrous leadership, with an ultimate goal of showing the benefits of ambidexterity as a useful leadership concept that can be applied in managing organizations. There are many leadership theories and models that exist today, but we believe that ambidextrous leadership can make a unique contribution by offering a framework that can be easily understood and applied, given its versatility. Again, we are not to argue ambidexterity as a universal theory, but ambidextrous leadership has potential to be a leadership theory that can well resonate with leaders of all levels, unlike some other leadership theories that tend to be more relevant to the top management or senior leadership team. This is an important distinction because today's dynamic and unpredictable business environment, coupled with changing work structures, calls for individuals at all levels of the hierarchy to become ambidextrous. As discussed previously, this is aligned with the contextual approach rather than a structural approach (which argues that only certain units should focus on exploration while the other units focus on exploitation). We believe that it can never always be about one thing within an organizational unit, since leaders face all types of challenges. Accordingly, in order to make the concept of ambidexterity useful for organizations, a multilevel intervention strategy will be necessary, rather than simply changing an organizational structure.

Then, what kind of a multilevel intervention strategy can we use? Largely, there will need to be three types of change strategies: cultural change, structural change, and skillset development. Although we do not want to prescribe this to be an intervention strategy that works for all organizations, we believe that this can be a useful starting point to think about how the concept of ambidexterity can be applied in managing organizations.

First, culture is an important deep structure of an organization that directs how individuals within the organization should behave. According to Schein (2010), leaders create organizational culture, and culture takes on a life of its own after being created. Thus, in order to build an ambidextrous organization, it will be important to build a culture that values both exploration and exploitation, in line with the overall organizational vision (Tushman, Smith, & Binns, 2011). Second, although we embrace the contextual approach rather than the structural approach to ambidexterity, it is not to say that we should not make any structural changes—in fact, making structural and systems change is always an important step in driving an effective organizational change due to the existing "structural inertia" (Hannan & Freeman, 1984). What we want to differentiate, however, is how to make such a structural change. Rather than specific business units focusing on exploration versus exploitation, we should build an ambidextrous architecture that encourages exercising ambidexterity at all levels, by having integrated rewards, knowledge sharing, and decision-making systems. Finally, once cultural and structural levers are in place, we recommend building a set of critical skills in leaders to help them learn to be able to exploit and explore at the same time, know when to switch and flex quickly between the two activities, and know how to make the switch. Cognitive interventions building leaders' behavioral agility, increasing leaders' ability in paradoxical thinking, and developing relational skills for being a boundary-spanning leader can all be useful starting points to build skillsets to be an effective ambidextrous leader.

In designing, implementing, and measuring the impact of these intervention strategies, one can also use the implications of individual traits to improve the effectiveness of an intervention. The current study showed that a person with a promotion focus would be more inclined to show explorative behaviors while a person with a prevention focus would be more

inclined to show exploitative behaviors. Further, certain personality traits like Openness to Experience and Neuroticism were found to be linked to explorative behaviors. These indicate that when designing the intervention, one can assess leaders' individual characteristics first and give them feedback to raise their awareness about their general tendencies. Understanding leaders' traits would not only allow leaders to be more aware of their behavioral tendencies, but also help design a more effective intervention strategy by focusing on developing behaviors that leaders are not naturally inclined to. Organizations could provide developmental opportunities where leaders can understand how their behavioral tendencies may influence their decision-making processes and what that means across various organizational challenges. Therefore, through these developmental experiences that incorporate both leaders' individual traits and cognitive/behavioral skillsets mentioned above, we hope that leaders would gain a better understanding of how no leadership role would ever require solely one type of behavior, and how they could still benefit by being able to show both behaviors over time.

Limitations and Future Research

The current research is not without its limitations. First and foremost, there is a lack of generalizability of the sample and study settings. In the pilot and Study 1, participants were recruited through an online convenience sampling method (Amazon Mechanical Turk; MTurk). This means that participants were volunteers who willingly took part in the study for monetary compensation and that the setting of the study was not a true organizational setting. It is possible that we did not find the effect of switching as pronounced as we wanted because of this acontextual environment where it is difficult to feel and truly understand the organizational goals and challenges that require both explorative and exploitative behaviors. Furthermore, we used the CEOs' letters to shareholders as the proxies of leader cognitions and behaviors. Yet, the

words in those letters can be argued to be the intentions at their best, not the actual behaviors. Although several researchers have argued for the validity of the MTurk sample (e.g., Buhrmester, Kwang, & Gosling, 2011) and use of CEO letters (e.g., Eggers & Kaplan, 2009) in organizational research, future research that leverages the data from real organizations and leaders will be necessary to not only test and refine the proposed model, but also better understand how ambidextrous leadership may operate in actual work settings.

Second, the data across all three studies have been collected one point at a time. In examining the impact of regulatory focus on exploration and exploitation as a potential antecedent, the self-reported survey responses were collected at the same time. The vignette study was conducted concurrently, by asking participants to report their reactions to the four leaders in the vignettes. Further, although the data for the independent variables in Study 2 were collected in 2016 and the dependent variables were collected in 2017, they were still limited to one point in time. Therefore, this cross-sectional design does not allow for examining whether there are true behavioral changes due to certain individual antecedents or situational demands. Thus, the use of a longitudinal design is imperative to truly examine not only the impact of leader traits on ambidextrous leadership behaviors, but also the impact of true switching and an overall balance over time, to more accurately test the proposed process model.

