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ABSTRACT

Innovation and creativity are the engines of social and economic progress. What roles do women play in innovation? Emerging evidence reveals that fewer women than men enter and succeed in innovation-related fields. Tackling gender inequality at work has always been one of the grand societal challenges, however little is known about gender issues specific to innovation achievements. This dissertation attempts to explain gender gaps in the innovation and creativity context. Innovation typically involves generating multiple novel and useful ideas, selecting the most promising one for implementation, and persistently championing the idea through implementation. I theorize and unpack the gender effect situated in different stages of innovation, specifically in idea selection and idea championing.

I propose that although women are equally capable as men in generating highly novel ideas, there is greater "novelty avoidance" in women than men - the extent to which individuals refrain from pursuing the most novel ideas they have generated. In a series of studies designed to feature the innovation process (Studies 1-3), I showed the differential influence of gender on idea generation and idea selection. Furthermore, I tested three alternative explanations to the gender difference in novelty avoidance tendency, namely, risk aversion, interdependent self-construal, and fear of social backlash associated with novelty (Study 2). Results suggest that fear of social backlash associated with novelty explains the gendered novelty avoiding/seeking tendencies. I also proposed and showed that the gender difference in novelty avoidance tendency was alleviated when women were told that their innovation will be judged by other women (Study 3).

For idea championing (Studies 4-6), I theorize that women employees are less likely than their men colleagues to engage in autonomous idea championing -

bypassing norms, rules, and established procedures to promote creative ideas. Drawing on the “creative prototype model”, I further theorized and showed that the more men employees autonomously champion their creative ideas, the more their supervisors perceived them as creative. In contrast, when women employees engaged in autonomous championing behaviors, they faced backlashes especially from their women supervisors.

I conclude by discussing the implications of these findings and future research to help advance current understanding of the challenges and opportunities that surround women innovators.

TABLE OF CONTENTS

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CHAPTER 1 INTRODCTION

Women have made great progress in the workplace. However, gender gaps in representation and achievements, favoring men are still prevalent. Recent evidence suggests that gender disparity is exacerbating in innovation-related fields. Half of the global workforce are women, but in the fields of science, technology, engineering, and mathematics (STEM), women comprise only 28% of the industry workforce (UNESCO, 2017). According to the World Intellectual Property Organization's recent analyses, more than 70% of all international patent filed don't include any female inventors (WIPO, 2017). When it comes to achievement, for example, in architecture industry, although 40% of entry-level architects in U.S. are women, only 18% of architecture's highest honours are received by women architects (Chang, 2014). Similarly, in business settings, start-up firms with all-female founders received only 2.2% of the total investment by venture capitalists, and all-men teams received about 79% of the total investment; 12% were allocated to start-up firms with mixed-gender founding teams (MasterCard, 2018).

The innovation-related achievement gaps between women and men are also confirmed by academic research. For example, a recent study analysed 1.5 million auction transactions around the world and found that on average, compared with paintings by male artists, paintings by female artists were sold with a 47.6% discount (Adams, Kräussl, Navone, & Verwijmeren, 2019). Another recent research found that patents filed by women inventors were 21% less likely to be accepted than those of men (Jensen, Kovács, & Sorenson, 2018). Finally, a recent meta-analysis found that in complex jobs, such as those that involve problem solving, gender gaps are the largest in performance evaluations and rewards (Joshi, Son, & Roh, 2015).

Why are gender gaps so pronounced in fields where creativity and innovation are of key concerns? Scholars in gender studies have long recognized that gender inequality exists, for example in STEM fields (e.g., Diekman, Brown, Johnston, & Clark, 2010; Wang, Eccles, & Kenny, 2013), however, gender issues specific to the innovation and creativity are not yet well understood. Given that both gender inequality and fostering innovation are identified as societal grand challenges (United Nation, 2015), considerable research attention has been paid to tackle the two grand challenges (e.g. George, Howard-Grenville, Joshi, & Tihanyi, 2016). Empowering female employees and helping them overcome gender biases in the workplace have risen to the top of the agenda of managers and organizational scholars in recent years (e.g. Joshi, Neely, Emrich, Griffiths, & George, 2015). The push for a comprehensive understanding of the antecedents and consequences of creativity and innovation has also been growing (e.g. Liu, Jiang, Shalley, Keem, & Zhou, 2016). To date, however, limited research has tried to bridge the gender and innovation literatures to explain the gender gaps evident in innovation (Elmore & Luna-Lucero, 2016; Luksyte, Unsworth, & Avery, 2017; Proudfoot, Kay, & Koval, 2015).

Connecting the literature on gender inequality and innovation in this dissertation, I attempt to unpack gender dynamics in different stages of innovation. In Chapter 2, I will first review the relevant literature that had incorporated gender as a factor in the context of innovation and creativity. Following the literature review, in my theory development (Chapter 3), I propose a phenomenological approach that incorporates 1) innovation processes and 2) innovator-centred perspectives to better understand gender dynamics in innovation. Building on the process model of innovation (e.g., Campbell, 1960; Nelson and Winter, 1982;

Staw,1990; Miner, 1994; Ford, 1996; Aldrich, 1999; Simonton, 1999), I propose that the role of gender becomes more salient in later stages of innovation, i.e., idea selection and idea championing, compared with the earlier stage of innovation (i.e., idea generation). Second, I move away from the "audience-centered" perspective of previous research (e.g. Proudfoot et al., 2015) but focused on the subjective experience of women and men innovators. Through six studies (Chapters 4-5), I unpack the differential influence of gender on idea generation, idea selection, idea championing, and finally innovation outcome. In Chapter 6, I will conclude my dissertation by discussing the theoretical and practical implications of my current findings. Additionally, I will discuss possible future avenues to conduct research to better understand the challenges and opportunities that women innovators face.

CHAPTER 2: LITERATURE REVIEW

Two irreversible changes are transforming the global business world: the growing importance of innovation and creativity (IBM Global CEO Study, 2010) and the accelerating inclusion of women (Mercer Global Study, 2016). Innovation and creativity drive organizational successes. Coming up with novel and useful products and ideas is the engine to economic and societal progress (Amabile, 1983; Stephan et al., 2016). While organizations are striving for continual innovation, the composition of the workforce is also changing. According to the Mercer Global Study in 2016, women composed 50% of the global workforce, and their roles in organizations are becoming more diverse. Therefore, at the crossroads of fostering innovation and achieving gender parity, women are inevitably involved in the innovation and creativity process in organizations. Although considerable effort has been devoted to attract and retain women to jobs that are closely related to innovation and creativity (e.g. Handelsman et al., 2005; Diekman et al., 2010; Le et al., 2014), our understanding of women innovators' actual experiences is quite limited.

Looking across 40 years of research on organizational creativity and innovation, the role of gender has only gained marginal attention. For example, studies in social psychology had examined individual creativity ability and performance and reported inconsistent gender differences (e.g. Runco, Cramond, and Pagnani, 2010; He et al., 2013). Macro-level organizational research examined how female CEO or women on boards affect firm innovation performance from resource-based views (e.g. Dezso and Ross, 2012; Musteen et al., 2006; Torchia et al., 2011). Because studies are scattered across different levels or disciplines we are

yet able to draw conclusions on how to close the gender gaps in innovation-related fields.

In the sections following, I will review relevant literature that looked at gender as a factor in the context of creativity and innovation. I categorized previous research into three streams based on their theoretical perspectives: 1) a human-capital-based view, 2) an audience-based view 3) an idea-generation-focused view and I will discuss the limitations of each of views.

Human capital based view

Team and group innovation research looked at gender diversity as an antecedent to team-level creativity and innovation performance (Knippenberg, 2017). The central argument of these studies is that experiences and knowledge is different for people with different social group membership (Eagly, 1987). Therefore, the knowledge, skillsets, mindsets, experiences, and points of views of women are different from men's (Tajfel, 1981; Ashforth and Mael, 1989). Consequently in teams or groups, these different ways of information processing can be an asset to collaborative innovation or creativity (van Knippenberg, De Dreu, & Homan, 2004). Compared to a traditionally all male teams, women team members bring in divergent perspectives to look at task-related problems, and these alternative and unique views are sources to novel and potentially useful ideas (De Dreu and West, 2001). For example, in solving the problem of global warming, what are female perspectives in it?

Consistent with this argument, earlier research by Hoffman and Maier (1961) found that gender heterogeneous groups came up with better quality solutions to problems than all-male groups. Rogelberg an Rumery (1996) also found that all female-team perform most creatively compared to all other team gender

compositions. A parallel line of research at the firm level adopted a resource-based view to study gender and firm innovation. Indeed, previous research found that gender diversity within the organization positively predicts firm innovation (Ostergaard et al., 2011; Rogelberg and Rumery, 1996; Kalleberg and Leicht, 1991). Women at higher level of innovators, also brings in social capital to organizations (Bell et al., 2011; Hulsheger et al., 2009). Lyngsie and Foss (2017) suggested that as the proportion of women in the top management team(TMT) increases, the negative biases against women might become less salient to women managers and employees, therefore they are better able to contribute to the innovation of the firm.

This line of research treats gender as a social category variable, and the central tenet of this perspective is how women in organizations can contribute to others', to a certain extent, men's creativity. Specifically, it exclusively focused on the benefit of involving more women in teams or on boards by increasing the pool of nonredundant information. What this line of research is missing however, is the actual experience of the women in the team and organizations. What happens to their own creative ideas?

An audience-based view: Gender stereotypes

An emerging line of research has started to investigate the biases that women face when they are engaging in creative work. For example, building on previous research of stereotypical beliefs on gender and agentic versus communal traits, Proudfoot and colleagues (2015) found that men and muscular traits are associated more with creativity than women or femininity traits. In a similar vein, Elmore and Luna-Lucero (2016) found that people attribute women inventors' creative ideas and performance to effort but attribute men inventors' to genius. In the organizational setting, research found that employee innovative behaviors by

men is positively related to job performance rating in general, but this effect does not exist for women employees (Luksyte, Unsworth, & Avery, 2017). Empirical research analysing archival data of 1.5 million auction transactions around the world found that on average, compared with paintings by male artists, paintings by female artists were sold with a 47.6% discount (Adams et al., 2019). In subsequent lab experiments, these researchers found that people who were made to believe a painting is from a female artist offered significantly less compared with people who were made to believe the same painting is from a male artist. Together, this line of research suggests gender bias favouring men existed when it comes to evaluating novelty, creativity, or innovativeness.

Although this stream of research is inspiring and represents a breakthrough in studying gender issues specifically surround women innovators, what is missing is the feelings, motives, and behaviors of the women innovators themselves, from a subjective perspective.

Is there a his and her creativity?

Research on gender and creativity has persistently argued and found no reliable differences in men and women's creative cognition capacity. For example, studies using the Remote Associates Test (a test that gauges whether people are good at making connections among disparate ideas) involving 404 college students showed no difference between women versus men participants (Harris, 2004). Chrisler (1991) administered the Torrance Tests for Creative Thinking (TTCT) on 32 adults and did not find any gender difference. In a review of creativity studies involving gender effects, Baer and Kaufman (2008) found that 34 studies reported no gender difference on their findings; only four studies reported males scored higher in creativity, whereas nine studies reported females scored higher.

Another stream of research has found that women differ from men in terms of the types of abilities that are linked to creativity (Baer and Kaufman, 2006). For example, women and girls are socialized and brought up to be masterful at verbal compared to spatial performance (Saykin et al., 1995; Gur et al., 1999). This difference could then explain the finding that female students' poems were judged as more creative compared with male students (Kaufman, Niu, Sexton, & Cole, 2010). Therefore, no systematic gender difference can be expected on creativity abilities.

However, creativity- the generation of novel and useful ideas is only the first step of innovation. There are subsequent stages ideas need to go through, specifically, evaluations, selection, championing, until successful implementation (e.g., Campbell, 1960; Nelson and Winter, 1982; Staw,1990; Miner, 1994; Ford, 1996; Aldrich, 1999; Simonton, 1999). Unfortunately, current research on creativity has exclusively studied the role of gender only in idea generation stage.

In sum, our current understanding on gender and innovation is from 1) a human-capital based view, which focused on gender diversity but ignored perspectives from women innovators; or 2) from an interpersonal perspective, which found biases against women in the creativity context; or 3) focused on the idea generation stage and found inconsistent results on gender differences in creativity performance. My dissertation offered complementary perspectives to the current ones, in that I propose to examine gender dynamics in the innovation context 1) at the individual level 2) from a self-censoring perspective and 3) involve the complete innovation process from generation to implementation.

CHAPTER 3: THEORY DEVELOPMENT AND HYPOTHESES

Maya Lin, the architect who designed the Vietnam Veterans Memorial in Washington D.C., revealed that before submitting her work to the memorial design competition, she spent disproportionate time and effort in rewording and re-editing the descriptions for her idea, consulting her advisor, and ruminating whether the selection committee would like her idea. She also expressed concerns of potentially biased evaluations: "*From the very beginning I often wondered, if it had not been an anonymous entry 1026 but rather an entry by Maya Lin, would I have been selected*?" (Lin, 2000). This anecdote reveals the common struggles many individuals face during innovation work - are their ideas good enough? Which idea should they pursue? Although these struggles are likely to be experienced by all innovators, they might be especially salient to women innovators.

