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Gender and Decision-Making: Competitive, Risky and Entrepreneurial Decisions:
Three Essays Related to How Sex and Gender Influence Decisions in Different Contexts

A dissertation submitted in partial satisfaction of the requirements for the degree of

Doctor of Philosophy in Management

by

Alice M. Wieland

2012

ABSTRACT OF THE DISSERTATION

Gender and Decision-Making: Competitive, Risky and Entrepreneurial Decisions:
Three Essays Related to How Sex and Gender Influence Decisions in Different Contexts

by

Alice M. Wieland

Doctor of Philosophy in Management

University of California, Los Angeles, 2012

Professor Bill McKelvey, Chair

There has been an abundance of recent literature related to how gender affects decisions in competitive, risky and entrepreneurial environments, mostly noting that women are less likely to compete, are more risk averse and less likely to embark on an entrepreneurial career path. This dissertation challenges those findings, presenting three chapters that address each of the environments in question. The first chapter shows that decisions to compete are moderated by the domain in which the competition takes place; and shows that gender stereotypes associated with competence in the domain influence the decisions of each sex to compete in the given domain.

The second chapter investigates the generally held conclusion that women are more risk averse than men, and examines when gender differences in risk aversion are likely to occur and when they are less likely to manifest. We find that gender differences in risk aversion are likely to occur in decisions under *risk*, where the probability of outcomes is known and objectively quantified, such as games of chance, and less likely to occur in decisions under *uncertainty*,

where one must rely on their own, internal, subjective expectancies of the probabilities of outcomes. We propose and test the mechanism that is responsible for producing gender differences in risk aversion: one's subjective expectancy of the outcome. In decisions under *risk*, when subjective expectancies are accounted for the gender difference in risk aversion disappears; while in decisions under *uncertainty*, we do not observe any gender differences in risk aversion.

The final chapter draws from social-cognitive psychology and judgment and decision-making research to examine the influence of anticipated social resources and socio-cognitive processes that operate in tandem to affect entrepreneurial decisions such as venture selection and investments. A conceptual model is presented which explores the influence of one's gender, on state self-efficacy, anticipated social resources, perceived risk and venture desirability; all of which influence entrepreneurial decisions. Findings support that gender role cognitions exert considerable power over who is likely to pursue different types of entrepreneurial opportunities.

This dissertation of Alice M. Wieland is approved.

Barbara Lawrence

Rakesh Sarin

Wendy Wood

Bill McKelvey, Committee Chair

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2012

DEDICATION

This work is dedicated to my parents, Paul and Anna Wieland, who dedicated their careers to serving those in need, and supported me, unconditionally, in pursuing my academic aspirations.

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Once upon a time, not a very long time ago, a not that young maiden worked in a corporate environment and mused to herself what she would do with her life if she didn't have to spend her time earning a living. Her heart lusted after a PhD and pursuing a life of service through research and teaching (consistent with feminine stereotypes). Making that leap, from a professional career back to student would be challenging, but felt right. Now, some years later, the even less young maiden is finally at the end of the process of earning the degree, but at the beginning of the most rewarding career she could ever imagine... One filled with ideas and opportunities to contribute to topics that matter. The process of getting through this PhD program has been especially challenging for me, the maiden, but the clouds have brought some silver linings. I am especially indebted to a few very kind and supportive souls who I would not have made it through this program without.

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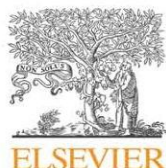
CHAPTER 1: DISSERTATION OVERVIEW

This dissertation explores how one's *sex*, which is biological, as a proxy for *gender*, which is socially constructed and consists of roles and norms based on one's biological sex, influence various aspects of decision-making. Are men and women making systematically different decisions in certain contexts? If systematic gender differences do exist in decision making the next question is, *Why?* Could these self-inflicted choices be partially to blame for the differential attainment of men and women in corporate and entrepreneurial environments? This dissertation aims to contribute to our understanding of when and why women and men may make systematically different decisions in certain contexts, and to dispel some prior research which suggests definite and robust sex differences in certain decisions that contribute to women's lesser economic outcomes. This is an important research question because although there has been much progress in the status of women in the last two decades, with significant gains in educational and occupational attainment, there are still discrepancies of outcomes for similarly trained and experienced men and women. The pay gap has now narrowed with women earning 80% of what men earn, even though women now make up almost 47% of the domestic labor force, and occupy over 51% of managerial and professional positions (U.S. Department of Labor). Additionally, there are still very significant disparities in terms of achieving the most prestigious and powerful positions available in our society. Women are still a small minority in elected governmental positions, (16% of Congressional seats), on Fortune 500 boards (15%), and as Fortune 500 CEO's (under 3%).

To date, there has been much research related to sexism, discrimination and the biased evaluations of women for traditionally masculine roles such as management (Heilman, 2001;

Heilman, Block, & Martell, 1995; Heilman & Haynes, 2005; Heilman, Wallen, Fuchs, & Tamkins, 2004; Rudman & Fairchild, 2004; Rudman & Glick, 1999, 2001). However, if cues in the environment suggest that certain courses of action, or occupational choices, would likely present significant barriers to obtaining desired outcomes, it is a rational, self-protective, choice to select a different path. People normally will not put themselves in situations where failure is likely. As such, concluding that differential sex outcomes results from discrimination may be overestimating the direct influence of discrimination (however, indirectly discriminatory practices may act as a deterrent, discouraging certain populations from pursuing paths where bias is likely). A neglected contributory factor of differential gender representation may be people's own decisions related to which paths are worth pursuing based on subjective cost – benefit analyses: risk perceived and likelihood of success x reward value (or subjective utility).