In addition to collecting the data across multiple points in time, an experience-sampling method (ESM) can be one alternative approach by capturing the information about one's momentary situation as well as his/her mental processes and behaviors (Csikszentmihalyi & Larson, 2014). With this method, collecting the data over an extended period of time would allow us to examine what the situational demands might have been, how leaders may have reacted accordingly, and how those behaviors were perceived by followers. This can further lead

to the calculation of the overall scores to understand whether a leader has achieved an overall balance between exploration and exploitation.

Further, the effect of the overall balance between exploration and exploitation was essentially tested at the organizational level only in Study 2. The leadership process model proposed in Tuncdogan et al. (2017) emphasized the importance of looking at a multitude of leadership outcomes. Yet, the outcome variable when testing the effect of switching was based on self-report measure and stopped at follower effects, while the outcome variable when testing the effect of an overall balance was based on organizational outcomes, without looking at follower effects. Although we attempted to examine the follower effects of an overall balance by using the Highest Rated CEOs List by Glassdoor, we had to remove this variable due to a low occurrence rate. Thus, to really understand the multilevel outcomes of ambidextrous leadership, a range of outcome variables at both the individual and organizational levels would have to be collected, in addition to obtaining the actual CEO approval ratings for each company from Glassdoor.

Finally, three studies from the current research tapped into the different parts of the proposed process model, without testing the model in its entirety at once. Thus, utilizing the different samples and methods for the different parts of the model would pose limitations in claiming the validity of the entire model, which was a focal point of the current research. Therefore, future research that collects the data on the all aspects of the model in real organizational settings is warranted to investigate the reliability and validity of this process model.

Conclusion

In this dissertation, the concept of ambidexterity was explored at the leadership level by proposing and testing a model of ambidextrous leadership. This model was then embedded in a

leadership process model to investigate: 1) if regulatory focus would influence tendency towards exploration and exploitation, 2) if switching between exploration and exploitation based on situational demands would influence followers' evaluation of leadership effectiveness, and 3) if achieving high levels of exploration and exploitation would lead to better outcomes compared to being high on only one or neither of them. Further, the reliability and validity of the newly developed behavioral indicators were examined. While the results supported the reliability and validity of exploration and exploitation as well as the effects of regulatory focus on the two, the findings around switching and an overall balance were mixed. However, this is one of the first few empirical studies that attempted to make the conceptualization of ambidextrous leadership more explicit within an overall leadership process model. Thus, this dissertation provides insights into how ambidexterity can be studied and researched to continue to refine and extend our knowledge of ambidextrous leadership.

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Appendix A – Experimental Vignette Study Design

	Exploration Goal		**Exploitation Goal**	
	Explorative behaviors	Exploitative behaviors	Explorative behaviors	Exploitative behaviors
Explorative Tendency	A	B	E	F
Exploitative Tendency	C	D	G	H

- Organizational Goal as a between-subject factor.
- Counterbalancing within each between-subject factor (i.e., Organizational Goal).
- In the pilot study, there will be n = 40 for each counterbalancing condition, i.e., N = 160 (only exploration goal tested).
- In Study 1, there will be n = 50 for each counterbalancing condition. Therefore, there will be n = 200 in each goal condition and N = 400 in total.

Appendix B – Sample Vignettes

Vignette General Introduction

You are working as a first-level manager at a consulting company, the Loen Consulting Group ('Loen'). It is a global company with presence in over 50 countries, providing consulting services to a wide range of industries, from hospitality to healthcare. The company mainly targets small- to medium-sized companies that want to improve their service quality and client relationships, while reducing unnecessary costs in their operations.

Loen has been struggling over the past year since several big consulting firms have begun targeting the smaller-sized businesses to increase their profits, amid a recent economic turmoil. Accordingly, Loen has created **a taskforce that aims to seek out new opportunities and to generate ideas for ways the company can experiment and change, through which it can benefit in the long term.** The taskforce can assign projects to various work teams in the company based on these new ideas.

You have been asked to support the work of this taskforce. Part of your job is to work with several senior-level leaders to make sure they execute the taskforce's recommendations. As such, you often attend meetings of the taskforce and work very closely with four leaders.

In the following, you will be provided with a description of those four leaders. Please read carefully and evaluate them after each description.

For an exploitative goal, the second sentence of the second paragraph will be replaced with the following:

Accordingly, Loen has created **a taskforce that aims to refine and improve the current business products and services while making the organizational processes more efficient, through which the company can maximize current short-term returns.**

Four Leader Vignettes

Leader A – Dylan (Explorative + Explorative):

Dylan has been a leader who

- always aspires to come up with innovative ideas and champions several new services the firm offers;
- inspires the team to think of new goals and ideas, and remain optimistic to achieve them; and
- tries to keep the energy up by providing a variety of experiences in the team.