According to recent findings, women in various innovation-related fields face a harder time in advancing their careers. Although considerable attention has been paid to close the gender gaps in the workplace (George et al., 2016; Joshi, Son, et al., 2015), less is known about gender issues specific to innovation achievements. Although research on how gender dynamics implicate creativity and innovation is developing it comes with limitations. Firstly, previous investigations on individual creativity suggest that women are no less capable than men in generating novel and useful ideas (for the review see Baer & Kaufman, 2008). Therefore, the current examination on gender differences in creative thinking abilities fails to explain the gender gaps observed in innovation fields. However, idea generation is only the first step in the innovation process (Bledow, Frese, Anderson, Erez, & Farr, 2009; Perry-Smith & Mannucci, 2017; Staw, 1990). After ideas are generated, the innovator must engage in careful evaluation and selection to winnow down alternatives as

well as promote the idea and gain support and resources for its successful implementation (Lu, Bartol, Venkataramani, Zheng, & Liu, 2019; Perry-Smith & Mannucci, 2017).

Secondly, an emerging line of research started to examine gender stereotypes associated with creativity and innovation (Elmore & Luna-Lucero, 2016; Luksyte et al., 2017; Proudfoot et al., 2015). For example, Proudfoot and colleagues (2015) found that people tend to associate "thinking-outside-box" creativity with more stereotypically masculine traits than stereotypically feminine ones. While this line of research generates rich insights for understanding the antecedent of gender gaps in creativity and innovation from the audience perspective, namely, bias against women in creativity and innovation, the subjective experiences of women innovators are absent.

To address the two limitations, I propose a phenomenological theory on women's self-censoring during innovation, specifically in idea selection stage.

Idea Selection

According to the process model of innovation, novel and potentially useful ideas typically go through generation, evaluation and selection, championing, and implementation (e.g., Campbell, 1960; Nelson and Winter, 1982; Staw, 1990; Miner, 1994; Ford, 1996; Aldrich, 1999; Simonton, 1999). Idea selection, defined as picking one novel idea from amongst many to pursue represents a critical step in the innovation process after ideas being generated (Burgelman, 1991; Criscuolo, Dahlander, Grohsjean, & Salter, 2016; Fuchs, Sting, Schlickel, & Alexy, 2019; Simonton, 1999; Staw, 1990). Indeed, in typical innovation settings, innovators need to explicitly select an idea from those that he or she has previously generated

to pursue further for implementation[1] (Berg, 2016; Fuchs et al., 2019; Girotra, Terwiesch, & Ulrich, 2010). On what basis then do innovators select among their ideas?

Novelty is a hallmark of innovation (Hennessey & Amabile, 2010), and it is the basis on which innovation can be distinguished (Runco & Jaeger, 2012). For example, the degree of novelty, differentiates innovation from being incremental (an improvement based on existing new ideas) to radical (new combination of pre-existing materials/ideas). The function of any organizational innovation is to supply new products, services, or processes. By not pursuing the most novelty ideas that one has generated, one potentially misses the chances of a home-run success. Therefore, there is a general tendency for organizations to seek novelty so that the innovation can fare well and become competitive (Katila & Ahuja, 2002; Laursen & Salter, 2006; Rosenkopf & Nerkar, 2001).

However, novelty is not always preferred or the only criteria to innovation success. For example, Rindova and Petkova (2007) suggested that when innovation is radically new, customers may only have limited capacity in understanding, therefore it may generate strong negative emotional reactions. Criscuolo and colleagues (2016) showed that when there is a considerable workload, organizations reduced their investments in highly novel R&D projects. Finally, evidence from laboratory studies suggested that when people are under high level of uncertainty they showed a slight negative bias against novelty (Mueller, Melwani, & Goncalo, 2012).

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[1] Although idea selection can happen interpersonally (e.g. Li & Agha, 2015), my theorizing only focuses on within-person idea selection where a creator has to select ideas that he or she has generated (e.g. Berg, 2016; Fuchs et al., 2019).

How do innovators select among their own ideas for implementation based on idea novelty? I introduce a new construct "*novelty avoidance*" to denote the extent to which individuals refrain from highly novel ideas they have generated during innovation work. This behavioral tendency captures the degree to which the idea an innovator picks to implement deviates in novelty from the most novel idea he or she has generated. In contrast, lower novelty avoidance suggests a greater tendency to pick the most novel idea from amongst the available alternatives.

Gender and Novelty Avoidance in Idea Selection

An emerging stream of research suggests there are gender stereotypes associated with idea novelty favoring men. Proudfoot and colleagues (2015) showed that people tend to associate novelty and "outside the box" creativity with stereotypically masculine characteristics. These authors also found that risk taking enhances a man's perceived creativity but not a woman's, and the effect is mediated by how perceivers attribute agency; specifically, when a man was described to engage in risky behaviors, people tend to perceive him as adventurous, daring, and courageous, but when a woman target was described to behave riskily people do not attribute such favourable characteristics to her. In a similar vein, Elmore and Luna-Lucero (2016) used metaphors to study social judgment of women's and men's inventions. These authors found that people tend to use the "lightbulb" metaphor to imply that ideas are instinctive, quick, and unexpected, which suggests people who come up with such ideas are high in their ability- "geniuses". On the other hand, the metaphor of "seeds" implies an idea comes from nurturing and people with such ideas are lower on their ability but might be compensated with "efforts". The researchers found that when people were introduced with a novel invention, and they were made to believe the inventor behind was a male, they attribute the

innovation due to “genius” of the inventor. In contrast, when people were asked to judge the same invention, but they were made to believe the inventor was a female, they attribute the innovation due to “effort” from the inventor. These two pieces of evidence provide rich insight such that high level of novelty is perceived as a stereotypically masculine trait and more congruent with gender role expectations of men. When women show a high level of novelty in their innovation, it will be perceived as a violation against their gender role expectations.

In addition to the above evidence suggesting a direct gender bias against women with high level of novelty, there is a second-order bias against women whose innovation is associated with high level of novelty. Specifically, research established that demonstrating high level of novelty is associated with intelligence, wisdom, and individualism (Niu & Sternberg, 2006; Sternberg, 1985). High level of novel creation is also a main criterion of merit (Dirk, 1999; Guetzkow et al., 2004). For example, in scientific and technological fields, consistently producing novel work makes scholars more visible (Simonton, 1994). Therefore, highly novel work could be taken as a form of high level of competence. At the same time, one of the most established findings based on social judgment research is that gender stereotypes existed along the dimensions of competence and warmth qualities (Fiske and Taylor, 1991: 121). Specifically, according to stereotypical gender beliefs, women are expected to be less competent and warmer compared with men. Therefore, to the extent that high level of novelty is signaling competence and high competence is stereotypically masculine, demonstrating novelty can be viewed as counter-stereotypical for women.

How does people’s view on women with high level of novelty affect women innovators’ selection of novel ideas? Social backlash happens when counter-

stereotypical behaviors are observed or stereotypical expectations are violated, the targets are punished and invite negative reactions (Nosek, Banaji, & Greenwald, 2002; Rudman & Phelan, 2008). For example, successful women managers were rated as more hostile, selfish, and quarrelsome compared with their male counterparts, and they were not recommended for promotion opportunities (Heilman, M. E., Wallen, A. S., Fuchs, D. & Tamkins, 2004). Women are socialized to be aware of the sanctions and negative reactions when engaging in counter-stereotypical behaviors (Eagly, 1987). Consequently, as a self-protective strategy, women are more likely to conform to the expected gender norm due to fear of social backlash (Rudman & Fairchild, 2004). For example, research found that women are less likely to delegate to their subordinates due to their fear of backlash associated with delegation (Akinola, Martin, & Philips, 2017).

I propose that high level of novelty is perceived as stereotypically masculine, and as a form of high level of competence, is perceived as counter-stereotypical for women. Due to fear of social backlash for violating gender role expectations, women innovators are more likely to engage in self-censoring in idea selection, such that they are less likely to pursue their highly novel ideas (i.e. more novelty avoidance in idea selection).

Hypothesis 1: Women are less likely than men to pursue the most novel idea they have generated (i.e. "novelty avoidance") during innovation work.
Hypothesis 2: Gender difference in "novelty avoidance" is mediated by feel of social backlash associated with novelty.

Moderating effect of evaluation panel

How can we help women overcome novelty avoidance during idea selection? It is well established that women's tendency to conform to stereotypical gender expectations depends on their identification with their gender role (e.g. Kiefer & Sekaquaptewa, 2007; Schmader, 2002). For example, for women who strongly identify with their gender ingroup, they perform more poorly on math tests compared with women who only weekly identify with their gender ingroup (Schmader, 2002). At the same time, women's identification with gender role varies by social situations. According to social distinctiveness theory, one of the most straightforward cues that make gender identity salient is the minority status (e.g. Steele, 1997; Mehra, Kilduff, and Brass, 1998). That is, as the proportion of women in a population decreases, women's gender identity will become more salient to them (e.g., McGuire et al., 1978; McGuire, McGuire, and Winton, 1979; Martins et al., 2003). Therefore, when women are out-numbered in a given situation, gender becomes a more salient social cue, which leads women to conform to gender role expectations. Indeed, previous research found that compared to women working in gender-diverse firms, women working in men-dominated firms are more likely to underplay the importance of feminine traits for professional success and intentionally differentiate themselves from their men colleagues (Ely, 1995).

Where do innovators infer their minority versus majority status? For novel ideas to get successfully implemented, innovators need to gather recognition and support from external evaluators, for example, stake holders, experts, supervisors, or funding agencies (Criscuolo, Dahlander, Grohsjean, & Salter, 2017; Perry-Smith & Mannucci, 2017). The evaluation panel in a typical innovation process refers to a group of managers or experts who make decisions in dedicated meetings to decide which ideas and how much resources are awarded (Criscuolo et al., 2017). Although

the actual involvement of the evaluation panel might be much later in the innovation process (Howell & Higgins, 1990; Perry-Smith & Mannucci, 2017) innovators are constantly aware and reminded of the role of external evaluators during the entire process including idea generation, evaluation, and selection. For example, in the anecdote shared earlier, Maya Lin while working on her own design ideas is constantly wondering about how others are going to evaluate her work based on her gender identity.

I propose that the gender demography of these evaluation panels will signal to innovators status of gender groups, consequently, influence their conformity to gender role expectations. Specifically, as the proportion of women in the selection panel increases, women innovators would show less novelty avoidance tendencies because they are less likely to behave in manner that is consistent with gender-role stereotypes.

Hypothesis 3: The proportion of women in selection panel moderates the relationship between gender and novelty avoidance such that when there are more women in the selection panel, women innovators are less likely to avoid selecting the most novel idea for implementation (i.e., lower novelty avoidance).

Autonomous idea championing

Many if not most creative ideas are never implemented. For example, at Kickstarter, a crowdsourcing platform for creative projects, only 36% of ideas receive enough funding to start implementation (Kickstarter, 2018). Creative ideas need resources in terms of time, money, talent, and political support to be successfully implemented (Perry-Smith & Mannucci, 2017). These tangible and nontangible resources, however, are not offered unconditionally. In organizations, employees must actively promote their creative ideas to gain the necessary resources. This process is commonly defined as idea championing (Perry-Smith & Mannucci, 2017).

Idea championing is a social process (Elsbach & Kramer, 2003). It requires interactions between proponents and gatekeepers, such as pitch meetings in Hollywood movie studios, video pitches at Kickstarter, or grant proposals in academia. Evaluators make subjective judgments regarding the creative potential of ideas and their proponents during these interactions. For example, Elsbach and Kramer (2003) studied "pitch" meetings between screenwriters and studio executives and producers. They found that studio executives and producers use behavioral and physical cues to evaluate and categorize the creative potentials of "pitchers." Similarly, Chen, Yao, and Kotha (2009) showed that venture capitalists form perceptions of entrepreneurs' passion during business plan presentations and make funding decisions accordingly. "Pitchers" or proponents must thus strategically manage impressions and adapt their behaviors during idea championing to push their creative ideas forward (Howell, Shea, & Higgins, 2005).

Accordingly, studies analyzing the behavioral patterns of innovation champions[2] found that champions use a greater variety of influence tactics and make more frequent attempts to influence others when they try to promote novel ideas in comparison with non-champions (Howell & Higgins, 1990).

Common means of influence, however, may not be sufficient to promote novel ideas because attempts at innovation often face resistance as they require changing extant routines and resource allocation systems within an organizations (Shane, 1995). According to the behavioral theory of firms (e.g., Cyert & March, 1963), substantial resources are invested to establish authority systems and routines within an organization, which creates high pressure to maintain the status quo and results in organizational inertia. Therefore, when employees try to promote their creative ideas, circumventing or even violating organizational norms, rules, and established procedures can be necessary. Consistent with Shane et al. (1995) and Shane (1995), I refer to this idea championing strategy as "autonomous idea championing." Specifically, autonomous idea championing is the extent that employees are willing to overcome organizational inertia by bypassing organizational norms, rules, and procedures to promote their creative ideas. Evidence suggests that autonomous idea championing increases the likelihood of innovation success, for example, Baer and Frese (2003) found that the success of process innovations depended on an organizational climate that supports autonomous initiatives.

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[2] In an organizational context, champions are defined as those who "emerge informally in an organization that make a decisive contribution to the innovation by actively and enthusiastically promoting its progress through the critical organizational stages" (Achilladelis, Jervis, & Robertson. 1971: 14)

Whether employees champion their ideas autonomously depends on their interpretation of the social situation and their own social motives. For example, Shane et al. (1995) found that in countries with high levels of uncertainty avoidance, people show little preference for autonomous idea championing strategies. This is explained by the low tolerance for breaking established rules and regulations in such societies (Hofstede, 1980; Chua, Roth, & Lemoine, 2015). Another factor that may influence employee's willingness to champion their ideas autonomously is their gender.