To tackle the overarching question of how sex and gender influence the decisions of men and women, a few different contexts were selected for examination, representing three separate, but related research projects. Specifically, of relevance to this research question are decisions enacted in competitive, risky and entrepreneurial environments. Recent research mostly notes that women are less likely to compete, are more risk averse and less likely to embark on an entrepreneurial career path. This dissertation explores how gender influences competition decisions in various domains (Chapter 2), the conditions under which gender differences in risk aversion are more likely to occur and less likely to occur, and why (Chapter 3), and finally, the socio-cognitive processes that lead people to start and invest more in entrepreneurial ventures that are congruent with one's gender (Chapter 4).



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Domain specificity of sex differences in competition

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ABSTRACT

There has been much recent literature about sex differences in competition, mostly noting that women are innately less competitive than men (Croson and Gneezy, 2009). This article examines the hypothesis that sex differences in propensity to compete are domain specific. We conducted a 2 (sex) $\times$ 4 (domain) experiment with 434 participants examining competition decisions, familiarity with the domain, and performance. We find no overall sex differences in rates of competition when collapsing across all four domains, but do find sex differences in rates of competition for individual domains. Additionally we examined the importance of winning at competition on self-esteem using the Contingencies of Self-Worth, Competition subscale (Crocker et al., 2003) and find that the subscale fully mediates the effect of sex on the strength of competitive pay preferences.

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1. Introduction

Recent research in experimental economics suggests that women are innately less competitive than men (Croson and Gneezy, 2009; Gneezy et al., 2003; Niederle and Vesterlund, 2007, 2008; Vandegrift and Yavas, 2009). A consequence of this research is that women would be less likely to compete in organizational tournaments leading to high status positions. It is a well known fact that there is a shortage of women in the upper echelons of management: only 2.6 percent of Fortune 500 CEO's and 15 percent of Fortune 500 board positions are held by women, even though women make up 51 percent of the management and professional labor force (US Dept of Labor, 2010). If the prior research is accurate, and women are innately less competitive, there are few effective interventions that could systemically address the shortage of women in high status positions. In which case, an argument could be made that the status quo is inherently adaptive, and women are underrepresented in high status occupations due to their inferior fit for these occupations.

The work presented here proposes and tests a set of hypotheses suggesting that societally sanctioned gender norms influence the domains that men and women elect to compete in. We present evidence that sex differences in the propensity to compete are domain specific. Due to the gender roles of men and women and the accompanying stereotypes, different sexes are likely to feel more or less competent in different domains. In their seminal article, Heath and Tversky (1991) found that people prefer “betting on their own judgment when they feel knowledgeable and competent, but not otherwise” (Heath and Tversky, 1991; p. 9). We extend this theory to apply to competition decisions. People will prefer to compete in domains they feel relatively more familiar and knowledgeable about; and those feelings of familiarity and knowledge are influenced by gender roles. Additionally, we examine the hypothesis that gender differences in competition are influenced by how men and women in our culture derive self-esteem. Research suggests that men, in particular, seem to gain self-esteem by

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demonstrating they are better than others (Crocker et al., 2003; Josephs et al., 1992), and this psychological need may nudge men towards competition.

First, we review the literature from behavioral economics and psychology related to sex differences in decisions to compete and performance in competition. We then present an experimental study testing the relevant hypotheses drawn from the literature review. We conclude with a discussion of our findings and their theoretical significance.

2. Literature review

2.1. Decisions to compete

Recently there has been a considerable amount of research suggesting that men enter competitions at significantly higher rates than women. Niederle and Vesterlund found that men are more than twice as likely to choose to be paid under a competitive scheme (vs. piece rate) than women are, even though performance on the task did not vary by sex of the participant (Niederle and Vesterlund, 2007, 2008). Additional research has found similar results: that men entered tournaments at much higher rates than women when the experimental task was to forecast future stock prices (Vandegrift and Yavas, 2009). However the tasks chosen in these experiments involve mathematical calculations. Math is a domain where women are stereotyped to do poorly (Inzlicht and Ben-Zeev, 2000; Keller and Molix, 2008; Steele and Ambady, 2006). In fact, Vandegrift and Yavas (2009) found that after controlling for skill at the experimental task (forecasting stock prices) gender differences in opting for the competitive option disappeared. Finally, Croson and Gneezy (2009) cite an unpublished study where participants either select to compete or be paid piece rate on two tasks, supposedly favored by each gender: shooting baskets, favored by men, or solving anagrams favored by women. On the task that favored men (shooting baskets), 53 percent of men competed, and only 15 percent of women competed; on the task that supposedly favored women (solving anagrams), 25 percent of women competed and 40 percent of men competed. However, since the details of this experiment are not disclosed it is difficult to determine if there may have been other drivers of the results, such as familiarity with the task or disclosing one's competitive preferences in a public setting. In contrast to the above results, Gneezy and colleagues (2009) found that women in a matrilineal society chose to compete at a basket shooting task at similar rates as men in a patriarchal society, suggesting that competitive preferences may be shaped by societal gender norms.