After Loen's new initiatives through the taskforce were announced, **Dylan** recently made the following statements in meetings and emails:

- "This is a difficult time—but also an opportunity for us. We must think about how to re-build our brand in the long term, by seeking out new ways to deliver our products and services and by experimenting with them."
- "It is very important for us to feel comfortable making new suggestions anytime—and to actually try them out."
- "If there are ways of doings things around here that you think need to be re-evaluated, I want to hear about them."

Leader B – Alex (Explorative + Exploitative):

Alex has been the kind of a leader who

- likes to experiment with new ideas;
- tends to constantly look for ways to improve how the work is done, in order to accomplish the organization's goals; and
- has generally been tolerant of people taking risks or making mistakes, as long as individuals learn and grow from them.

After Loen's new initiatives through the taskforce were announced, **Alex** recently made the following statements in meetings and emails:

- "We are going through difficult times, so we now have to execute on every opportunity. We cannot afford to make mistakes, so we should hold each other accountable to perform our very best."
- "We have to maximize the return from our current customer base so that we at least meet our short-term profit goals."
- "This is a good time to think about ways to refine and optimize the way we do things around here. If you think of how to make the current processes more efficient, I would like to hear about them."

Leader C – Jamie (Exploitative + Explorative):

Jamie has been a leader who

- always tries to transfer the existing knowledge to team members, so that they can feel safe and competent in delivering their work;
- has always made sure that the job gets done with a high level of accuracy based on organizational norms and rules; and
- finds ways to make the business processes and structures more efficient to maximize current profits.

After Loen's new initiatives through the taskforce were announced, **Jamie** recently made the following statements in meetings and emails:

- "Given the difficulties we are facing, we have to go beyond cost cutting. This is a time for us to try new things out, and we need to be more willing to take risks to come up with different products and services to deliver."
- "We have to seek out different ways to expand our knowledge base. We may have to listen to new voices in order to discover opportunities we are not able to see."
- "It is important to re-consider our current norms and structures. I would like to investigate some alternatives to the way we do business today."

Leader D – Lee (Exploitative + Exploitative):

Lee has been a reliable leader who

- has tended to establish efficient business routines that can provide quality results;
- has generally been intentional about refining the team's products/services, processes, and work structures; and
- tries to ensure that there is a certain level of reliability in what the clients experience.

After Loen's new initiatives through the taskforce were announced, **Lee** recently made the following statements in meetings and emails:

- "Considering the current economic difficulties, providing more reliable service experiences to our clients is more important than ever."
- "First, we need to focus on how to maximize our short-term returns."
- "We have to further leverage our success stories and knowledge that exist within the organization. We should think about how we can take advantage of what we already know to improve the delivery of our products and services to clients."

TABLES

Table 1. Summary of Each Proposed Study

Study	Purpose	Proposed Setting
Pilot Study	● To establish reliability and validity of the ambidextrous leadership measure ● To pilot the stimulus materials being used in Study 1	● MTurk, N = 160 ● Correlational & experimental vignette ● Administer the manipulation materials on switching under the exploration goal scenario only ● Administer the ambidextrous leadership measure, along with the transformational leadership and ethical leadership measures, to examine convergent and discriminant validity of the new measure
Study 1	● To establish the linkages between regulatory focus and ambidextrous leadership behaviors ● To examine the impact of **switching** on followers' leadership perceptions	● MTurk, N = 400 ● Correlational & experimental vignette ● For the experimental vignette study, revise the stimulus materials based on the pilot study. A full three-way (2 x 2 x 2) mixed-design will be used—leader tendency (exploration vs. exploitation; within) x leader current behaviors (exploration vs. exploitation; within) x situational demands (exploration vs. exploitation goals; between) ● Administer the work-regulatory focus questionnaire and revised ambidextrous leadership measure
Study 2	● To examine the impact of an **overall balance** on followers' leadership perceptions and other important outcomes	● CEO letters to shareholders from S&P 500 companies ● Examine the frequencies of the words associated with exploration vs. exploitation behaviors ● Median split into a 2-by-2 model of ambidextrous leadership, and use polynomial regression and response surface methodology. ● Examine the impact on outcomes: Highest rated CEO's on Glassdoor, innovation index by Strategy&, and financial performance

Table 2. Summary of Demographic Characteristics of Participants in the Pilot and Study 1

	Pilot Study		Study 1	
	N	%	N	%
Work Experience				
1~2 years	7	5.11	19	4.91
3~4 years	34	24.82	55	14.21
5~6 years	37	27.01	74	19.12
7~8 years	9	6.57	29	7.49
More than 8 years	50	36.50	210	54.26
Leadership Experience				
None	15	10.95	61	15.76
1~2 years	49	35.77	109	28.17
3~4 years	43	31.39	93	24.03
5~6 years	19	13.87	56	14.47
7~8 years	2	1.46	20	5.17
More than 8 years	9	6.57	48	12.40
Age				
Under 25 years	8	5.88	28	7.24
25 ~ 29	36	26.47	89	23.00
30 ~ 34	57	41.91	115	29.72
35 ~ 39	18	13.24	53	13.70
40 ~ 44	4	2.94	37	9.56
45 ~ 49	4	2.94	24	6.20
50 ~ 54	7	5.15	22	5.68
55 ~ 59	1	0.74	9	2.33
60 ~ 64	1	0.74	5	1.29
65 or older	0	0.00	5	1.29
Gender				
Male	94	68.61	229	59.17
Female	43	31.39	158	40.83
Other	0	0.00	0	0.00
Prefer not to answer	0	0.00	0	0.00
Education				
Less than high school	0	0.00	2	0.52
High school graduate, diploma, or the equivalent (GED)	3	2.19	28	7.25
Some college	19	13.87	69	17.88
Associate degree	12	8.76	46	11.92
Bachelor's degree	64	46.72	165	42.75
Master's degree	38	27.74	73	18.91
Doctorate degree	1	0.73	3	0.78