Gender and idea championing

Despite evidence of a gender gap in developing innovations, research on gender and creativity has consistently revealed no differences in men and women's ability to be creative (Baer & Kaufman, 2008; Hedges & Nowell, 1995; Hyde, 2005). For instance, studies using the Remote Associates Test involving 404 college students showed no disparity between women and men participants (Harris, 2004). Chrisler (1991) administered the Torrance Tests for Creative Thinking on 32 adults and did not find any gender difference. A review of creativity studies involving gender effects by Baer and Kaufman (2008) revealed that 34 studies reported no gender difference in their findings; in contrast to nine studies that reported higher scores for women than for men, and four studies reported that men scored higher than women. In sum, the current understanding is that men and women are equally capable when it comes to creative capacity.

In contrast to the idea generation stage, where gender difference in creative capabilities may be the key concern, I theorize that during idea championing, gender differences regarding social motives and behaviors play a more important role. Individuals actively manage their behaviors and engage in impression management

when others are present (Jones, 1990). According to impression management theory, low status individuals, such as ethnic minorities and women, tend to monitor and adjust their behaviors more while navigating the social environment because of their exposure to and greater sensitivity toward prejudice and discriminations compared with high status individuals such as white men (Guadagno & Cialdini, 2007). Research comparing the impression management tactics of men and women revealed that women are more likely to engage in protective strategies to minimize negative impressions. For example, women are more liable to hedge (i.e., use verbal tactics that imply uncertainty and lack of commitment) during social interactions (Carli, 1990). Similarly, women tend to adjust their level of assertiveness during negotiations; for instance, women are less prone than men to use competing tactics in self-advocacy negotiations, and women refrain from standing their ground or persisting in their offers in front of male partners (Amanatullah & Morris, 2010; H. R. Bowles & Flynn, 2010; Kray, Thompson, & Galinsky, 2001).

Promoting creative ideas autonomously requires the willingness to violate existing organizational norms, rules, and established procedures when necessary. Therefore, autonomous idea championing is a form of organizational deviance (Robinson & Bennett, 1995; Warren, 2003). Those who engage in such deviant behaviors run the risk of creating undesirable impressions and put interpersonal relationships at risk (Pinto, Marques, Levine, & Abrams, 2010). Therefore, women will be more hesitant to engage such behaviors. A meta-analysis on deviance confirmed that gender is a significant predictor of both organizational and interpersonal deviance (ρ=.15, .12) such that women are less likely than men to engage in behaviors that violate organizational rules and norms (Berry, Ones, & Sackett, 2007). Given that idea championing is a highly social endeavor and that

autonomous idea championing may negatively impact proponents' relationships, I propose that compared with men, women are less motivated to engage in autonomous idea championing.

Hypothesis 4: Women employees engage in less autonomous idea championing than men.

Idea Championing and Creativity Evaluations

Idea championing not only influences resource allocation and the eventual success of creative ideas but also affects the evaluation of the idea champion, in particular of his or her creativity (Elsbach & Kramer, 2003; Katz & Giacommelli, 1982). In an organizational context, supervisors and colleagues form subjective perceptions of how creative a focal employee is that can deviate from the actual creativity of products and ideas that people generate (e.g., Zhou & George, 2001). For example, a study that examined idea pitching and the evaluation of pitchers' creativity found that narcissistic pitchers are perceived as more creative despite pitching for the same ideas as less narcissistic people (Goncalo, Flynn, & Kim, 2010). These subjective evaluations of employee creativity are important because they are linked to rewards, performance reviews, and future career opportunities (Kampylis & Valtanen, 2010).

Autonomous idea championing may affect whether an employee is perceived as creative because it serves as a social cue. Elsbach and Kramer (2003) built on social judgment theory and work on the subjective nature of creativity assessment (e.g., Kasof, 1995; Katz & Giacommelli, 1982) to propose that during idea championing, observers rely on social cues and various stereotypes to evaluate

proponents' creativity. Judges pay attention to two types of creativity-related cues during interaction with pitchers: personal cues and relational cues. They then match and categorize the pitchers into "creative" or "uncreative" prototypes and appraise them as having high or low creativity, respectively. For personal cues, the authors found that judges categorize "passionate," "extreme," and "obscure" as matching creative prototypes. For relational cues, judges look for behavioral cues, such as "enthusiasm," "competing," and "asking questions," to categorize creative prototypes (Elsbach & Kramer, 2003). These cues are consistent with behaviors associated with autonomous idea championing. Specifically, when employees overcome organizational inertia by bypassing organizational norms, rules, and procedures to push their ideas forward, they are seen as bold, risk-taking, and passionate, all of which are traits often associated with creativity (Shane, Venkatarman, & MacMillan, 1995; Scott Shane, 1995).

Relative to men, how do women fit in the "creative" versus "uncreative" prototypes? A recent line of research has started to examine gender stereotypes in the context of creativity and innovation. Proudfoot and colleagues (2015) showed that people tend to associate novelty and "outside the box" creativity with stereotypically masculine characteristics. These authors also discovered that risk taking enhances a man's perceived creativity but not a woman's, and the effect is mediated by how perceivers attribute agency; specifically, people tend to perceive men engaging in risky behaviors as being adventurous, daring, and courageous, but they do not attribute such favorable characteristics to women who engage in the same behaviors. In a similar vein, Elmore and Luna–Lucero (2016) found that people attribute women inventors' creative ideas and performance to effort but attribute those of

men inventors to genius. These findings suggest that innovation and innovation-related behaviors are not readily associated with women.

Therefore, although behavioral cues associated with autonomous idea championing fit creative prototypes, the gender of individuals who engage in such behaviors should affect their positive effects on creativity evaluation. Given that innovation and creativity are stereotyped as masculine performance, women who autonomously champion their creative ideas might face backlash on their creativity evaluation. Indeed, research has shown that when women appear competent in male gender-typed tasks, their overall evaluation decreases (Heilman, Wallen, Fuchs, & Tamkins, 2004). This circumstance is due to people tending to penalize women for violating gender-stereotypic expectations (Eagly & Karau, 2002; Fiske, 1998). Furthermore, women employees who engage in autonomous idea championing might violate gender expectations regarding deviance. Bowles and Gelfand (2010) found that deviance by women is evaluated more harshly than deviance by men because as low-status members, women are expected to show greater conformity to group norms (Hollander, 1958).

In sum, because autonomous idea championing by men fit creative prototypes in the eyes of evaluators, men will be perceived as creative when they autonomously push their creative ideas forward (Howell & Boies, 2004). Conversely, women's autonomous idea championing behavior are counter-stereotypical (Proudfoot et al., 2015) and invite backlashes on their creativity evaluation. Therefore, I propose that when women engage in autonomous idea championing, their creativity evaluation will be lower as compared to men.

Hypothesis 5: Gender moderates the effect of autonomous idea championing and creativity evaluation such that autonomous idea championing is more positively related to creativity evaluation for men than for women.

Role of Supervisor Gender

The evaluation of women who engage in autonomous idea championing may be even less favourable when their supervisors are women rather than men. Research on gender expectation violation consistently shows that women are more likely than men to react negatively toward norm-deviant women (e.g., Garcia-Retamero & López-Zafra, 2006; Rudman, Johnson, Julian, Phillips, & Zehren, 1998). Two theoretical mechanisms explain this effect (Sheppard & Aquino, 2014). First, from a "collective threat" perspective, Fiske and Taylor (1991) argued that stereotype-consistent traits of women, such as being communal and caring, are rewarded in women and thus become part of women's self-schemas. They instill pride and esteem in women (Glick & Fiske, 1996, 2001) and become the characteristics or "markers" they use to differentiate themselves from men (Brewer, 1991). Therefore, counter-stereotypical behavior by some women reflects poorly on the group of women as a whole; moreover, other women who observe these counter-gender norm behaviors are likely to penalize the individuals to protect the ingroup image. This effect is also known as the "black sheep effect" (Marques, Yzerbyt, & Leyens, 1988). Following this logic, in the context of idea championing, women evaluators, such as women supervisors, should be highly likely to notice the cue of employee gender and rely on gender stereotypes to evaluate creative potential because it is relevant to their own gender role expectation. For instance, Ellemers, Heuvel, Gilder, Maass, and Bonvini (2004) noted that although no gender difference

exists in self-reported work commitment among doctoral students, female faculty perceive female doctoral students as less committed to scientific fields, and they endorse these gender-stereotypical perceptions more strongly than the male faculty.

The second perspective involves social comparisons within the same gender (Sheppard & Aquino, 2014). When women engage in behaviors that are stereotypically masculine, such as being agentic and ambitious, they are perceived to threaten other women's self-evaluation of status and competence (Festinger, 1954). Duguid (2011) found that women do not support highly qualified female candidates in career opportunities to become their potential work group peers in highly prestigious jobs. This effect is especially salient in male-dominated work contexts (Derks, Van Laar, Ellemers, & de Groot, 2011). For example, Parks-Stamm, Heilman, and Hearns (2008) demonstrated that women penalize women who succeed in male gender-typed jobs because of their self-protective motives of their own status and perceived competence. Recent evidence suggests that supervisors can feel threatened and envious of subordinates, and they act on their feelings of envy (Yu, Duffy, & Tepper, 2017). Such feelings toward subordinates will influence female supervisor's creativity evaluation of women who engage in autonomous idea championing because autonomous idea championing threatens the position and status of supervisors.

In sum, I expect that in women employee–women supervisor dyads, when women employees champion their ideas autonomously, women supervisors 1) perceive the behavior as violating the role expectancy of women as a group and 2) feel threatened by and become envious of these women champions; thus, the relationship between autonomous idea championing and creativity evaluation would be negative. By contrast, in men employee–women supervisor dyads, the

autonomous idea championing of the employee fits creative prototypes and gender expectations. Therefore, the relationship between autonomous idea championing and creativity evaluation should be positive. In the case of women employee–men supervisor dyads, women violate gender stereotypes and expectations if they engage in autonomous idea championing. However, men supervisors may still interpret the behavior positively as an indicator of creativity because they are less likely than women supervisors to see these female employees as threats to their own gender identity or as direct competitors at work.

> *Hypothesis 6: The relationship between autonomous idea championing and creativity evaluation is negative in women employee–women supervisor dyads but positive in employee–supervisor dyads of other gender compositions.*

CHAPTER 4: EMPIRICAL EVIDENCE FOR NOVELTY AVOIDANCE.

Study 1

The purpose of study 1 is to first test the gender difference in the idea selection stage, i.e. novelty avoidance tendency (hypothesis 1). I conducted a controlled laboratory study featuring different stages of innovation: idea generation, idea selection, and idea implementation. This way I could also replicate previous findings on gender differences in idea generation. I also intend to triangulate the operationalizations of novelty avoidance to establish the robustness of the results. Specifically, I attempt to operationalize novelty of ideas based on both objective and subjective measures. I also conduct supplemental analyses to explore the consequence of engaging novelty avoidance in idea selection, specifically on the innovation implemented.

Sample and Procedure

Participants were 107 business students from a large university in Asia (50% of the participants are male, mean age=21.2). Participants first took an online pre-survey where I collected demographic information, and control variables. Several days after completing the pre-survey, participants were scheduled to come to the laboratory for an individual innovation task. The task requires participants to make a 60-second promotional video for the University. I told participants that the objective of this video is to help the University increase its visibility worldwide. To motivate participants, I promised cash awards for the top 3 most creative videos. During the task, participants were first instructed to generate as many novel and appropriate ideas as possible that can be featured in their video about the University. Next, they were instructed to evaluate each of the ideas they generated on two dimensions: novelty (the degree to which the idea is new and unconventional) and

appropriateness (the degree to which the idea represents the University and effectively promotes it to an external audience). They were then instructed to select and implement one idea that they have just generated and evaluated. For implementation, participants were asked to go outside the laboratory and shoot (using their smart phones) the 60-second video based on the selected idea. Upon completing and submitting their videos, I asked for participants' reflections on their experiences during the task, in particular the extent to which they enjoyed the idea generation and idea selection aspects of the task. A measure of enjoyment would give us additional insight into the participants' motivation states during these phases.

Measures

Idea Novelty (objective). I operationalized idea novelty as infrequency by objective counts. On average, each participant generated approximately 6 ideas, resulting in a total of 686 ideas. Out of the 686 ideas, I grouped similar ideas together and counted the number of times these ideas were mentioned (for example, in all 686 ideas, featuring food around the University was mentioned 88 times, whereas a virtual tour of the campus was mentioned 31 times). I hired two research assistants to check the categorization of the ideas. Inter-rater consistency statistics suggest satisfactory level of consistency among ratings (ICC(1)=.45, ICC(2)=.71). Therefore, I averaged the frequency count among three ratings. Next, for each idea, I subtracted their frequency from 1. This infrequency score represents novelty such that higher the infrequency score, the more novel the idea is.

Novelty avoidance. I operationalize novelty avoidance as the gap between the maximum novelty of the ideas one generated and the novelty of the idea one selected to pursue. Based on objective novelty scores, for each participant, I retrieved the maximum of the idea novelty score and the novelty score of the idea

that they selected to pursue. Finally, I computed the difference between the two by subtracting the novelty score for the selected idea from the maximum novelty score for ideas generated for each participant. This difference score represents the degree to which the novelty of participants' selected idea deviates from the maximum novelty of ideas generated.

Novelty avoidance (objective)=Maximum idea novelty score (objective)- Selected idea novelty score

The novelty avoidance score derived from this formula ranges from 0.0001 to 0.07, for easier interpretation, I standardized this novelty avoidance score.

Control variables.