The main hypothesis of this study is that sex differences in decisions to compete are influenced by the competitive domain. The competence hypothesis (Heath and Tversky, 1991) suggests the people prefer to bet in areas of knowledge rather than a matched chance gamble. Similarly, if someone is more familiar or has more knowledge about a domain he or she would be more likely to elect to compete in that domain and show a stronger preference for competitive pay in the domain. Social role theory (Eagly et al., 2000) suggests that men and women are socialized to take on different roles in society, and therefore would have different exposures to various domains and develop different competencies based on their expected societal/gender role. The authors posit that social structure or cultural norms are the root cause of sex differences in behavior. We therefore present the following hypotheses:

Hypothesis 1a. Men's and women's decisions to compete depend on the domain of the competition.

Hypothesis 1b. Decisions to compete will be influenced by one's familiarity or knowledge with the domain of competition.

2.2. Competition and self-esteem

Recent research on gender has noted the precarious nature of manhood (Vandello et al., 2008), suggesting that manhood in our society requires continual social proof or one's status as a man can be questioned. Additionally, the male gender role in our society requires men to be individualist, independent and autonomous, and puts men in a position to have to "prove" that they are better than others to generate self-esteem (Josephs et al., 1992). In a recent article, Crocker et al. (2003) proposed that some people's self-worth is based on being superior to others, by outdoing others in competition, and that men are especially vulnerable to generating self-esteem via competitive performance. Although, at the individual level, both men and women vary with respect to how important winning in competitive situations is to feelings of self-worth.

It is therefore possible that men and women may decide to compete for different reasons. As a group, men may choose to compete as a means of generating greater self-esteem, as well as for the economic rewards, while women may take a more rational approach to the decision to compete based on economic expectancies. The Contingencies of Self-Worth, Competition subscale (Crocker et al., 2003) was included in the experiment to examine this phenomenon. If men's decisions to compete are driven by something other than economic expectancies, we would see greater variance in men's decisions to compete: selecting to compete at high rates in domains of competence and low rates in domains where they feel less competent, to avoid the negative self-evaluation that may result from losing a competition.

Hypothesis 2a. Winning in competitive situations will be more important to men's feelings of self-worth than to women's.

Hypothesis 2b. The importance of winning in competitive situations to one's self-worth will mediate the relationship between sex and competitive pay preferences.

2.3. Sex differences in performance

Gneezy et al. (2003) first suggested that women may be less effective in competitive situations than men, noting that men's performance increased under competitive pressures while women's performance did not. However, the dependent variable in this study was the number of mazes solved. Spatial abilities are one of the few domains where men have consistently shown greater ability (Baron-Cohen, 2002), and therefore this domain (mazes) maybe stereotyped as a masculine domain. Social role theory suggests that men and women would perform better at a task in a competitive situation that is congruent with their gender role due to greater exposure to the content. In contrast, performance would be impaired in a domain that is incongruent with their gender role. This theory would suggest approximately equal performance in neutral domains. We therefore propose that both men and women will show higher performance in domains in which they feel more competent (knowledgeable or familiar).

Hypothesis 3. Performance in a domain will be positively related to one's perceived competence (knowledge or familiarity) with the domain of competition.

3. Experimental design and procedure

To test our hypotheses we employed a 2 (sex) $\times$ 4 (domain) experimental design. The domains included two tasks that the different sexes were hypothesized to be equally competent in (verbal ability and crafts), one that favored women (fashion) and one that favored men (math).

The experiment was administered online via Qualtrics. Participants were given the following instructions: "You will be randomly assigned one of the following general knowledge quizzes: Math, Verbal, Fashion or Crafts. Each quiz will consist of multiple choice questions and have a time limit to answer all the questions. To ensure you are motivated to perform your best you will receive additional incentive payments either for the questions you answer correctly, or for how well you perform relative to another randomly selected participant (you will have the choice of payment scheme)." Participants were then asked to rate how "familiar/knowledgeable" they were about the four topics being tested on a 1 (not at all), to 5 (expert), Likert scale. Next, participants were randomly assigned to one of the four quizzes automatically by Qualtrics. The screen for the verbal quiz read:

You have been assigned the Verbal quiz. The quiz consists of 8 questions of word knowledge of moderate difficulty.

Now you must select how you will be compensated for your correct answers. You can either be paid a base rate of 5 cents per correct answer, or compete against another randomly selected MTurk participant and be paid 15 cents for each correct answer if you are the participant with the most correct answers, 7 cents per correct answer if there is a tie in number of correct answers (or be paid nothing additional per correct answer if you answer fewer questions correctly).