Note. N = 137 for the pilot; N = 387 for Study 1

Table 3. Descriptive Statistics and Correlations Among Main Study Variables in the Pilot

Variable	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Controls																		
1. Work Experience	3.45	1.34																
2. Leadership Experience	2.79	1.25	.37***															
3. Work Environment	3.79	.75	-.29**	.20*														
4. Age	3.18	1.51	.55***	.45***	-.14													
5. Gender	.31	.47	.30***	.14	-.02	.17*												
6. Education	4.86	1.07	-.21*	.17	.29***	-.01	-.19*											
Vignettes (Tendency – Current)																		
7. Exploration-Exploration	4.24	.66	-.03	.00	-.01	-.14	.18*	-.14										
8. Exploration-Exploitation	3.82	.79	-.28***	.01	.26**	-.09	-.15	.12	.22**									
9. Exploitation-Exploration	4.09	.61	-.13	.03	.03	-.17	-.09	.00	.46***	.27**								
10. Exploitation-Exploitation	3.94	.76	-.21*	.12	.24**	-.09	-.03	.13	.26**	.50***	.29***							
Survey Questionnaires																		
11. Amb. Leadership - Exploration	4.10	.62	.01	.00	.08	-.06	-.03	.01	.47***	.28**	.47***	.18*						
12. Amb. Leadership - Exploitation	3.80	.64	-.25**	.06	.34***	-.15	-.17	.11	.22*	.42***	.39***	.42***	.31***					
13. Ethical Leadership	4.18	.61	.06	-.05	.07	-.09	.00	-.16	.45***	.19*	.39***	.22*	.68***	.43***				
14. Transformational Leadership	3.89	.56	.13	.08	-.05	.05	.13	-.16	.43***	.15	.31***	.12	.56***	.17*	.64***			
15. Transactional Leadership	3.56	.65	-.18*	-.03	.14	-.16	-.07	.02	.27**	.31***	.33***	.33***	.36***	.45***	.34***	.61***		
16. Passive-Avoidant Leadership	2.66	1.16	-.55***	-.04	.34***	-.19*	-.32***	.49***	-.13	.33***	.11	.27**	-.02	.35***	-.15	-.08	.40***	
17. Leadership Outcomes	3.97	.59	.27**	.03	-.10	.15	.09	-.18*	.33***	.12	.28***	.07	.56***	.13	.53***	.81***	.45***	-.23**

Note. N = 137. * $p < .05$, ** $p < .01$, *** $p < .001$

Table 4. Reliability Statistics from the Pilot

Scales	No. of items	Mean	SD	Cronbach's Alpha
Leadership Effectiveness				
Vignette 1 (Exploration-Exploration)	3	4.24	.66	.81
Vignette 2 (Exploration-Exploitation)	3	3.82	.79	.84
Vignette 3 (Exploitation-Exploration)	3	4.09	.61	.74
Vignette 4 (Exploitation-Exploitation)	3	3.94	.76	.82
Ambidextrous Leadership				
Amb. Leadership - Exploration	10	4.10	.62	.88
Amb. Leadership - Exploitation	10	3.80	.64	.85
Ethical Leadership	8	4.18	.61	.85
Transformational Leadership				
Individual Consideration	4	3.98	.67	.76
Idealized Attributes	4	3.79	.60	.53
Idealized Behaviors	4	3.78	.64	.66
Inspirational Motivation	4	3.99	.68	.76
Intellectual Stimulation	4	3.92	.69	.79
Transactional Leadership				
Contingent Reward	4	3.84	.65	.70
Management by Exception (Active)	4	3.29	.91	.81
Passive-Avoidant Leadership				
Laissez-Faire	4	2.57	1.26	.91
Management by Exception (Passive)	4	2.74	1.13	.88
Leadership Outcomes				
Extra Effort	3	3.84	.59	.35
Effectiveness	4	4.05	.66	.79
Satisfaction	2	4.03	.81	.62

Note. N = 137.

Table 5. Exploratory Factor Analysis Results from the Pilot

Item	**Factor 1**	**Factor 2**
Creating reliability in experience	.79	
Ensuring team members they stick to original plans	.76	
Focusing on short-term goals	.75	-.12
Refining the existing knowledge base	.73	
Optimizing and stabilizing current work norms and structures	.69	
Discouraging errors	.67	
Elaborating on existing beliefs and decisions	.67	
Adhering to rules	.61	
Using tried-and-true methods to get things done	.56	.24
Establishing and maintaining routines	.38	
Seeking out ways to obtain new knowledge	-.11	.81
Thinking about long-term goals		.75
Allowing team members for errors		.69
Creating variety in experience		.61
Reconsidering existing beliefs and decisions	.27	.58
Exploring different ways of doing things		.56
Motivating team members to take risks	.11	.53
Searching for new work norms and structures		.52
Experimenting with different ideas	.28	.42
Providing a safe space for trying things out	.36	.38
Initial eigenvalues	4.79	3.67
Variance explained	23.9%	18.4%

Note. N = 137. Loadings below .1 are suppressed.
Extraction Method: Principal Axis Factoring. Rotation Method: Oblimin.