Number of ideas. I controlled for the total number of ideas each participant generated because having to choose from a large number of ideas might render selection difficult (Iyengar & Lepper, 2000).

Variance of idea novelty. I controlled for the variation of idea novelty for each participant. Because the variance of idea novelty directly influences the availability of "novelty avoidance" such that if a person generates equally novel ideas, novel avoidance would not be captured because there is no room for the person to "avoid" selecting most novel ideas.

Idea usefulness. Previous research suggests some people see usefulness and novelty as inversely related (Mueller et al., 2012). I therefore used this control variable to partial out the effect of participants trying to select high novelty ideas to compensate for low perceived usefulness. I measured subjective assessments of usefulness of each idea. Participants rated each of the ideas they generated on "to what extent do you think this idea represents the University and effectively

promotes it to an external audience" on the scale from 1 (not at all) to 7 (very much so).

Uncertainty avoidance. I also measured and controlled for uncertainty avoidance because highly novel ideas involve more uncertainty (Rindova & Petkova, 2007), some parts of variance in novelty avoidance might be shared with uncertainty avoidance. I measured uncertainty avoidance with Hofstede (1984) five-item scale. Cronbach's alpha=.89

To demonstrate incremental predictive validity of gender on novelty avoidance, I also controlled for *Big-five personality* (Gosling, Rentfrow, & Swann, 2003) because previous research has shown that these variables could affect people's motivation in engaging in creativity tasks (George & Zhou, 2001). For the same reason, I measured and controlled for their *identification with the University* (adapted from Mael & Ashforth, 1992, Cronbach's alpha is .86) because it could affect their intrinsic motivation in the task (Madjar, Greenberg, & Chen, 2011).

Results

Table 1 presents the descriptive statistics and correlations among key variables. Table 2 shows the test of hypothesis 1. I first regressed novelty avoidance on all the control variables in Model 1. For easier comparison and interpretation on the regression coefficients, I transformed all scores that used objective (frequency) measure of idea novelty, specifically, SD of idea novelty, by multiplying 100. In Model 1, I observed that the personality dimension of emotional stability is positively associated with novelty avoidance (b = 0.15, p=0.04), suggesting that people whose trait emotional stability is higher might be more inclined to avoid highly novel ideas. I also found that openness to experience is negatively associated with novelty avoidance (b=-.19, p=.04), which points that people who are more

open to experiences are also more likely to pursue highly novel ideas. Interestingly, I found that mean-level of usefulness by subjective judgment is marginally negatively related to novelty avoidance (*b*=-.133, *p*=.06), suggesting that when people feel that their ideas are generally useful and feasible, they are less likely to avoid novelty when selecting an idea for implementation. In Model 2, I added gender as the predictor. I found that compared with men (mean=-.24, s.d.=.72), women exhibited greater "novelty avoidance" (mean=.24, s.d.=1.17; *mean difference*=.48, p=.02, Cohen's d=.49) in that they are less likely than men to pursue their most novel idea. Put differently, this comparison showed that women tend to self-censor in idea selection by discarding their most novel ideas. Thus, hypothesis 1 is supported.

Robustness check

Subjective novelty avoidance. As a robustness check, I computed another novelty avoidance index based on subjective measure of idea novelty. Specifically, for each idea participants themselves generated, I asked themselves to evaluate to what extent they think each idea is novel (1= not at all to 7= very much so). Then for participants who selected the ideas they themselves rated as most novel I give a score of 0, to capture no avoiding novelty happened. In contrast, for participants who did not select the most novel ideas based on their own rating, I coded them as 1 to depict their tendency to avoid novelty. I then regressed the subjective novelty avoidance on gender; logistic regression showed that women, compared with men, tend to knowingly not select the idea they themselves perceived to be the most novel (*b*=.80, *wald*=4.11, *p*=.04). This finding suggests that women consciously avoided choosing their most novel idea for implementation.

During the reflection segment of the study, I also measured participants' enjoyment of each stage of the creativity task (idea generation stage and idea selection stage) using the item "to what extent did you enjoy the idea generation (idea selection) phase?" (1= not at all to 5=very much). I found no gender differences on the enjoyment of idea generation (*b*=.13, n.s.). Interestingly, consistent with my previous finding on gender effect of novelty avoidance, I found that women reported less enjoyment in the idea selection stage (*b*=.52, *t*=2.25, *p*=.03). This finding lends further credence to my argument that while women have no problem coming up with novel ideas, they may struggle to select the appropriate idea for implementation as reflected by the lower enjoyment for this stage of the innovation process.

Supplemental analyses

Could the gender difference on novelty avoidance be explained by women's misjudgment of their ideas' novelty? To test this alternative explanation, I calculated an indicator for whether participants had accurately identified their most novel ideas. Specifically, among all the ideas each participant generated, when the participant gave the highest subjective novelty score to an idea that also has the highest objective novelty score, I generated a dummy code of "1" to indicate that they accurately identified the most novel idea. If a participant gave the highest subjective novelty score to an idea (ideas) that does (do) not have the highest objective novelty score out of all the ideas she/he generated, I generated a dummy code "0" to indicate that they did not accurately identify the most novel idea. I then regressed this binary variable on gender and found no significant gender difference in the accuracy of identifying the most novel idea (*b*=.95, *wald*=4.52, *p*=.10). Thus,

the gender effect on novelty avoidance is not due to women misjudging their ideas' novelty.

Could the gender difference on novelty avoidance be due to the quality differences in the ideas that women and men generated? There is also no gender difference in terms of the number of ideas participants generated (*b*=.57, n.s) nor the average level of novelty of all the ideas (*b*=.11, n.s.). Taken together, these findings imply that women are not inherently less capable at creative thinking: they generated as many ideas as men. Thus, women's tendency for novelty avoidance during innovation work is not due to gender difference in creative cognition.

Finally, I tested the consequence of novelty avoidance in idea selection stage. *Evaluation of innovation.* I hired three experienced experts from a local art school to rate the novelty and usefulness of the 60-second videos. All three experts were asked to rate on a scale from 1 (not at all) to 10 (very much so) "How original do you think this video is?", "To what extent you think this video effectively promote the University?" The ICC(1)= .48, ICC(2)=.70 , which suggests an acceptable threshold for aggregation. I thus averaged scores from the three judges into two variables: expert-rated novelty and expert-rated usefulness. I regressed the novelty avoidance score to the novelty of the videos, and I found that novelty avoidance is negatively related to novelty of the video (b=.25, $p<.01$). However, I did not find any effect of novelty avoidance on the usefulness dimension (b=.13, n.s.).

Study 2

One limitation of Study 1 is the generalization of the sample such that the participants in the study are students. I therefore designed a study with a realworld sample, i.e. freelancers in creative industries. The purpose is to serve a replication of the findings from study1 as well as to add the external validity to the findings. In Study 2, I also seek to test the mediation hypothesis (hypothesis 2) on fear of social backlash against some other alternative mechanisms proposed, i.e. risk aversion and interdependent self-construal.

Sample and procedure

I recruited 409 participants (average age= 34.52, 26% women) from an online freelancer platform. The platform is a large freelancing and crowdsourcing platform. Any registered user could sign up on the platform and post a "contest" describing a task that needs to be completed. Rewards need to put up for the contest and the contest host will be able to select the winning design, and the winner will get the rewards promised. With the approval of the ethics committee, I posted a contest on the platform asking for a name and logo designed for an "Eco-hotel" (Please see Appendix for the material used). But I also indicated in the contest page that this contest is tied with a research study. To participate in the contest, freelancers also need to complete two parts of surveys. In the pre-survey link, I asked participants to indicate their account name in the online platform, then I asked them to document their innovation processes same as Study 1. First, I asked participants to come up with as many creative (novel and useful) ideas for the Eco-hotel as possible. I described usefulness as effectively capturing the main selling point of the hotel "being Eco-friendly". Then I asked participants to rate each of the ideas they themselves just generated on the two dements "novelty" and "effectively

capture the identity of the Eco-hotel". Next, I asked participants to select one idea from the pool of the ideas they just generated. Finally, participants were asked to submit the designed logo based on the idea they selected in my contest webpage via the freelancer platform. After their submission, they were asked to complete another survey. To link their survey responses with their submission, I asked for the submission number and their account name again in the post-contest survey.

Measures

Novelty avoidance. Same as study 1, I operationalize novelty avoidance as the gap between the novelty of the idea pursued and the maximum novelty of the ideas generated. Novelty is objectively measured. On average each participant generated approximately 5 ideas, resulting in a total of 2101 ideas. The novelty score was calculated based on how frequently each idea has appeared in the entire pool of ideas all participants generated, and I subtracted the frequency from 1 so that a higher score means more novel. I then derived the maximum of the idea novelty score for each participant and the novelty score of the specific idea that they pursued. Finally, I computed the difference between the two by subtracting the novelty score for the pursued idea from the maximum novelty score for ideas generated for each participant. For easier interpretation, I again standardized all novelty avoidance score.

Fear of social backlash. Based on previous research on negotiation and social backlashes (Rudman and Fairchild, 2004), I generated a modified measure of fear of backlash associated with high novelty by including a stem instruction "When you work on your most novel and original design... "; follow up sample items include: "I worried about being called overconfident [vain] based on my work", "Someone would say that I was acting "out of line" based on my work", and "I was

afraid I might be disliked" on the scale from 1 (not at all) to 7 (very much so). The Cronbach's alpha for this scale is .78.

Controls

I controlled for age and tenure of the freelancers. I also controlled for the characteristics of the ideas generated, same as Study 1. *Variance of idea novelty.* I calculated and controlled for the standard deviation of idea novelty for each participant. I also controlled for *number of ideas that each participant generated* to partial out the effects of novelty avoidance due to availability of alternatives. *Idea usefulness (subjective judgment).* Same as Study1, I measured and controlled for subjective assessments of usefulness of each idea. Participants rated each of the ideas they generated on "to what extent do you think this idea effectively represents the Eco-hotel" on the scale from 1 (not at all) to 7 (very much so).

Results

Table 3 presents the descriptive statistics and correlations for all variables. First, same as Study 1, I tried to establish the main effect of gender on novelty avoidance. I regressed the control variables, i.e. number of ideas generated, standard deviation of idea novelty[3], usefulness of the ideas, number of ideas, age, and tenure as a freelancer. Next, I regressed gender to novelty avoidance (Table 4 Model 2). Indeed, I found that gender has a significant effect in predicting novelty avoidance (b=-.24, p=.02).

Next, I went on to test hypothesis 2 on the mediating effect of fear of social backlash. First, I found that there is a significant gender difference in fear of social backlash (mean difference=.21, p=.04). This suggests that gender difference is

[3] for easier of interpretation and comparison of the effects, I again transformed the novelty by multiplying 100

salient on fear of social backlash. Next, I entered fear of backlash in the regression model in Table 4 Model 3. I found that fear of backlash significantly predicts novelty avoidance (b=0.10, p=.02), and the effect of gender is reduced (b=-0.130, n.s.). Finally, I ran a bootstraping analysis based on 5000 sample and found that indeed the effect of gender on novelty avoidance can be explained by fear of social backlash (indirect effect=-.094, 95%CI [-.043,-.001]).

Finally, I tested the consequences of novelty avoidance. *Evaluation of innovation.* I hired two experienced experts from a local art school to rate the novelty and usefulness of the LOGO design. Both experts were asked to rate on a scale from 1 (not at all) to 7 (very much so) "How original do you think this LOGO?", "To what extent you think this video effectively promote the Eco-hotel?" The ICC(1)= .60, ICC(2)=.87, which suggests an acceptable threshold for aggregation. I thus averaged scores from the two judges into two variables: expert-rated novelty and expert-rated usefulness. I regressed novelty avoidance score to the novelty of the videos, and I found that novelty avoidance is negatively related to novelty of the video (b=.56, p<.01). I did not find any effect of novelty avoidance on the usefulness dimension (b=.41, n.s.).

Alternative Explanations

Risk motives. Innovation is more than just being able to generate novel and appropriate ideas. Does one have the risk appetite to pursue an idea that could very well fail? Research on creativity and innovation suggest that novel ideas can be risky to pursue (Dewett, 2006). Novel ideas are oftentimes unconventional; such ideas are a deviation from or violation of the prevailing norm (Chua et al., 2015) and are likely to be rejected (Ahuja & Lampert, 2001). Highly novel ideas also may

not translate into innovation success because they are untested and often involve too many uncertain elements (Haas, Criscuolo, & George, 2014; Keum & See, 2014).

Gender study on risk aversion suggests that women and men behave differently under situations with uncertainties and in making decisions that involve risks. Specifically, studies in economics have long documented that women are less risk seeking and adopt financial strategies involving fewer risks than men (Powell & Ansic, 1997; Sundén & Surette, 1998). A meta-analysis has shown that this gender difference in risk preferences appeared to be robust across contexts (Byrnes, Miller, & Schafer, 1999). To the extent that pursuing highly novel ideas involve great risk, women could be more cautious when pursuing novel ideas compared with their male counterparts.

To rule out this alternative explanation, I measured risk appetite using a scenario study. (Simon, Houghton, and Aquino, 2007). The scenario contained a risky and safe alternative. However, I did not find significant gender difference in risk aversion (mean difference=20.56, p=.13).

Interdependent self-construal. Gender difference has been widely documented for relational-independent self-construal such that women endorse a more relational self-construal than men (Cross & Madson, 1997; Kashima et al., 1995). Because novel ideas represent uniqueness and individuality, women might be less motivated to pursue these ideas as a way to express themselves. Indeed, Goncalo and Staw (2006) found that teams with members having higher relational-self construal tend to not select novel ideas to implement. Taken together, it might be that women have higher tendency than men to refrain from selecting their most novel ideas for implementation.