Please choose the option you would prefer below:

- 15 cents per correct answer if you compete against another participant and perform better
- 5 cents per correct answer

The payment options were randomly presented. The introduction sentence announcing which quiz the participants were assigned varied by condition, but the second paragraph and the payment options were exactly the same in all conditions. The introduction sentences for the other conditions were as follows: Math, "You have been assigned the Math quiz. This quiz consists of 7 questions that will require math calculations"; Fashion, "You have been assigned the Fashion quiz. The quiz consists of 8 questions of fashion knowledge"; and Crafts, "You have been assigned the Crafts quiz. The quiz consists of 8 questions about crafts." After participants had selected their preferred method of payment for performance on the quiz, they were asked on the following screen to "indicate how strongly you prefer the option you selected for performance payment" on a 1 = strongly prefer piece rate, to 5 = strongly prefer competition, scale (3 = indifferent). On the next screen participants were given information about the strict time limits of the quiz, e.g. "The Verbal quiz is on the next page. Once you click the next button, you will have exactly 70 seconds to answer the 8 questions." These tight time-limits were given and enforced by the survey software to prevent participants from having any slack time to get assistance from the internet in answering the questions presented. Participants then took the quiz that they were randomly assigned. All quizzes consisted of 7 or 8 multiple choice questions. The math and verbal questions were adapted from GRE and GMAT review materials. An example of a fashion question was, "Who designed the famous black dress that Audrey Hepburn wore in 'Breakfast at Tiffany's'?" With the following answer choices: Cristobal Balenciaga, Hubert de Givenchy, Christian Dior, Andre Courreges and Ann Taylor. An example of a Crafts question is, "Which of the following is not an example of a traditional Native American craft?" With the following answer choices: Glass blowing, Clay pot, Cornhusk doll, Beadwork.

Since the math quiz required calculations participants were given more time on that quiz (5 minutes to answer 7 questions).

After participants completed their assigned section, they were asked to answer the following measure of risk aversion: "Imagine you have a lottery ticket for a cash prize worth \$100. There is a 50% chance you'll win the \$100, and 50% chance you won't

Table 1
Decisions to compete by sex and domain.

Domain	% choosing to compete				<i>p</i> -value
	Men	<i>N</i>	Women	<i>N</i>	
Verbal	62%	42	42%	66	.049
Math	48%	46	45%	58	.763
Crafts	47%	43	47%	68	.956
Fashion	26%	42	46%	69	.034
All conditions	46%	173	45%	261	.926

win (and get \$0). What is the least amount you would accept to sell the ticket? Participants were shown a scale with values from \$0 to \$100 and asked to indicate their minimum selling price for the ticket. Additionally, the Competition subscale measuring the importance of competition to one's self-worth from the Contingencies of Self-Worth, scale (self-worth scale) (Crocker et al., 2003) was included. This scale consists of five items and participants rate themselves from 1 = Strongly Disagree to 7 = Strongly Agree on each of the items. The average rating across all five items reflects the importance of self-worth derived from competition. Finally, participants were asked to provide some demographic information including their gender, age and level of education, thanked for their participation and given a code to enter in M-Turk.

3.1. Participants

To test our hypotheses that sex differences in competition are domain specific Amazon Mechanical Turk (M-Turk), an online labor market, was used to recruit and pay participants. Several recent studies have verified the advantages and appropriateness of this subject population for experimental online research (Eriksson and Simpson, 2010; Paolacci et al., 2010; Reips, 2002). Four hundred and thirty-four participants completed the online survey: 261 women (60 percent) and 173 men (40 percent), only from the United States. Some participants that completed the online survey did not submit the payment request for their work through M-Turk. The mean time spent on the survey was approximately 7 min. Participants were paid 50 cents to take the survey plus incentive compensation based on the option they selected: either piece rate or competition. If participants selected to compete they were randomly matched with another participant and only paid for their performance if they either had the most correct answers or had an equal number of correct answers as the matched participant. The mean incentive payment was 35 cents per participant, and ranged from \$0 to \$1.20, for a total average compensation of 85 cents per participant.

4. Experimental results

4.1. Decisions to compete

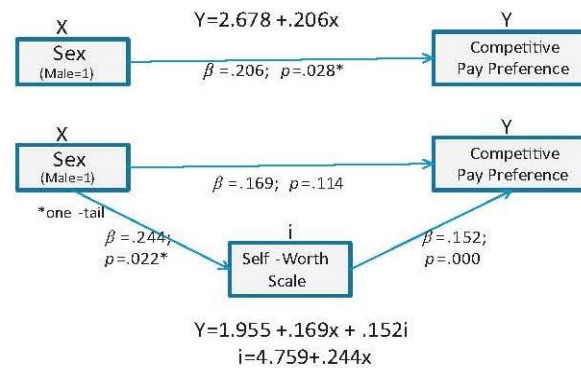
Although prior research has found that men opt to compete at significantly higher rates than women (Croson and Gneezy, 2009; Gneezy et al., 2009, 2003; Gneezy and Rustichini, 2004; Niederle and Vesterlund, 2007, 2008; Vandegrift and Yavas, 2009), when we collapse across domains examined, we find no difference in competition decisions between men and women (46 percent for men vs. 45 percent for women; $p = .926$). This result may be because two domains were theorized to be neutral, one male (math), and one female (fashion). We do find support for Hypothesis 1a, it appears that decisions to compete or not depend on the domain of competition (see Table 1). Contrary to expectations, no sex differences in competitive decisions were found on the math task. On average, women did answer slightly more questions correctly than men on the math quiz, but participants would not have known about the difficulty of the quiz in advance. Additionally, we expected the sexes to compete about equally in the verbal and craft domains, but we can see that men chose to compete at a significantly higher rate in the verbal domain. Finally, as hypothesized, women opted to compete at a significantly higher rate than men in the fashion domain. Consistent with prior research, we did find a sex difference in risk aversion: women were significantly more risk averse than men ($M_{\text{Men}} = 45.24$, $M_{\text{Women}} = 40.24$; $p = .015$). In spite of being somewhat more risk-averse, women choose competition at the same rate as men in math and crafts, and at a higher rate than men in fashion. So risk aversion does not explain the decision to compete.