Table 6. Mixed-Effects Model Analysis Results in the Pilot

	Model 1 (Random Intercept Only)		**Model 2 (Random Intercept with Controls Only)**		**Model 3a (Full Random Model without Interaction)**		**Model 3b (Full Random Model with Interaction)**	
	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.
Fixed Effects								
Intercept	4.025***	.042	3.986***	.316	3.899***	.315	4.100***	.315
Work Experience			-.079*	.039	-.073†	.039	-.084*	.039
Leadership Experience			.049	.038	.050	.038	.011	.036
Work Environment			.063	.059	.045	.058	.031	.057
Age			-.038	.033	-.044	.033	-.022	.032
Gender (Female)			.010	.091	.022	.090	.031	.092
Education			-.021	.041	-.021	.041	-.014	.042
Counterbalance 2			.220†	.112	.209†	.110	.155	.101
Counterbalance 3			.160	.108	.178†	.106	.091	.095
Counterbalance 4			.256*	.107	.269*	.104	.243**	.079
Tendency (Exploration)					.014	.043	-.116†	.064
Current Behavior (Exploration)					.263***	.055	.134*	.067
Current*Tendency							.261**	.087
	Variance	S.D.	Variance	S.D.	Variance	S.D.	Variance	S.D.
Random Effects								
Intercept	.153	.391	.120	.347	.200	.447	.409	.640
Tendency					.004	.065	.451	.672
Current Behavior					.166	.408	.515	.718
Current*Tendency							.835	.914
Residual	.321	.567	.322	.567	.243	.494	.043	.208
Deviance	1068.7		1049.5		1005.5		986.4	
AIC	1074.7		1073.5		1043.5		1034.4	
BIC	1087.6		1125.1		1125.1		1137.6	
Chi-square Test			$\chi^2(9) = 19.21$*		$\chi^2(7) = 44.05$***		$\chi^2(5) = 19.07$**	

Note. Estimation Method = ML. Analysis conducted using the *lmer* and *lmerTest* packages in R.
Number of observations: 544, groups: subject, 132 (cases with missing data removed)
† $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

Table 7. Descriptive Statistics and Correlations Among Main Study Variables from Study 1

Variable	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Controls																				
1. Work Experience	3.92	1.32																		
2. Leadership Experience	3.02	1.54	.42***																	
3. Work Environment	3.75	.86	-.05	.20***																
4. Age	3.65	1.94	.54***	.47***	.00															
5. Gender	.41	.49	.16**	-.10*	.03	.13**														
6. Education	4.49	1.24	-.15**	.08	.10	-.08	-.11*													
Vignettes (Tendency – Current)																				
7. Exploration-Exploration	4.31	.66	.13**	.10*	.07	.08	.12*	-.08												
8. Exploration-Exploitation	3.97	.75	-.05	-.01	.13*	.01	.03	.00	.25***											
9. Exploitation-Exploration	4.17	.72	.05	.07	.01	.01	.00	.00	.40***	.36***										
10. Exploitation-Exploitation	3.90	.75	-.04	-.03	.10	-.08	.12*	.04	.20***	.29***	.32***									
Survey Questionnaires																				
11. Amb. Leadership - Exploration	4.02	.58	-.07	.11*	.15**	-.05	-.01	.01	.31***	.24***	.38***	.16**								
12. Amb. Leadership - Exploitation	3.92	.56	.01	.01	.18***	-.03	.18***	.04	.16**	.22***	.25***	.39***	.17***							
13. Promotion Focus	4.03	.82	-.12*	.00	.12*	-.24***	-.03	.07	.19***	.11*	.20***	.17**	.41***	.29***						
14. Prevention Focus	4.25	.67	.03	-.07	.06	-.05	.21***	-.05	.28***	.31***	.24***	.25***	.34***	.44***	.43***					
15. Extraversion	2.76	.92	-.11*	.14**	.23***	-.10*	-.11*	.13*	.03	-.05	.09	.04	.23***	-.04	.18***	-.01				
16. Agreeableness	3.72	.86	.16**	-.10*	.01	-.01	.20***	-.15**	.21***	-.02	.12*	.05	.24***	.06	.21***	.27***	.14**			
17. Conscientiousness	3.75	.88	.37***	.17***	-.04	.20***	.15**	-.20***	.14**	-.02	.12*	-.01	.16**	.15**	.16**	.27***	-.03	.29***		
18. Openness to Experience	3.65	.95	.30***	.06	-.14**	.04	.06	-.16**	.12*	-.10	.05	-.09	.23***	-.09	.16**	.11*	.03	.44***	.35***	
19. Neuroticism	2.58	.93	-.13*	-.07	.11*	-.03	.10*	.15**	-.03	-.04	-.10	.01	-.18***	.00	-.19***	-.05	-.15**	-.24***	-.41***	-.23***