To rule out this alternative explanation, I measured each innovator's self-construal, specifically, interdependent self-construal using the Self-construal scale from Brewer and Chen (2007). Individual self-representation; Relational self-representation; Group self-representation ($\alpha = .92$). Interestingly in this sample, I also failed to find support that women have more interdependent self-construal (b=.23, n.s.). Also there is no significant relationship between self-construal and novelty avoidance.

Study 3

The purpose of Study 3 is to test the moderating effect of gender composition of evaluation panel on gender difference in novelty avoidance during idea selection (hypothesis 3). Same as in Study 1 and Study 2, I conducted a controlled laboratory study that features all aspects of innovation.

Participants and Design

I recruited 380 business students at a large Asian university. In exchange for their participation, the students received course credits with a chance to win cash awards. Participants completed a two-part study: an online survey and a collaborative project in the laboratory. The average age of the participants was 23.3 years old, and 50% were female. In the online survey conducted prior to the lab study, participants independently reported their demographic information and completed measures for the control variables.

Participants in the lab were instructed to work on an innovation task. They were told to make a creative "Photo Collage" to promote the University on a social media webpage. Same as in Study 1 and Study 2, participants were given the instructions to first generate as many creative ideas as possible about photo collages, then they were asked to evaluate each idea they just generated, and finally they were asked to select one idea and make the photo collage based on the idea.

Measures

Novelty avoidance. Same as in Study 1 and Study 2, I operationalized novelty avoidance as the gap between the novelty of the idea pursued and the maximum novelty of the ideas generated. Novelty is objectively measured. On average each participant generated approximately 8 ideas, resulting in a total of

3145 ideas. I then derived the maximum of the idea novelty score for each participant and the novelty score of the specific idea that they pursued. Finally, I computed the difference between the two by subtracting the novelty score for the pursued idea from the maximum novelty score for ideas generated for each participant. I also standardized the novelty avoidance score for easier interpretations.

Manipulation of gender compositions for evaluation panel. I manipulated the gender compositions of the evaluation panel (see Appendix). Specifically, after participants read the information regarding the innovation task, I stated that there will be a panel of experts judge the Photo Collages, and if their Photo Collage was judged as one of the Top 3 most creative one, I would contact them for the rewards. Then I listed the experts who are going to evaluate the Photo Collages. I gave either 1) four all-male names; 2) four all-female names; 3) two male names and two female names; or 4) no information given. As a way to check for effective manipulation, towards the end of the study, I asked participants to indicate "as an attention check question, please select one of the names that appeared in the 'evaluation panel'". Because the main concern of the manipulation is the saliency of the majority gender in the evaluation panel, I excluded participants who were assigned to the "all-men" panel but selected one female name in the names given. Similarly, I also excluded participants who were assigned to the "all-women" panel but selected one male name in the names given.

Results

An ANOVA revealed a significant interaction between the gender of the innovator and the gender composition of the evaluation panel, $F(3, 316)=2.12$, $p<.01$. As shown in Table 5, women exhibited significantly more novelty avoidance compared with men in the control condition (mean difference=.46, $p=.05$), all-male

condition (mean difference=.49, p=.03). However, the novelty avoidance difference between women and men in all-female condition, and gender-balanced panel condition is not significant. Also, I conducted further analyses and found that for women participants, their novelty avoidance in all-women condition was significantly lower compared with all other panel conditions, except for a gender-balanced condition. For men participants, their novelty avoidance in all-women condition was significantly higher compared with all other panel conditions.

As a robustness check, I coded the proportion of women to 0%, 50%, 100% for the three conditions where gender information of panel was given. I then conducted an interaction analysis between proportion of women and gender of the participant on novelty avoidance and found that the interaction term is significant (b=-.09, p<.01). Next, I looked at the effect for women participants and men participants separately, for women participants, as the proportion of women evaluators in the panel increases, their novelty avoidance decreases (b=-.13, p=.01), however, for men participants, the proportion of women evaluators in the panel does not have a significant effect on their novelty avoidance tendencies (b=.07, n.s.).

CHAPTER 5: EMPIRICAL EVIDENCE FOR IDEA CHAMPIONING

In one laboratory and two field survey studies, I investigated gender differences in autonomous idea championing and their consequences. In a laboratory study (Study 4) I examined gender differences in autonomous idea championing strategies after controlling for participants' creativity. In a field survey of professionals in various creative industries (Study 5), I replicated the gender differences in autonomous idea championing strategies and provided evidence on the construct validity of my championing strategies measure. Finally, in a field study of employee-supervisor dyads (Study 6), I examined the effects of autonomous idea championing strategies on creativity evaluation for women as compared to men employees and the role of supervisor gender.

Study 4

The purpose of Study 4 is to test the proposed gender differences in autonomous idea championing strategies (Hypothesis 4), while ruling out the possibility that gender differences in autonomous idea championing strategies are due to creativity differences between women and men. Participants in this scenario-based study read a scenario describing a situation where they had generated a creative idea at work and were asked how they would champion their idea. To assess their creativity, participants were asked to generate a new idea to solve a company problem.

Sample and Procedure

One hundred students enrolled in an introduction to business course from a large business school were recruited. In exchange to participate in the 5-minute survey they received class participation points for the online session of the week. Four students did not complete the demographic information of the survey and were

hence deleted from the dataset. The final sample consisted of 96 students (mean age=21, 49% men).

Students first read a scenario asking them to imagine that they work in the marketing department of a budget-airline company (adopted from Gersick, 1989; Waller, Zellmer-Bruhn, and Giambatista, 2002). They were told to imagine that they work in a marketing department for a budget-airline company. They had recently come up with a novel and practical idea to help obtain more revenue from customers. Next, I asked how willing they are to autonomously promote this idea. Finally, the students were asked to come up with a novel and practical idea that they think can promote the sales for the budget-airline company.

Measures

Autonomous Idea Championing. I adopted a scale based on Shane et al. (1995) to measure participants' willingness to display autonomous idea championing in the scenario of the budget-airline. Specifically, the items measured the willingness to engage in a set of behaviors that had the aim to promote the new idea to help obtain more revenue from customers. The following four items were used to measure autonomous idea championing: "I would even be willing to bypass instructions"; "I try out a new approach even if I face resistance"; "I make necessary decisions without waiting for the approval of my manager"; and "I try out an unusual method even if my manager does not support it". Participants reported their willingness to engage in these behaviors on a five-point Likert scale (1=*strongly disagree*, 5= *strongly agree*). The Cronbach's α value for autonomous idea championing was .84.

Creativity. I measured *creativity* by hiring external judges to rate the creativity of the ideas participants had generated to promote the sales for the

budget-airline company. Three professionals who work in marketing or strategy development departments were hired to evaluate the creativity of ideas. They were asked to provide an overall assessment for each idea based on the definition of creativity as encompassing both novelty and usefulness (Amabile 1982). Usefulness refers to the potential value of an idea for the budget airline company. The judges then rated the overall creativity of each idea on one dimension (*1= not at all to 7= very much*). The ratings among the three judges indicate acceptable inter-rater reliability (ICC[1]= .89, ICC[2]=.73). I thus aggregated the ratings among the three judges.

Self-reported creativity. I also measured participants' own perception of their creativity. Following the same procedure, I presented the definition of creativity as both novel and practical ideas. They then rated their own ideas on the scale of (1= *not creative at all* to 7=*very creative*).

Results and Discussion

Consistent with previous research, there were no significant gender difference on expert-rated creativity (men: *mean*=2.94, *SD*=1.21; women: *mean*=2.74, *SD*=1.10; *t*=.85, n.s.) and self-reported creativity (men: *mean*=3.04, *SD*=.76; women: *mean*= 3.11, *SD*=.84; *t*=-.35, n.s.). In support of Hypothesis 4, there was a significant gender difference in participants' preference for autonomous idea championing (men: *mean*=4.29, *SD*=1.27; women: *mean*=3.61, *SD*=1.55; η^2=.04; *b*=.68, *t*=2.35, *p*<.05). Figure 1 shows the mean comparison. I found that after controlling for expert-rated creativity and self-reported creativity, the effect of gender on autonomous idea championing strategies remained significant (*b*=.70, *t*=2.41, *p*<.05).

In sum, I did not find differences between expert-rated and self-report creativity of women and men. However, after controlling for potential differences in creativity, women were less likely to champion their ideas autonomously than men. This scenario study provides initial evidence that gender difference in innovation may be due to differences in idea championing rather than idea generation.

Study 5

I conducted another study to examine gender difference in autonomous idea championing in the field setting of creative industries (Hypothesis 4), in which creativity and innovation are critical job requirements. In addition, this study establishes the construct validity of autonomous idea championing and examines whether gender effects are unique to this championing strategy. To establish construct validity of autonomous idea championing, this study also included personal initiative and creative behavior as two constructs that are conceptually related to idea championing. Personal initiative refers to employee's tendency to take an active and self-starting approach on work-related matters and to go beyond the job scope (Frese, Fay, Hilburger, Leng, & Tag, 1997). As innovation championing is a specific form of initiative, it can be expected to be positively related to the general tendency to display personal initiative. Autonomous idea champion may also be positively related to creative behavior. The more frequently employees engage in creative behavior and generate new ideas, the more opportunities they have to display autonomous idea championing. However, personal initiative and creative behavior should be unaffected by gender differences.

Procedure and participants

Participants were 150 adults working in the creative industries in the U.S. (53% male, 69% Caucasians, mean age=40.17, average tenure=8.72). All participants were systematically recruited from a variety of creative industries as defined by the UK government's Department for Culture, Media, and Sports (Department of Culture, 2001) (e.g., research and development; architecture; music, performing, and visual arts) from the Qualtrics panel. I asked each participant to respond to a series of questions about their innovation-related behaviour in their

organization. Two participants were excluded because they indicated themselves as freelancers without companies affiliated.

Measures

Autonomous idea championing. I used the same four-item scale as in Study 1 to measure autonomous idea championing. I changed the wording of the instructions from hypothetical to event-based. Specifically, I asked participants to think about when they attempt to promote creative ideas at work, followed by "When I want to promote a creative idea at work…" sample item is "I try out a new approach even if I face resistance" (*1= not at all to 5= very much so*). The reliability for the scale is .87.

Personal initiatives. I measured personal initiatives based on Frese et al., (1997) using three items: "I take initiative immediately even when others don't", "Usually I do more than I am asked to do", "Whenever there is a chance to get actively involved, I take it" (*1= strongly disagree* to *7= strongly agree*). Cronbach α for this scale is .87.

Creative behaviors. I measured creative behaviors using 8 items[4] from Zhou and George (2001). Sample items include "I suggest new ways to achieve goals or objectives", "I come up with new and practical ideas to improve performance", and "I come up with creative solutions to problems" (*1= strongly disagree* to *7= strongly agree*). Cronbach α for this scale is .92.

Demographic variables. To show incremental validity of gender on autonomous idea championing strategies, I also collected demographic variables.

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[4] I excluded one item regarding championing behaviors (i.e. "I promote and champion ideas to others") due to conceptual overlap.

Specifically, I asked for tenure in the current organization; their job position; age, as well as their education level.

Results

I first proceeded to show convergent and divergent validity of autonomous idea championing strategies with personal initiative and creative behaviours. Table 6 presents the descriptive statistics and correlations of all variables. Autonomous idea championing was correlated with personal initiative (r=.21, p<.01) and creativity (r=.28, p<.01). I then performed a CFA that included all variables (championing strategies, personal initiative, and creative behavior). The three-factor model showed a good fit (CFI=.92, SRMR=.06, RMSEA=.07, χ^2=404.76, df=237).

Next, I examined the effect of gender on autonomous idea championing strategies and on the other variables. As shown in Table 7 and in support of Hypothesis 4, gender was a significant predictor of autonomous idea championing (b=.41, t=2.65, p<.01). Men were more likely to engage in autonomous idea championing strategies than women (men: *mean*=3.36, *SD*=.87, women: *mean*=3.05, *SD*=1.04; η^2=.03). In Model 2 in Table 7, I added control variables. Gender remained a significant predictor of autonomous idea championing strategies. Neither personal initiative nor creative behaviour were significantly related to gender (see Table 7). Gender effects were thus specific for autonomous idea championing.

Study 6

Study 5 established construct validity of autonomous idea championing and provided further evidence on gender differences in this idea championing strategy. Study 5 features a unique sample of creative professionals and thus adds to the external validity of my research. In addition, in this study, I did not find gender difference on creativity (mean difference=-.16, t=-1.00, n.s.), which provides further support that women and men do not differ in their level of creativity at work. Next, I collected data from employee-supervisor dyads to test the full set of hypotheses.

I designed Study 6 to replicate the effect of gender on autonomous idea championing strategies in a sample of full-time employees across different industries. The study further examines the consequences of autonomous idea championing for creativity evaluations by supervisors. According to Hypotheses 5 and 6, the relationship between autonomous idea championing and creativity evaluation depends on the gender of employees as well as supervisors.

Sample and Procedure

I recruited supervisor–employee dyads from a broad range of industries, including advertisement, education, engineering, and financial services. I collected data through the snowball procedure, a common method used by researchers to recruit field participants (e.g., Eddleston, Veiga, & Powell, 2006; Ferrin, Dirks, & Shah, 2006). A total of 350 undergraduate students enrolled in a business course at a large local university were recruited in exchange for course credits. Each student was asked to identify a full-time employee working in a local organization and his/her direct supervisor. Both supervisors and employees completed surveys online.