Hypothesis 1b predicted that the decision to compete would be based on how familiar or knowledgeable the participant felt with the domain. To explore this hypothesis we conducted a binomial logistic regression with the decision to compete as the dependent variable (compete = 1; piece rate = 0), the participant's familiarity/knowledge of the domain they were assigned as the independent variable, while controlling for other relevant variables in the study, including the self-worth scale, sex, age, education, and risk aversion (see Table 2). We can see that the only significant predictors of the decision to compete are familiarity/knowledge with the domain of competition, and the self-worth scale.

Table 2
Binomial logistic regression: decision to compete.

Variable	Model 1	Model 2	Model 3	
	B	B	B	p
Constant	–.769***	–1.619***	–1.358*	.082
Familiarity	.200**	.191**	.190**	.041
Self-worth scale		.180**	.182**	.027
Sex (Male = 1)			.009	.966
Age			–.056	.604
Education			.059	.568
Risk aversion			–.006	.250

N = 434.

* $p < .10$.** $p < .05$.*** $p < .01$.**Fig. 1.** Mediation of sex and competitive pay preferences.

4.2. Importance of competition to self-esteem

We hypothesized that winning in competitive situations would be more important to men's self-esteem than to women's. Therefore, we included a five item measure from Crocker et al. (2003) that measures how important winning at competition is to self-worth. The measure includes such items as, "*Doing better than others gives me a sense of self-respect*" and "*My self-worth is influenced by how well I do on competitive tasks*". The Cronbach's alpha for the scale was .902. As expected, men scored higher than women on this scale ($M_{Men} = 5.00$, $M_{Women} = 4.76$; $p = .022$, one-tailed), supporting Hypothesis 2a. Additionally, from Table 2 above we can see that the self-worth scale significantly predicts the choice to compete.

Hypothesis 2b predicts the self-worth scale will mediate the relationship of sex to strength of competitive pay preferences. To examine the importance of this psychological drive, we also measured the strength of competitive pay preference. Again, to measure this variable we asked participants to "*indicate how strongly you prefer the option you selected for performance payment*" on a 1 = Strongly prefer piece rate, 2 = Somewhat prefer piece rate, 3 = Indifferent, 4 = Somewhat prefer competition and 5 = Strongly prefer competition. In accordance with the procedures set forth by Baron and Kenny (1986), the self-worth scale (Crocker et al., 2003) was investigated as a mediator, and found to fully mediate the relationship between sex and the strength of competitive pay preferences (see Fig. 1).

Consistent with expectations, sex predicted competitive pay preferences ($\beta = .206$, $p = .028$, one-tailed), and was significantly related to the self-worth scale ($\beta = .244$, $p = .022$, one-tailed). Also as expected the self-worth scale was significantly related to the strength of competitive pay preference ($\beta = .152$, $p = .000$) when both sex and self-worth scale were included in the regression. The effect of sex on competitive pay preference adjusted for the effect of self-worth scale became insignificant in the model ($\beta = .169$, $p = .114$). Therefore we found the self-worth scale, measuring the importance of winning at competition to feelings of self-esteem, to fully mediate the effect of sex on the strength of competitive pay preferences (Sobel test, $z = 1.761$, $p = .039$, one-tailed) (Baron and Kenny, 1986).

4.3. Competitive performance

Hypothesis 3 predicts that performance in a domain will be positively related to one's perceived competence (knowledge or familiarity) with the domain of competition. Again, Social Role Theory (Eagly et al., 2000) would predict that men and women will be more familiar or knowledgeable about domains that are congruent with their gender role. If one sex is more familiar or knowledgeable about a particular domain, not only would we expect that sex to choose to compete more in that

Table 3
Familiarity/knowledge as the predictor of performance.

Variable	B	Sig.
Constant	3.012	.000
Familiarity	0.164	.062
Payment (Compete = 1)	0.383	.019
Sex (Male = 1)	−0.507	.002
Age	0.169	.052
Education	0.202	.017
Verbal dummy	−0.696	.003
Math dummy	−2.224	.000
Fashion dummy	−0.922	.000

N = 434.

domain, but we would also expect better performance in the congruent domain due to greater knowledge and familiarity. In Table 3 we show the relationship between Performance and Familiarity/Knowledge while controlling for other variables. We find support for the hypothesis that greater familiarity leads to higher performance. Additionally, the results of this analysis reveal that overall men are performing worse than women on the tasks, and there is a significant increase in performance for those that opted to compete at the task. Not surprisingly, educational attainment is also a significant predictor of performance.