Note. N = 387. * $p < .05$, ** $p < .01$, *** $p < .001$

Table 8. Examining the Impact of Regulatory Focus on Exploration and Exploitation in Study 1

	Exploration		**Exploitation**	
	Coefficient	S.E.	Coefficient	S.E.
Intercept	2.38***	.23	1.80***	.24
Work Experience	-.05*	.03	.00	.02
Leadership Experience	.05*	.02	.00	.02
Work Environment	.04	.03	.09	.03
Age	.01	.02	.00	.02
Gender (Female)	-.03	.06	.12	.05
Education	-.02	.02	.02	.02
Promotion Focus	.21***	.04	.08*	.04
Prevention Focus	.19***	.05	.30***	.04
R^2	.23		.24	
F-Test	$F(8, 371) = 13.54$, $p < .001$		$F(8, 371) = 14.71$, $p < .001$	
Standard OLS				
MAE	.498		.460	
MSE	.399		.338	
RMSE	.632		.581	
Robust Regressions (MM)				
MAE	.509		.459	
MSE	.431		.345	
RMSE	.656		.588	

Note. N = 380. Unstandardized OLS estimates are reported.
MAE = Mean Absolute Error; MSE = Mean Squared Error; RMSE = Root Mean Squared Error.
* $p < .05$, ** $p < .01$, *** $p < .001$.

Table 9. Reliability Statistics from Study 1

Scales	No. of items	Mean	SD	Cronbach's Alpha
Leadership Effectiveness				
Vignette 1 (Exploration-Exploration)	3	4.31	.66	.83
Vignette 2 (Exploration-Exploitation)	3	3.97	.75	.84
Vignette 3 (Exploitation-Exploration)	3	4.17	.72	.84
Vignette 4 (Exploitation-Exploitation)	3	3.90	.75	.84
Ambidextrous Leadership				
Amb. Leadership – Exploration	9	4.02	.58	.82
Amb. Leadership – Exploitation	9	3.92	.56	.78
Regulatory Focus				
Promotion Focus – Achievement	3	4.03	.82	.75
Promotion Focus – Gain	3	3.61	.96	.82
Promotion Focus – Ideals	3	3.95	.81	.78
Prevention Focus – Security	3	4.25	.67	.75
Prevention Focus – Loss	3	3.94	.84	.74
Prevention Focus – Oughts	3	4.43	.57	.68
IPIP				
Extraversion	4	2.76	.92	.71
Agreeableness	4	3.72	.86	.75
Conscientiousness	4	3.75	.88	.69
Openness to Experience	4	3.65	.95	.77
Neuroticism	4	2.58	.93	.67

Note. N = 387.

Table 10. Mixed-Effects Model Analysis Results in Study 1

	Model 1 (Random Intercept Only)		**Model 2 (Random Intercept with Controls Only)**		**Model 3a (Full Random Model without Interaction Terms)**		**Model 3b (Full Random Model with Interaction Terms)**	
	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.
Fixed Effects								
Intercept	4.091***	.025	3.858***	.171	3.690***	.173	3.670***	.177
Work Experience			.005	.023	.006	.023	.010	.023
Leadership Experience			.013	.020	.013	.019	.013	.019
Work Environment			.063*	.030	.067*	.029	.068*	.029
Age			-.007	.016	-.005	.016	-.008	.016
Gender (Female)			.100†	.052	.093†	.051	.108*	.051
Education			-.013	.020	-.018	.020	-.019	.020
Counterbalance 2			.038	.070	.048	.070	.014	.069
Counterbalance 3			.001	.071	-.020	.071	-.037	.070
Counterbalance 4			-.099	.068	-.123†	.068	-.116†	.067
Goal (Exploration)					-.048	.049	.025	.075
Tendency (Exploration)					.101***	.030	.097	.063
Current Behavior (Exploration)					.297***	.032	.268***	.063
Goal*Tendency							-.048	.087
Goal*Current							.002	.085
Tendency* Current							-.025	.083
Goal*Tendency*Current							.159	.115
	Variance	S.D.	Variance	S.D.	Variance	S.D.	Variance	S.D.
Random Effects								
Intercept	.142	.377	.133	.364	.223	.472	.265	.515
Tendency					.022	.148	.195	.442
Current Behavior					.059	.243	.158	.398
Current*Tendency							.202	.449
Residual	.370	.608	.370	.608	.310	.557	.265	.515
Deviance	3256.1		3140.6		3023.2		3007.6	
AIC	3162.1		3164.6		3063.1		3063.6	
BIC	3178.1		3228.6		3169.7		3212.7	
Chi-square Test			$\chi^2(9) = 15.45$†		$\chi^2(8) = 117.50$***		$\chi^2(8) = 15.54$*	

Note. Estimation Method = ML. Analysis conducted using the *lmer* and *lmerTest* packages in R.
Number of observations: 1520, groups: subject, 380 (cases with missing data removed)
† $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