Student recruiters provided the company email addresses of supervisors and employees. To encourage honest answers, I made the surveys anonymous and

generated a random code for each supervisor–employee dyad to match the responses. To ensure data quality, I randomly emailed and asked for confirmation from supervisors and employees whose codes were entered in the survey responses to check if they completed the surveys themselves. After data collection, all email addresses were removed such that the codes could not be linked to the emails.

I received 310 supervisor responses and 330 employee responses. Among the responses received, 217 supervisor and employee surveys were matched (final response rate: 62%). In sum, the participants comprised 50% male supervisors with an average age of 42 years and average tenure of 7.29 years and 38% male employees with an average age of 34 years and average tenure of 5.46 years. Given the local racial compositions, most of my employee–supervisor dyads consisted of same-race pairings.

Measures

Creativity evaluation. I assessed the supervisors' evaluations of employees' creativity using the 13-item scale by Zhou and George (2003). Supervisors were asked to rate their employee's creativity on a five-point Likert-type scale (*1=not characteristic at all, 5= very characteristic*). Sample items include "He/She suggests new ways to achieve goals or objectives," "He/she often has new and innovative ideas," and "He/she exhibits creativity on the job when given the opportunity to." The Cronbach's α value was .87.

Autonomous Idea Championing. Each employee rated their behavioral tendencies on a five-point Likert scale (*1=strongly disagree, 5= strongly agree*). The Cronbach's α value for autonomous idea championing was .84.

Control variables

Leader–member exchange

We controlled for leader–member exchange as previous research showed that the relationship between employees and supervisors affects employee involvement in creative work (Atwater & Carmeli, 2009). Leader–member exchange was measured with a seven-item scale adapted from Liden, Wayne, and Stilwell, (1993). Using a seven-point Likert scale (*1=strongly disagree, 7= strongly agree*), supervisors rated their relationships with their employees. Sample items are "My working relationship with this employee is very effective" and "There is a good fit between this employee and myself." The Cronbach's α value for this scale was .92.

Demographics

I also controlled for employees and supervisors' tenure (years) and age (years) because experience could influence creative performance at work.

Results

Table 8 reports the means, standard deviations, and correlations among the key variables. As expected, gender has a positive and significant relationship with autonomous idea championing (r=.16, p<.01), indicating that men are more likely than women to engage in autonomous idea championing.

Hypotheses Testing

Gender effects on idea championing. I conducted OLS regression analysis to test Hypothesis 4. Consistent with study 4, I found that employee gender is a significant predictor of autonomous idea championing (b=.35, t=3.16, p<.01). Men are more likely than women to champion their creative ideas autonomously (men: mean=3.09, SD=.81; women: mean=2.74, SD=.80, η^2=.04). In other words, men are more likely than women to break the rules or norms when pursuing their creative ideas at work. Thus, Hypothesis 4 is supported.

Effects of autonomous idea championing on creativity evaluation. Next, I tested the effect of autonomous idea championing on creativity evaluations by supervisors. I ran hierarchical linear models. The results are reported in Table 9. In Model 1, I entered autonomous idea championing and employee gender. In Model 2, I entered the interaction term between employee gender and employee autonomous idea championing strategy. The findings indicate that the interaction term significantly predicts employee creativity evaluations (b=.32, t=2.42, p<.05). In Model 3, I entered all the control variables as predictors for creativity evaluation. Consistent with previous research findings, leader–member exchange has a significant and positive relationship with supervisors' creativity evaluations (b=.28, t=3.14, p<.01). The interaction between gender and autonomous idea championing remains significant (b=.31, t=2.41, p<.05). To interpret the interaction, I examined the simple slopes on the basis of employee gender. Figure 4 shows a positive relationship between autonomous idea championing and creativity evaluations for men employees, (b=.32, t=3.51, p=.00). For women employees' creativity evaluations were not affected by their degree of autonomous idea championing (b=.01, p=.81). Thus, Hypothesis 5 is supported.

Finally, I tested Hypothesis 6 using a three-way interaction between employee gender, supervisor gender, and autonomous idea championing. I first entered supervisor gender and the various two-way interactions in Model 4 (Table 9). Then, I included the three-way interaction term as the predictor for creativity evaluation in Model 5. The results indicated a significant three-way interaction effect (b=−.77, t=-2.63, p<.01). In Model 6 I entered the control variables. The three-way interaction remains significant (b=-.75, t=-2.61, p<.05). Specifically, men supervisors rated employees with higher autonomous idea championing as more

creative (b=.31, t=3.60, p<.05) regardless of the gender of the employee. For women supervisors, however, employee gender moderated the effect of autonomous idea championing on creativity evaluation (b=.24, t=2.93, p<.01). In particular, the more women employees engaged autonomous idea championing, the lower the creativity evaluations of women supervisors (b=−.22, t= -1.78, p=.06), whereas men employees engaged in autonomous idea championing were rated by women supervisors as more creative (b=.50, t=2.42, p<.05). A slope difference test showed that the simple slope for women-women supervisor-employee dyads is significantly higher from the rest of dyads (Men-men dyads: t=2.78, p<.01; men-women dyads: t=2.55, p=.01; women-men dyads: t=2.92, p<.01). These analyses provided support for Hypothesis 6.

CHAPTER 6: FUTURE RESEARCH & CONCLUSION

Summary of findings

This dissertation examines gender dynamics in the innovation process. I hypothesized and found that gender differences are not salient in early stage of innovation, i.e. idea generation (Study 1), however, in later stages of innovation, specifically in idea selection (Studies 1-3), women demonstrate more novelty avoidance, and in idea championing stage (Studies 4-6), women are less autonomous in bypassing organizational constraints.

For idea selection dynamics, I further propose and found that women's novelty avoidance tendency can be explained by their fear of social backlash associated with high level of novelty, and this gender difference is alleviated when their external evaluators are composed of women. Importantly, I also found a negative consequence for engaging in novelty avoidance during idea selection, such that the innovation implemented is judged is judged as less novel.

For the idea championing dynamics, I focused on gender differences in autonomous idea championing—the tendency to promote creative ideas by bypassing organizational norms, rules, and established procedures—and how it affects creativity evaluations. I found that women employees are less likely than men to champion their creative ideas autonomously. When women employees do engage in autonomous idea championing, their creativity evaluation depends on the supervisor's gender. When supervisors are women, creativity evaluation decrease for women employees who champion creative ideas autonomously. By contrast, when men employees engage in autonomous idea championing, their creativity evaluation increases regardless of the gender of their supervisors.

Theoretical contributions

My dissertation has the potential to make both theoretical and practical contributions. From the theoretical perspective, my dissertation serves to bridge creativity and innovation literatures. Perry-Smith and Mannucci (2017) proposed that inconsistent results in creativity and innovation literatures could be resolved by studying intermediary phases in innovation processes such as idea championing. My dissertation takes up this call by examining gender differences in idea selection and championing strategies. In so doing, I resolve the inconsistency among studies that show no gender difference in creativity (e.g. Baer & Kaufman, 2008), and studies that show women's under-achievement in innovation-related fields (e.g. Thebaud, 2015). My dissertation suggests that gender differences in idea selection and autonomous idea championing strategies might partially explain gender gaps in innovation.

Furthermore, my dissertation features a series of designs that incorporate different stages of innovation. These unique study designs allow differentiating various processes in innovation to unpack behavioural dynamics inside "the black box" of innovation. Indeed, initial evidence from entrepreneurship literature has found that female-entrepreneur-led firms are less like to engage in radical innovation (Strohmeyer, Tonoyan, & Jennings, 2017). However, the argument of Strohmeyer et al. (2017) was human-capital based such that women entrepreneurs' educational and occupational backgrounds limit their capacities to engage in highly novel innovation. My research offered a nuance to this finding in that it dives into deeper analyses to show behavioural differences in how women versus men approach innovation, specifically in selecting and championing their creative ideas.

This dissertation directly adds on to the emerging line of research that examines challenges women innovators face. Proudfoot and colleagues (2015)

found that people tend to perceive women as less creative; Elmore and Luna-Lucero (2016) found that people perceive men's creativity as a result of genius but women's creativity as a result of effort. Studies in this dissertation go one step further to show that women innovators actually exhibit a different pattern of behaviors in the innovation process compared to their male counterparts and offers potential explanation on where these differences between stereotypes of women and men innovators come from.

Practical Implications

My dissertation also has practical implications. In a report by McKinsey (2016) on women in the workplace, across different types of industries, women are increasingly entering occupations that involve creativity and innovation (i.e. information technology, and entertainment industry). Knowing how to manage gender issues in the context of organizational innovation is therefore increasingly critical for both organizations and society. Preliminary results from my dissertation studies revealed that women and men are equally capable in coming up with novel and useful ideas, however, women have the tendency to avoid putting forth their most novel ideas due to various concerns i.e. risk aversion, creative motivation, and fear of social backlash.

My dissertation offers a potential explanation and solution for women's difficulty in advancing their creative careers. After creative ideas are generated, employees need to promote and "sell" them to gain support and resources for implementation. However, organizational inertia frequently resists these efforts. Thus, it might be necessary for champions to violate organizational norms, rules, and established procedures to push their ideas forward. My studies attempt to show that women employees are less willing to do so. Organizations should be aware that

gender differences exist in the idea championing processes; in particular, women have different social concerns than men during these processes. Recognizing this tendency in women innovators, organizations might consider redesigning their innovation processes and procedures to help women advance their ideas without having to violate organizational rules and norms. For example, organizations can set up mentoring or networking programs for women who have novel ideas and help them secure sufficient resources to pursue their creative ideas.

Limitations and Future Directions

Despite the above contributions, my study is not without limitations. First my theory exclusively focused on the social motivational mechanisms of gender differences in the innovation process, sidestepping the role of affective dynamics. Because affect has been shown to influence motivation and decision making (Erez & Isen, 2002; Figner, Mackinlay, Wilkening, & Weber, 2009) and women and men differ on their attention and responses to emotional stimuli (Fujita, Diener, & Sandvik, 1991) it is plausible that the affective states that women and men innovators experience could alter the difference I found in novelty avoidance. Indeed, initial evidence from Study 1 can be found that emotional stability seems to heighten the tendency of novelty avoidance. Future research could examine how emotions in men versus women differentially influence the various stages of innovation.

For the studies in idea championing, although I theorized about the social concerns that women employees might have when championing creative ideas autonomously, I did not directly test these mechanisms in the current study. Future work should expand my investigation by directly measuring the various

mechanisms, particularly the concerns about social backlash when women engage in autonomous idea championing. For Hypotheses 5 and 6, the mediating role of women supervisors' feeling of threats or social comparison with other women is also worth investigating. Future inquiries can also compare these various mechanisms to examine which plays a more significant role. By better understanding the underlying mechanisms, I can begin to devise potential solutions where required.

I encourage future research to build on my findings and explore other nuances in innovation process. For example, in my results (Study 2), I found that people have the tendency to avoid selecting the most novel ideas when they perceive their ideas' usefulness is low. This suggests that novelty avoidance could be a functional approach during the innovation process because it allows the innovator to balance novelty and appropriateness when selecting ideas for implementation. When generated ideas are generally low in appropriateness (i.e. low usefulness or feasibility), it makes sense for the innovator to be cautious and not select the most novel (and hence risky) one for implementation as doing so would increase the risk of rejection or failure.

Future research can also extend my findings into higher levels of analysis. In the team context, the composition of women and men innovators may affect team innovation processes and outcome because of the different approaches and tendency to avoid novelty between them (Cite Baer's studies?). In addition, the role of organizational settings can be further examined as boundary conditions of my findings on gender difference; for example, building on my finding on different approaches women and men innovators take to promote novel ideas, and previous findings on diversity climate and innovation, could the difference in novelty

avoidance between women and men innovators be less salient in organizations with more diverse climate? One speculation is that in organizations that emphasize diversity and inclusion, women might feel more empowered to take risks and are less concerned about social judgments, reducing their novelty avoidance tendencies. In addition, the role of national cultures can be further examined as boundary conditions of my findings on gender difference. For example, for countries or regions with loose culture (Gelfand et al., 2011), research should examine whether women champions are more likely than their male counterparts to promote their ideas autonomously because of greater tolerance toward deviant behaviors from women.

Finally, future research can also look into individual differences that could alleviate women's tendency of novelty avoidance in idea selection. For example, even in the field that is not STEM related, previous research has shown that women experience more conflicting identities than men at work (e.g. mother-professional identity, Hodges and Park, 2013). This creates a potential asymmetry between their gender identity and work-relevant identity (Meister, Jehn, and Thatcher, 2014). Identity integration literature suggests that without integrating two conflicting identity experiences, it is hard for creativity to generate (Sacharin, Lee, & Gonzalez, 2009; Cheng, Sanchez-Burks, & Lee, 2008). I encourage future research to look at barriers and challenges women innovators face from an identity perspective, specifically, how to balance between the conflicting roles, responsibilities, and expectations coming from gender role and innovator role?

Conclusion

In closing, as more women enter the workforce and in particular creative industries, it is timely and important to better understand how women innovate. The present research begins to address this issue by studying how women versus men innovators select ideas for implementation and champion these ideas during innovation work. Although women are cognitively as capable as men when generating novel ideas, they hesitate to pursue their most novel ideas because of various social concerns and appear less brave in championing their creative ideas. I hope my work can stimulate and inspire more researchers to begin investigating gender differences in creativity and innovation.