In addition to the research implying that women are more reluctant than men to engage in competition, there is a stream of research that has found that when women do enter a competitive situation their performance does not significantly improve over a non-competitive situation. On the other hand, men's performance has been shown to increase in competitive situations (Croson and Gneezy, 2009; Gneezy et al., 2003). Croson and Gneezy (2009) state that in competitive situations "males react with extra effort, while females do not" (p. 464). Our results show that overall both sexes receive a boost in performance when in a competitive situation. When we run a regression of performance (dependent variable) on sex of participant and payment choice (independent variables), including an interaction term between the two, we find that both sex ($\beta = -.667$, $p = .007$) and the payment option ($\beta = .408$, $p = .079$) are significant predictors of performance while the interaction term is not significant ($p = .840$). Thus, both men and women exhibit about the same boost in performance when they select to be paid via competition.

5. Discussion

In this article we challenge the conclusions of prior literature that women are *always* less competitive than men. Heath and Tversky (1991) proposed a competence hypothesis: that people prefer to bet on their own knowledge rather than on a chance gamble with the same set of odds. This result may also apply to decisions made in a competitive environment: people are willing to compete when they believe they are knowledgeable about the domain of competition. However, knowledge about a domain may be highly correlated with societal gender roles. We hypothesize that decisions to compete, or to refrain from competition, are partly based on subjective expectancies of winning. We suggest that if one feels relatively competent in a particular domain, they will be more likely to choose the competition option and may not sufficiently correct for the average competencies of the participants against whom they will be competing. In this work, we measured self-perceived competency as perceptions of familiarity and knowledge with the different domains included in the study. Although we do not find overall sex differences in the rate of selecting to compete when we collapse across domains, we do find that familiarity and knowledge of a domain does in fact predict the decision of whether or not to compete.

In accords with Social Role Theory (Eagly et al., 2000) we also proposed that due to societal gender roles, different sexes will gain greater competencies in different domains, influencing their subjective expectancy value of the competition in various domains. We found support for this theory, although not in the direction and magnitude predicted in the Math and Verbal domains. However, as expected, women selected the competition option significantly more than men in the Fashion domain: 46 percent of women opted to compete versus 26 percent of men.

We also explored a psychological mediator that was hypothesized to influence the choice to compete: the importance of being better than others to one's self-esteem, as measured by the Contingencies of Self-Worth, Competition subscale (Crocker et al., 2003). As expected, we find that performing well in competitive situations is significantly more important to men's self-worth than to women's. We also find that this psychological measure significantly predicts the decision to compete or not. Finally, we find that the importance of being better than others to one's self-esteem completely mediates the effect of sex on performance. Men scored significantly higher on competitive pay preferences than women but when the Self-Worth, Competition subscale is included in the model the effect is no longer significant. We can also see the effect that this psychological need may be having on the decisions to compete for men and women. Men's competition choices range from 62 percent in Verbal to only 26 percent in Fashion, while women's choice range is much narrower from 42 percent in Verbal to 47 percent in Crafts. It appears that men's decision to compete or not is much more heavily influenced by the domain (26–62 percent), while women's decisions appear more stable (42–47 percent). If we consider the harm to men's self-esteem that is associated with losing a competition, we would expect such a result. It may be more painful for men to lose at a competition than it is for women, influencing men's reluctance to compete in domains in which they are relatively

unfamiliar. Since women would not experience the same threat of loss of woman-hood (Vandello et al., 2008), women may be instead focusing solely on the expectancy value of rewards (the competition winner received three times the piece rate payment).

Finally, we also expected familiarity of the domain, which is influenced by gender roles, to positively influence performance. We find that performance across domains is positively related to familiarity with the domain of competition. Additionally, contrary to prior research we find that both sexes perform better when selecting to be paid via competition.

In conclusion, we find support that sex differences in competition are moderated by the domain in which the competition takes place, and that familiarity or knowledge of the domain of competition significantly influences the decision to compete. We also find that winning at competition and demonstrating that one is better than others is more important to men's self-worth than to women's, and that this construct mediates the effect of sex on the strength of competitive pay preferences. Finally, we find that perceived familiarity or knowledge of a domain significantly influences performance and that both men and women experience similar boost in performance when in a competitive situation.

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CHAPTER 3: GENDER DIFFERENCES IN RISK AVERSION: A THEORY OF WHEN AND WHY?

There has been an abundance of research conducted during the last two decades related to gender¹ differences in risk aversion, mostly finding women to be more risk averse than men (Byrnes, Miller, & Schafer, 1999; Carr & Steele, 2010; Croson & Gneezy, 2009; Eckel & Grossman, 2002, 2008). So prevalent is the finding of women's greater risk aversion that further research has proposed mechanisms by which it operates: from avoidance of negative social consequences for non-conformance to stereotypes (Larkin & Pines, 2003), to "feeling more" (Croson & Gneezy, 2009), i.e. having stronger emotional reactions to losing (Eriksson & Simpson, 2010), to higher perceptions of negative outcomes and lower expectations of enjoyment for risk-taking (Harris, Jenkins, & Glaser, 2006). However, other research has not found any differences in risky decision making between the sexes (Carr & Steele, 2010; Demaree, DeDonno, Burns, Feldman, & Everhart, 2009; Fehr-Duda, De Gennaro, & Schubert, 2006; Schubert, Brown, Gysler, & Brachinger, 1999; Vlaev, Kusev, Stewart, Aldrovandi, & Chater, 2010). In this research we investigate gender differences in risk aversion for decisions under *risk*, where outcome probabilities are specified and for decisions under *uncertainty*, where one must rely on one's own subjective expectancies to assess likely outcomes.