Table 11. Final Revised Behavioral Indicators of Explorative and Exploitative Behaviors

Explorative Behaviors
• Exploring different ways of doing things • Experimenting with a variety of ideas to achieve goals • Motivating team members to take risks • Searching for new work norms and structures • Thinking about long-term goals • Creating variety in experiences • Seeking ways to obtain new knowledge • Reconsidering existing beliefs and decisions
Exploitative Behaviors
• Using tried-and-true methods to get things done • Adhering to rules • Discouraging errors • Refining current work norms and structures to make them more efficient • Ensuring that team members stick to original plans • Focusing on short-term goals • Creating reliability and consistency in experiences • Reinforcing existing beliefs and decisions

Table 12. Ambidextrous Leadership Dictionary Used in Study 2

Exploration		Exploitation	
accept failure	revisit strategy	avoid error / risk	operational efficiency
benefit long-term	risk-taking	benefit short-term / near-term	operational excellence
bold risk	take risk	consistency	operational improvement
bold strategy	transform business	continue leverage	optimize business
challenge status quo	transform company	cost efficiency	optimize exist(ing)
experiment idea	transform organization	cost reduction	optimize operation
explore idea	transform portfolio	disciplined execution	optimize process
explore new	transform process	efficient business	optimize strategy
innovation / innovate / innovative	transform product	efficient execution	organic growth
inorganic growth	transform workplace	efficient growth	precise execution
invention / invent	transformation process	efficient operation	prevent error
long-term focus	transformative change	efficient process	process efficiently
long-term goal	variety (of) experience	efficient structure	productivity improvement
long-term growth	variety (of) way	enhance capability	prove(n) method
long-term opportunity		enhance efficiency	prove(n) playbook
long-term profit		enhance exist(ing)	prove(n) strategy
long-term profitability		enhance portfolio	reconfigure exist(ing)
long-term return		enhance product	reduce cost
long-term solution		execute efficiently	reduce error / risk
long-term strategy		expand exist(ing)	refine business
long-term value		exploit	refine product
new approach		good (best) practice	reinforce capability
new business		improve accuracy	reinforce strategy
new capability		improve efficiency	reliability / reliable
new knowledge		improve exist(ing)	remain consistent
new market		improve process	rule-based
new norm		improve productivity	short-term / near-term focus
new opportunity		increase accuracy	short-term / near-term goal
new product / service		increase capability	short-term / near-term growth
new structure		increase efficiency	short-term / near-term opportunity
new way		leverage advantage	short-term / near-term profit
restructure company		leverage capability	short-term / near-term return
restructure organization		leverage exist(ing)	short-term / near-term strategy
restructure process		maintain status quo	strengthen capability
revisit decision		mitigate error / risk	take advantage
revisit norm		operate efficiently	try true (tried-and-true)
			update exist(ing)

Table 13. Descriptive Statistics and Correlations Among Study Variables in Study 2

Variable	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12
Controls														
1. Age	56.70	5.53												
2. Gender	.05	.21	-.02											
3. Tenure	6.41	6.79	.48***	-.10										
4. Size (no. of employees)	57.31	142.12	.00	.02	.01									
Ambidexterity														
5. Exploration	.62	.52	-.03	.00	-.06	.01								
6. Exploitation	.31	.32	-.09	.07	-.14*	-.04	-.09							
Regulatory Focus														
7. Promotion	2.33	.91	-.05	.04	-.10	.02	-.03	.11*						
8. Prevention	.39	.42	.00	-.02	-.07	-.10	-.12*	.15**	-.05					
Outcomes														
9. GPM	43.18	20.88	.00	-.06	.00	-.12*	.17**	-.13*	-.04	-.04				
10. ROA	6.02	5.52	.06	-.01	-.02	.08	.10	-.09	.10*	-.16**	.05			
11. ROE	18.29	18.32	-.01	.00	-.06	.11*	.10	-.08	.04	-.07	.00	.58***		
12. Innovation List	.28	.45	-.17***	.03	-.07	-.01	.32***	-.01	.05	-.07	.26***	.03	.01	
13. Top CEO List	.08	.26	.03	.03	.04	.04	.05	-.08	-.05	-.06	.02	.03	.09	.07

Note. N = 373. * $p < .05$, ** $p < .01$, *** $p < .001$

Number of employees is in thousands. All control variables, ambidexterity, and regulatory focus variables are from 2016 and outcome variables are from 2017. Innovation List and Top CEO List indicate whether the company was listed as one of the top innovative companies and highest rated CEOs by Strategy& and Glassdoor, respectively.