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TABLES

TABLE 1. Descriptive Statistics and Correlations for Variables (Study 1)

Variables	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Agreeableness	4.403	1.311	1												
2. Conscientiousness	4.345	1.427	.645**	1											
3. Extraversion	4.027	1.326	.302**	.209*	1										
4. Emotional Stability	4.212	1.477	.580**	.558**	.427**	1									
5. Openness to experience	4.425	1.376	.637**	.527**	.495**	.640**	1								
6. Identification with the University	3.35	1.006	.222*	.217*	0.137	.331**	.300**	1							
7. Uncertainty avoidance	5.105	0.734	.214*	-0.009	0.188	0.117	0.136	.424**	1						
8. Number of ideas	6.009	2.852	0.049	0.033	-0.044	0.127	-0.018	0.069	0.009	1					
9. Mean level of usefulness (subjective)	5.823	1.071	0.058	0.02	0.016	0.044	0.018	0.095	0.177	0.147	1				
10. Mean level of novelty (objective)	0.024	0.012	-0.034	-0.098	0.122	0.01	-0.087	-0.033	0.035	0.240*	-0.091	1			
11. SD of novelty (objective)	0.022	0.01	-0.036	-0.147	0.116	-0.018	-0.055	-0.065	0.068	-0.085	-0.126	.705**	1		
12.Gender	0.496	0.502	-0.152	0.018	0.01	.187*	-0.034	0.059	-0.001	0.121	0.049	-0.064	-0.089	1	
13.Novelty avoidance (objective)	0	1	-0.008	-0.112	0.024	0.008	-0.131	-0.05	-0.14	-0.124	-0.076	.275**	.230*	-.240*	1
14. Novelty of innovation	2.341	0.737	0.065	0.113	0.069	0.149	0.027	0.037	0.055	-0.064	-0.204	-0.056	-0.102	0.097	0.004

Note. For gender dummy: men=1, women=0; Novelty avoidance (objective) is standardized, and novelty avoidance (subjective) is dummy coded as: 0=select the idea subjectively judged most novel; 1= did not select idea subjectively judged most novel. *p<.05, **p<.01. N=107.

TABLE 2. Hierarchical Linear Regression Models Predicting Novelty Avoidance (Study 2)

	Model 1		*Model 2*	
	b	*s.e.*	*b*	*s.e.*
Intercept	2.250*	1.295	2.305*	1.279
Agreeableness	0.165	0.135	0.098	0.139
Conscientiousness	-0.092	0.114	-0.102	0.112
Extraversion	-0.025	0.109	-0.024	0.108
Emotional Stability	0.149*	0.112	0.216*	0.117
Openness to experience	-0.189*	0.131	-0.211*	0.130
Identification with the University	0.094	0.169	0.067	0.168
Uncertainty avoidance	-0.330	0.204	-0.281	0.204
Number of ideas	-0.032	0.047	-0.032	0.047
Mean level of usefulness (subjective)	-0.133	0.106	-0.106	0.105
SD of novelty (objective)	0.136	0.150	0.091	0.150
Gender			-0.414*	0.239
ΔR^2	.156			.042
R^2	.156			.198

Note. For gender dummy: men=1, women=0; Novelty avoidance (objective) is standardized, and novelty avoidance (subjective) is dummy coded as: 0=select the idea subjectively judged most novel; 1= did not select idea subjectively judged most novel. *p<.05, **p<.01. N=107.

TABLE 3. Descriptive Statistics and Correlations for Variables (Study 2)

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11
1. Age	34.52	10.26	1										
2. Tenure	4.56	2.17	.290**	1									
3. Uncertainty avoidance	2.56	1.06	0.001	0.048	1								
4. Number of ideas	5.33	2.14	0.108	0.09	-0.051	1							
5. Mean level of usefulness (subjective)	5.29	.67	-0.019	-0.123	-.223*	0.147	1						
6. SD of novelty (objective)	.02	.02	-0.119	-0.202	-0.070	-0.085	-0.126	1					
7. Gender	.74	.49	0.116	0.041	0.018	0.121	0.049	-0.089	1				
8. Novelty avoidance (objective)	0	1	-0.181	-0.101	-0.027	-0.124	-0.076	.230*	-.240*	1			
9. Novelty of innovation	4.71	1.26	0.129	0.020	0.080	-0.064	-0.204	-0.102	0.097	0.004	1		
10. Fear of social backlash	2.15	1.52	.221*	0.120	0.002	-0.073	0.190	-0.052	0.186	.208*	-0.021	1	
11. Risk aversion	34.58	10.49	0.151	0.045	0.044	-0.111	-0.153	-0.094	0.119	0.063	.205*	-0.096	1
12. Interdependent self-construal	2.90	1.37	-0.083	-0.013	0.092	0.002	0.112	-0.039	-0.054	0.005	0.069	0.078	0.013

Note. For gender dummy: men=1, women=0; Novelty avoidance (objective) is standardized. *p<.05, **p<.01. N=402.

TABLE 4. Hierarchical Linear Regression Models Predicting Novelty Avoidance (Study 2)

	Model 1		Model 2		Model 3	
	b	*s.e.*	*b*	*s.e.*	*b*	*s.e.*
Intercept	1.129*	1.295	1.305*	1.279	1.305*	1.279
Age	0.165	0.135	0.098	0.139	0.098	0.139
Tenure	-0.092	0.114	-0.102	0.112	-0.102	0.112
Uncertainty avoidance	-0.330	0.204	-0.281	0.204	-0.281	0.204
Number of ideas	-0.032	0.047	-0.032	0.047	-0.032	0.047
Mean level of usefulness (subjective)	-0.133	0.106	-0.106	0.105	-0.106	0.105
SD of novelty (objective)	0.136	0.150	0.091	0.150	0.091	0.150
Gender			-0.243*	0.239	-0.130	0.270
Fear of backlash					0.098*	1.279
ΔR^2	.156			.042		
R^2	.156			.198		

Note. For gender dummy: men=1, women=0; Novelty avoidance (objective) and SD of novelty (objective) are standardized

*p<.05, **p<.01. N=402.

TABLE 5. Descriptive Statistics and Correlations for Variables (Study 3)

Participant Gender	Female			Male			
Conditions	Mean	SD	N	Mean	SD	N	
all-male	0.345	1.120	40	-0.135	0.916	41	Mean difference=.49, p=.03, Cohen's d=.43
mixed-gender	0.061	1.039	42	-0.181	0.683	44	Mean difference=.242, P=.15
all-female	-0.126	0.980	39	0.117	1.000	38	Mean difference=-.243, p=.39
control	0.239	0.907	39	-0.219	1.120	39	Mean difference=.461, p=.05, Cohen's d=.27

TABLE 6 Descriptive Statistics and Correlations for Variables (Study 5)

Variables	Means	SD	1	2	3	4	5	6	7	8
1. Age	40.17	12.21								
2. Tenure	8.72	8.57	.54**							
3. Job position	1.86	1.10	.10	.08						
4. Education level	4.96	1.34	-.02	-.12	.13					
5. Gender	.53	.50	-.08	.02	-.00	.07				
6. Autonomous idea championing	3.25	.95	-.11	-.07	.08	.09	.20*			
7. Personal initiatives	5.90	.96	.15	.18*	.12	-.18*	-.09	.21**		
8. Creativity generation behaviors	5.58	.94	-.06	.05	.12	-.21**	.10	.28**	.68**	
9. Job autonomy	4.21	.77	-.03	-.09	.04	-.05	-.07	.09	.22**	.23**

**p<.01 *p<.05, N=148

TABLE 7. Hierarchical Regression Results Predicting Autonomous Idea Championing (Study 5)

	Model 1		Model 2	
	b	*t*	*b*	*t*
Constant	3.02**	.11	1.00	1.35
Control Variables				
Age			-.01	-1.12
Tenure			-.01	-.50
Job position			.03	.49
Education level			.11	1.86
Creativity generation behaviors			.22	1.85
Personal initiatives			.10	.90
Job autonomy			-.00	-.04
Predictor Variable				
Gender	.41**	2.65	.36*	2.30
R^2	.05		.15	

**p<.01 *p<.05, N=148

TABLE 8 Descriptive Statistics and Correlations for Variables (Study 6)

Variables	Means	SD	1	2	3	4	5	6
1. Employee Tenure	5.46	6.28						
2. Supervisor Tenure	7.29	7.55	.40**					
3. Leader–Member Exchange (supervisor rated)	4.20	.49	.09	.02				
4. Autonomous idea championing	2.89	.83	.00	-.07	-.06			
5. Employee Gender	.38	.49	-.12	-.02	-.09	.16**		
6. Supervisor Gender	.52	.50	.06	.09	.01	.08	.24**	
7. Creativity evaluation by supervisor	3.59	.78	.07	-.05	.54**	.05	.06	-.01

**p<.01 *p<.05, N=217

TABLE 9. Hierarchical Regression Results Predicting Creativity Evaluation by Supervisors (Study 6)

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	b	*t*	*b*	*t*	*b*	*t*	*b*	*t*	*b*	*t*	*b*	*t*
Constant	3.21**	17.25	3.53**	15.66	1.98**	3.84	3.85**	12.79	4.17**	13.00	2.55**	4.26
Control Variables												
Employee Tenure					.00	.74					.00	.90
Supervisor Tenure					.00	.74					.01	1.39
Leader-Member Exchange					.28**	3.14					.27**	2.85
Predictor Variables												
Employee Gender	-.01	-.07	-.95*	-2.35	-.88*	-2.21	-.98*	-2.18	-2.35**	-.344	-2.22**	-3.30
Autonomous idea championing	.12	1.89	.01	.08	.02	.24	-.09	-.83	-.21	-1.81	-.19	-1.64
Gender × autonomous idea championing			.32*	2.42	.31*	2.41	.25	1.71	.73**	3.14	.69**	3.05
Supervisor gender							-.77	-1.88	-1.48**	-3.05	-1.40**	-2.95
Supervisor gender × autonomous idea championing							.22	1.60	.48**	2.84	.46**	2.79
Gender × Supervisor gender							.39	1.65	2.62**	2.98	2.57**	2.96
Gender × Supervisor gender × Autonomous idea championing									-.77**	-.263	-.75*	-2.61
R^2	.02		.04		.10		.07		.10		.17	

**P<.05, **P<.01, N=217*

TABLE 10. Simple Effects Based on Different Gender Compositions of Supervisor and Employee Dyads (Study 6)

Gender composition of supervisor–employee dyads	N	Regression coefficients of autonomous idea championing on creativity evaluation (Standard Errors)	P-Value
Women supervisor–men employees	25	.50(.21)	.02
Women supervisor–women employees	79	-.22(.13)	.06
Men supervisor–men employees	53	.22(.09)	.02
Men supervisor–women employees	60	.25(.13)	.06

Note. N=217 dyads. Standard errors are in parentheses

FIGURES

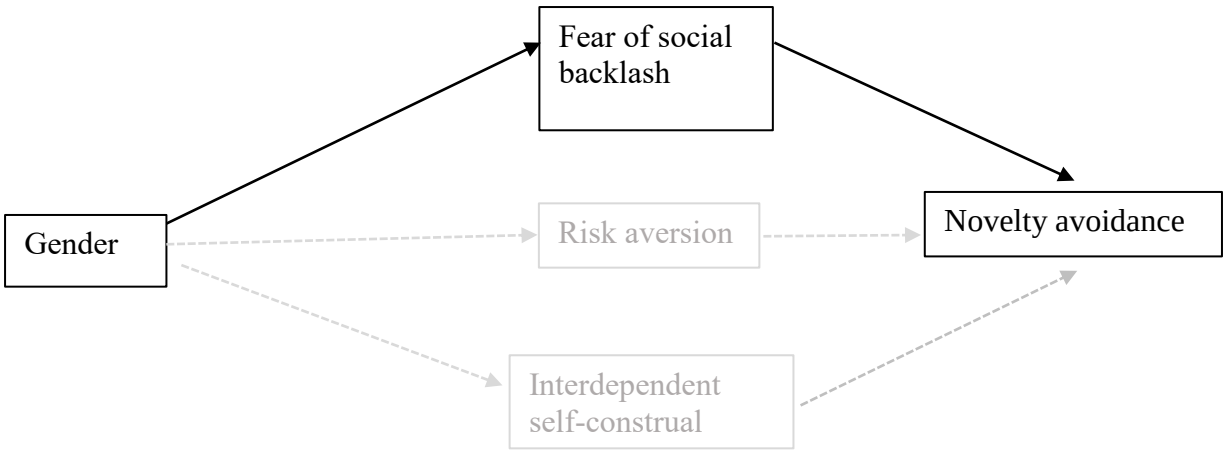

FIGURE 1. Model of gender difference on novelty avoidance (Study 2)

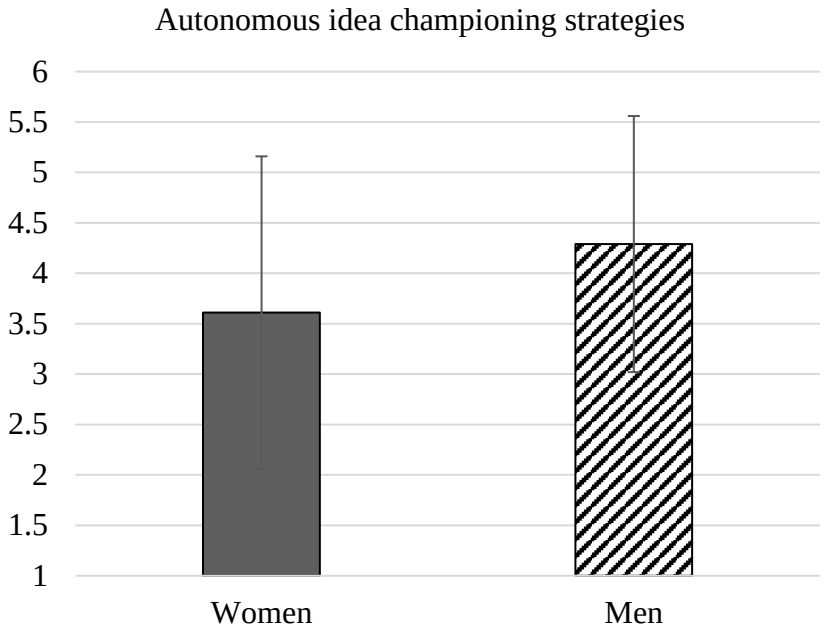

FIGURE 2. Effects of Gender on Autonomous Idea Championing (Study 4)