We begin with the well-known distinction between decisions under *risk*, and those under *uncertainty*. Decisions under *risk* refer to making decisions in contexts where the probabilities of each outcome are known, for example the toss of a fair coin. In other words, the decision context represents objective outcome probabilities, i.e. there is consensus about these

¹ In this research we use the terms gender and sex interchangeably. Although sex is usually defined as the biological distinction between male and female, and gender refers to social roles that one takes on (Rudman & Glick, 2008), the literature we are building on does not make the distinction between sex and gender. Additionally, some research has suggested that using either terms should be considered correct due to the lack of consensus about how sex and gender differ (Eagly, 2000).

probabilities. Decisions under *uncertainty* refer to decisions in which outcome probabilities are not exactly known, but are inferred by the decision maker based on *subjective expectancies*, which may be based on prior experience or any other relevant information source. Thus, decision makers may have different beliefs and therefore assign different probabilities to an event, e.g. the US winning the most gold medals in the 2012 Olympics. This distinction is important because it serves to separate decisions involving risk into two categories, one in which the decision maker should rely on external cues to optimize their outcomes (decisions under risk), and the other in which the decision maker *must* rely on internal assessments for outcome optimization (decisions under uncertainty).

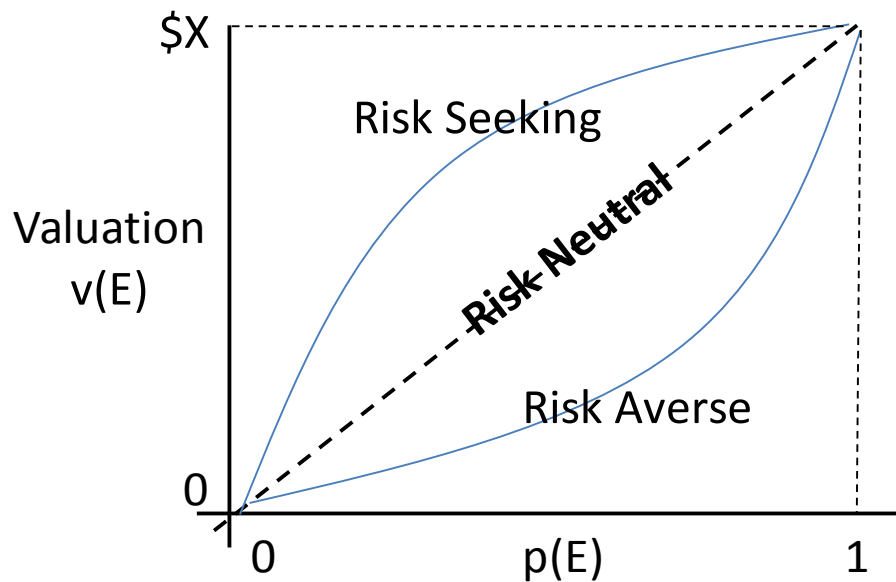
In this research we suggest that decisions under uncertainty are less likely to lead to gender differences in risk aversion, but those involving risk, with known probability estimates, are more likely to produce gender differences in risk aversion. Our experiments examine situations in which the risk is either objective, in which the outcome expectancies are known, or the decision is uncertain, in which outcome expectancies must be inferred from one's own knowledge. Consistent with current work in decision making, we label the subjective probability estimates or "subjective estimates of the likelihood of future events", as *expectancies* (Roese & Sherman, 2007). Additionally, we propose that it is these subjective expectancies that actually mediate, or account for, the gender differences that appears to be so robust in decisions under risk, i.e. men and women have different internal, subjective expectancies for winning objective probability games.

Following is the subjective expected utility model that has been widely accepted for evaluating decisions under risk and uncertainty.

The Model

Consider a bet on an event, E , in which a participant receives $\$X$ if the event occurs; otherwise he or she receives nothing ($\$0$). The subjective probability of the occurrence of event E is assessed to be $p(E)$, and the participant provides his or her valuation of the bet, $v(E)$. Rationally, $p(E)$ lies between 0 and 1 and $v(E)$ should lie between $\$0$ and $\$X$. If the participant is risk neutral, the relationship between $p(E)$ and $v(E)$ would be linear, as depicted in the graph below by the dashed line labeled “Risk Neutral”. However, since research has documented the robustness of risk aversion, the relationship between $p(E)$ and $v(E)$ is expected to be non-linear as shown in Figure 1 by the lower curved line.