Table 14. Logistic Regression Results for Innovation in Study 2

	Coefficient	S.E.	Wald's Test	Exp(B)
Intercept	2.99	1.86		19.98
Gender (Female)	1.04	.75	1.92	2.84
Age	-.09**	.03	7.08**	0.92
Tenure	.02	.03	.39	1.02
Sector			30.24***	
Consumer Staples	1.20†	.61		3.32
Energy	.38	.75		1.47
Healthcare	2.16***	.52		8.65
Industrials	1.19*	.49		3.30
Information Technology	2.42***	.57		11.23
Materials	.46	.67		1.58
Telecommunication Services	1.23	1.31		3.43
Size (log of number of employees)	.03	.14	.03	1.03
Exploration	.48**	.15	9.29**	1.61
Exploitation	.20	.16	1.42	1.23
Exploration*Exploitation	.12	.18	.39	1.12
Overall Model Evaluation				
Hosmer & Lemeshow test		$\chi^2(8) = 9.23$, $p = .32$		
Area under the ROC curve		.79		
Somers' D_{xy} rank correlation		.59		

Note. N = 257 (cases with missing data & three sectors removed). Unstandardized estimates are reported. Three sectors (Financials, Real Estate, and Utilities) had to be removed because none of these companies made it to the Innovation list. Consumer Discretionary is a reference group for all other sectors.
† $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 15. Polynomial Regression Results in Study 2

	ROA				ROE			
	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.
Intercept	3.00***	.58	2.86***	.59	4.71***	1.11	4.61***	1.13
Gender (Female)	-.13	.22	-.11	.22	-.14	.42	-.14	.43
Age	.01	.01	.01	.01	.00	.02	.01	.02
Tenure	-.01	.01	-.01	.01	-.01	.02	-.01	.02
Sector								
Consumer Staples	.01	.22	-.04	.23	.38	.44	.28	.45
Energy	-.91***	.27	-.86**	.27	-1.47**	.53	-1.42**	.53
Financials	-1.56***	.18	-1.54***	.18	-1.43***	.35	-1.43***	.35
Healthcare	-.73***	.19	-.74***	.19	-1.11**	.36	-1.15**	.36
Industrials	-.19	.17	-.18	.17	-.27	.33	-.27	.33
Information Technology	-.35†	.20	-.35†	.20	-.47	.38	-.49	.39
Materials	-.45†	.23	-.46*	.23	-.41	.45	-.42	.45
Real Estate	-1.33***	.26	-1.31***	.26	-1.80***	.49	-1.73***	.50
Telecommunication Services	-.39	.51	-.32	.51	.16	.97	.21	.97
Utilities	-1.57***	.27	-1.52***	.28	-1.60**	.51	-1.55**	.52
Size (log of number of employees)	-.10*	.05	-.10*	.05	.03	.09	.04	.09
Exploration	-.06	.05	-.01	.07	-.08	.10	.06	.13
Exploitation	-.03	.05	-.15†	.08	-.09	.11	-.22	.15
Exploration^2			-.03	.03			-.08	.06
Exploration*Exploitation			.03	.07			.02	.13
Exploitation^2			.07*	.03			.08	.07
R^2	.30		.31		.17		.18	
F-test	$F(16, 316) = 8.45$, $p < .001$		$F(19, 313) = 7.45$, $p < .001$		$F(16, 305) = 4.01$, $p < .001$		$F(19, 302) = 3.55$, $p < .001$	
ΔF-test			$F(3, 313) = 1.80$, $p = .15$				$F(3, 302) = 1.07$, $p = .36$	
Surface Tests								
a_1 ($b_1 + b_2$)			-.16	.10			-.17	.19
a_2 ($b_3 + b_4 + b_5$)			.07	.10			.02	.19
a_3 ($b_1 - b_2$)			.14	.11			.28	.20
a_4 ($b_3 - b_4 + b_5$)			.01	.08			-.02	.16

Note. N = 358 (cases with missing data removed). Unstandardized estimates are reported. Consumer Discretionary is a reference group for all other sectors.
† $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 15. Polynomial Regression Results in Study 2 (Continued)

	GPM			
	Coefficient	S.E.	Coefficient	S.E.
Intercept	6.55***	1.01	6.77***	1.03
Gender (Female)	-.37	0.39	-.43	.39
Age	.02	0.02	.01	.02
Tenure	-.01	0.01	.00	.01
Sector				
Consumer Staples	.23	0.40	.15	.40
Energy	-.36	0.43	-.34	.43
Financials	.24	0.31	.20	.31
Healthcare	.51	0.32	.43	.33
Industrials	-.24	0.30	-.29	.30
Information Technology	1.14**	0.34	1.07**	.35
Materials	-.54	0.40	-.49	.40
Real Estate	-.54	0.45	-.49	.45
Telecommunication Services	1.68†	0.92	1.55†	.92
Utilities	-.44	0.45	-.53	.47
Size (log of number of employees)	-.34***	0.08	-.33***	.08
Exploration	.20*	0.09	.26*	.12
Exploitation	-.04	0.09	-.03	.13
Exploration^2			-.06	.06
Exploration*Exploitation			-.14	.12
Exploitation^2			-.03	.06
R^2	.16		.17	
F-test	$F(16, 340) = 4.14$, $p < .001$		$F(19, 337) = 3.61$, $p < .001$	
ΔF-test			$F(3, 337) = .80$, $p = .49$	
Surface Tests				
a_1 ($b_1 + b_2$)			.23	.17
a_2 ($b_3 + b_4 + b_5$)			-.24	.17
a_3 ($b_1 - b_2$)			.29	.19
a_4 ($b_3 - b_4 + b_5$)			.05	.15

Note. N = 358 (cases with missing data removed). Unstandardized estimates are reported. Consumer Discretionary is a reference group for all other sectors.
† $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.