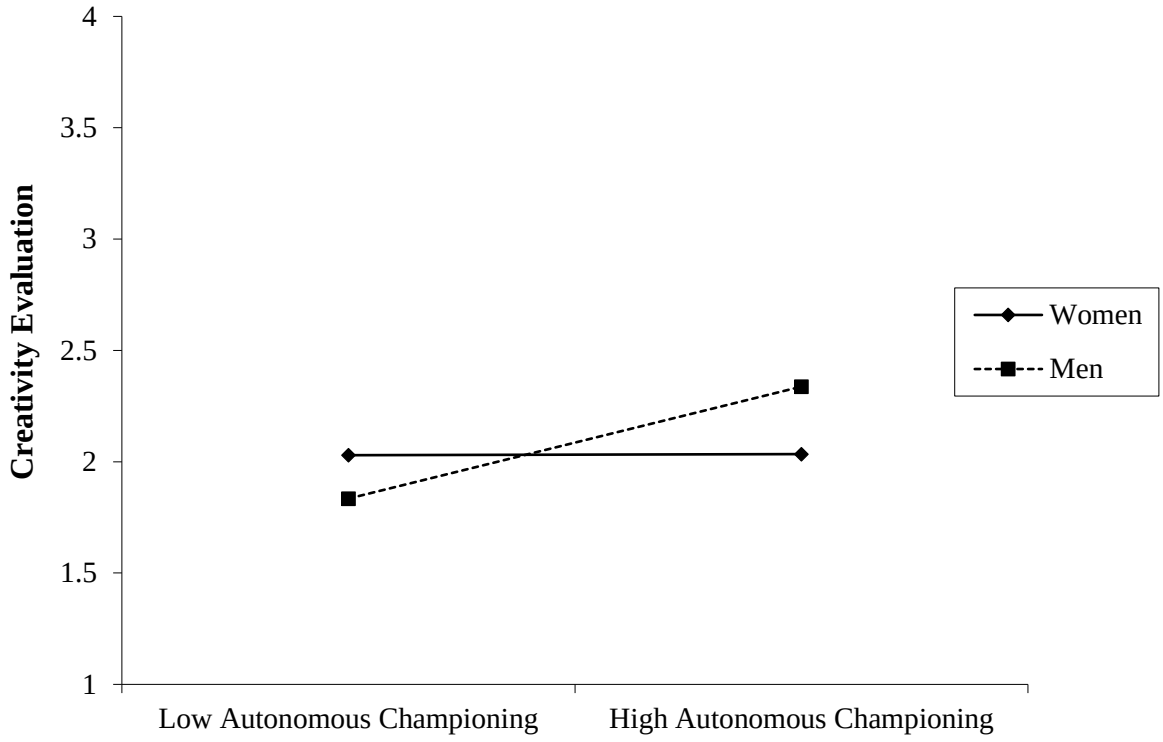

FIGURE 3. Effects of Gender and Autonomous Idea Championing on Creativity Evaluation (Study 5)

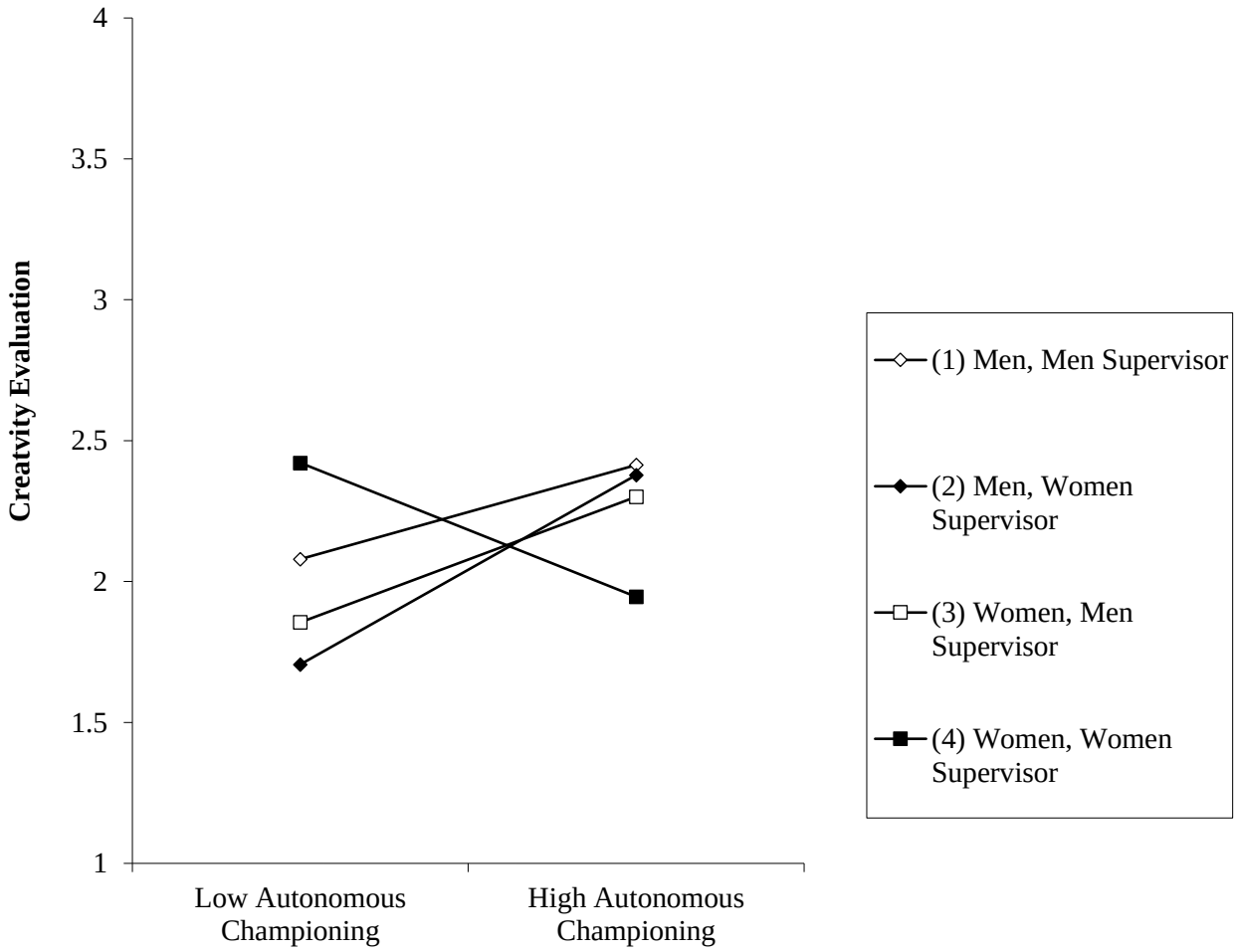

FIGURE 4. Effects of Employee Gender, Supervisor Gender, and Autonomous Idea Championing on Creativity Evaluation (Study 6)

APPENDICES

Appendix A Instructions for study 1

Smu challenge

Context
In marking SMU's 15th anniversary, the University endorsed a bold vision called Vision 2025 which aims to build SMU into a great university. One of the essential "building blocks" of SMU Vision 2025 is to attract and grow more SMU undergraduate students. Despite its fast grow and impressive accomplishments for the last 15 years, SMU still faces several roadblocks to accomplish Vision 2015.

One challenge we face is that as a relatively young institution, SMU is less recognized and publicized compared to other universities in the region and worldwide. To illustrate, NTU Youtube homepage video features 80,483 views in one year, NUS Youtube homepage video heats 42,139 views in two years, and the SUTD Youtube homepage video hits 118,180 views in 6 months! However, the SMU Youtube homepage introduction video only gets 12,908 views in a year.

Now we are passing this grand challenge to you, the most valuable member of the SMU community, to help SMU grow its publicity and attract more talents like you to join us! In this creative mission, we are asking for a mini-film no more than 60 seconds that can show and impress the world with the real SMU.

Creative Challenge
Through an original and eye-catching video, show the audience a real SMU featuring ONE aspect of the SMU experiences.

We are expecting more than the usual advertisement videos. The video should be **novel, eye-catching, engaging, and memorable**, and they require thinking **outside the box.**

It can be composed of real-life footages happened around SMU, a scripted video, or it can be improvised. Stories and styles of execution are up to you. Put the surprise, fun, and joy into it. You could also add humor and unexpected twist if relevant. Engage the audience to experience real SMU moments that "Wow" them and gather their "like", "thumbs up", and "share" for SMU on social media.

SMU must be the focus of your video as it triggers these connections. Your video needs to tell **ONE coherent story about SMU or ONE aspect of SMU life.** Don't simply put together a set of video clips. We'd like to engage the audience on social media, so you need to make sure your video resonates with them, makes them stop whatever they are doing to watch and share with their friends.

Format
Video (up to 60 seconds)

Winning Criteria
The winners will have found a way to create a highly original, unique, and memorable video that introduces a real SMU to those who do not know or are not familiar with the University, while making the SMU image positive and a must-check-out university to junior school students and their families.

The winning videos need to be appealing to viewers on social media. The ones that make people want to share to their friends through Whatsapp, Facebook, Wechat, Twitter, Weibo, or even emails.
Prizes
1st Prize SG$100 (1)
2nd Prize SG$50 (2)
3RD Prize SG$30 (3)

Rules
+ For this contest, if there is dialogue in the video, we'd like most of it to be in English. The part that is not in English please add in subtitles.
+ The video must be an original piece from you. No third party is allowed to help with creating or editing the video. You cannot use any video clips already existing from the internet in your submission.
+ Be creative and respectful to maintain a positive image of SMU.
+ Please upload the videos to the respective computer, and choose to upload it as
    ++ Name your video creatively and relevant to the theme of your video
    ++ In the description please add in your SMU email address
+ Only use the camera function from your device no other Video editing Apps are allowed
+ When shooting your video clips, it is important not to infringe on others' privacy or transpass out of bound areas. Exercise common sense and courtesy.
+ Only use the video editing tool we provided in your computer (Windows Media Video Maker). A tutorial video can be found in the computer.
+Please do not infringe on other's privacy and seek consent where applicable (e.g. if you are taking footage of a class).
+After all the participants concluded the study, external experts (professionals in entertainment industry) and other SMU students who have not participated in the study will evaluate the creativity of all the videos, and the top 9 most creative videos will be selected, and we will contact you for cash prize

Guidelines:
You will be guided through each of the following phases in this webpage.

Phase I: Generate ideas
You will be asked to generate as many ideas as possible about SMU experiences that can be documented in one 60-second video. Here you may generate ideas of different aspects (e.g. food in SMU, extra-curriculum activity).

Phase II: Evaluate ideas
You will be asked to evaluate each idea you just generated on several criteria.

Phase III: Choose one idea to implement
You will be asked to choose one idea out of all the ideas you just generated to work on.

Phase VI: Video production
You can go outside of the lab for 20 minutes to shoot the videos based on the idea you just selected. Then you come back and edit your videos and upload the videos to the computer.

*Important: Please do not share with your peers on campus about the task and the experiment. Simply tell them you are working on an in-class project if they ask about it.

Appendix B Instructions for study 3

To help SMU grow its publicity and attract more talents like you to join us, it may be worthwhile considering to set up a Pinterest webpage.
Now we need your help to create some Photo Collages for this SMU's Pinterest Web Page.
The photo collage should show the audience **ONE aspect of the SMU**
It needs to be **creative,** eye-catching **and can be potentially well liked/shared on the Pinterest website.**

Prizes
1st Prize SG$100 (1)
2nd Prize SG$50 (2)
3rd Prize SG$30 (3)
Judging Panel

The graduate students at the SMU creativity lab will be judging the photo collages:

We will inform you the results of the evaluation when the study is completed. If you have any questions please let us know.

Appendix C Posting for the Eco-Hotel (Study 2)

Eco- hotel – Name and Logo needed

Hi there! We need your creative designs for a new hotel. The Eco-hotel is located inside a natural hub- a home to more than 300 species of animals and 2,000 species of exotic plants.
The hotel will be in the heart of the nature area, surrounded by Zoos, Rainforest Walks, Natural Reverses, and Wildlife Parks.
The idea behind the hotel is nature tourism. While visitors can tour around the attractions in the Natural Hub, the hotel will provide a real experience of living in the wild. The Eco-hotel will provide full hotel services with more than 400 rooms as well as unique camps and family rooms.

The hotel adopts an open concept that wild animals around the natural hub can roam free around the hotel. Guests will be able to observe different kinds of wild lives from their own room window or balcony!

We are looking for a name (in English) and logo for the hotel.
We want the name and the logo to be modern, creative, memorable, and most importantly showing the unique feature of the hotel: opportunity to get close with nature and wild animals.
Below are sample pictures of similar eco-hote