Figure 3-1: Relationship of Valuation to Subjective Estimates of Probability



Under the expected utility model, valuation of a bet depends on one's beliefs (probability) and tastes (utility). A widely accepted form for the utility function is the following power form (Keeney & Raiffa, 1976; Tversky & Kahneman, 1992):

$$\left[\frac{v(E)}{X} \right]^\alpha$$

In this form, α is the curvature of the utility function. In Figure 1, $\alpha=1$ corresponds to a risk neutral valuation, $\alpha<1$ corresponds to a risk averse valuation, and $\alpha>1$ corresponds to a risk seeking valuation.

In the expected utility model, utility of the valuation of the bet is equal to the expected utility of the bet:

$$\left[\frac{v(E)}{X} \right]^\alpha = p(E)$$

Taking the natural logarithm of both sides:

$$\alpha \text{ LN}(v(E)/X) = \text{LN}(p(E)) \text{ or } \text{LN}(v(E)) = \text{LN}(X) + 1/\alpha \text{ LN}(p(E))$$

Alternatively, we can write:

$$\text{LN}(v) = b_0 + b \text{ LN}(p) \text{ or } \text{LN}(\text{Valuation}) = b_0 + b \text{ LN}(\text{Probability})$$

This basic model can be used to estimate the valuation of bets for a population.

A participant who believes that event E has a higher probability of occurrence than another participant should provide a higher valuation for the bet if their utility functions for the bet are similar. Therefore, a comparison of the valuations for real events must control for the participant's probability estimate (expectancy) of the event. ***A multiple regression model permits us to control for probability so we can isolate gender differences in valuation and therefore establish whether women are more risk averse than men.*** We use both a linear and non-linear multiple regression model throughout this manuscript. Following is the non-linear model:

$$\text{LN}(\text{Valuation}) = b_0 + b_1 \text{Sex} + b_2 \text{LN}(\text{Probability})$$

In this Model both valuation and probability are normalized between 0 and 1, and sex is a dummy variable with Male=1, and Female=0. Therefore, if coefficient b_1 is positive and statistically significant, then one can assert that on average men have a higher valuation of the

bet than women, (after controlling for subjective expectancies), and can be deemed less risk averse. We also use a linear model.

$$\text{Valuation} = b_0 + b_1\text{Sex} + b_2\text{Probability}$$

Since our participants differ in age and education, both of which may influence risky decisions, we include controls for these two variables. Additionally, in some experiments, we measure the knowledge a participant has with the domain (on a 5-point Likert scale) and vary the domain and conditions of the risky prospect, which are dummy coded variables. If these variables were relevant in the experiment, we included controls for them as well. Therefore for each experiment we provide full regression models with these controls included.

Non-Linear Model

$$\text{LN(Valuation)} = b_0 + b_1\text{Sex} + b_2\text{LN(Probability)} + b_3\text{Age} + b_4\text{Education} + b_5\text{Knowledge} + b_6\text{Domain1} + b_7\text{Domain2} + \dots$$

Linear Model

$$\text{Valuation} = b_0 + b_1\text{Sex} + b_2\text{Probability} + b_3\text{Age} + b_4\text{Education} + b_5\text{Knowledge} + b_6\text{Domain1} + b_7\text{Domain2} + \dots$$

In each of the above models, our focus is on the sign and statistical significance of b_1 . If b_1 is statistically significant then one can establish that on average:

Non-Linear Model

$$\frac{\text{Valuation of Men}}{\text{Valuation of Women}} = \text{Exp}(b_1).$$

Linear Model

$$\text{Valuation of Men} - \text{Valuation of Women} = b_1.$$

STUDY 1: Games of Chance

In the first study we sought to replicate prior research to ensure that the gender differences in risk aversion replicated in the traditional economic method of measuring risk aversion: valuation of gambles in which the probability of the outcome is provided, rather than those where valuation depends on subjective assessments. Again, recent research is robust with findings in economics of gender differences in risk aversion: see Croson and Gneezy (2009) for an overview. For this experiment, we adapted the methodology employed from prior research (Chow & Sarin, 2001), and examined various levels of outcome probability.

Method

Design and Procedure

One hundred and six participants were recruited and paid through M-Turk and the study was run online. Five participants were excluded from the analysis because their responses came from IP addresses that had already responded to the survey, and there was no way to ensure that these participants did not take the survey twice. The final sample includes 101 participants: 57 women and 44 men. Several recent studies have verified the advantages and appropriateness of the M-Turk subject population for conducting experimental research related to judgment and decision making (Eriksson & Simpson, 2010; Paolacci, Chandler, & Ipeirotis, 2010) finding it to be superior to university subject pools.

Participants first completed a consent form and then were given brief instructions that stated, “*We are interested in your judgments. There is no right answer. Please take your time and think about each question carefully, and then answer the questions that follow to the best of your ability.*” Then participants were asked to provide price estimates for three questions adapted from prior research (Chow & Sarin, 2001) on a scale of \$0 to \$100. The first question was

exactly like the question presented below, and the other two were similar, but provided for ascending probabilities of 50% white balls, then 66% white balls.

Imagine that there is a bag filled with exactly 10 white balls and 20 yellow balls. You get to select a single ball from the bag without looking. If the ball you draw is white you win \$100; if it's yellow, you get nothing.

Bag Ball Distribution

10 white balls

20 yellow balls

30 total balls

*What is the **most** you would pay to play this game?*

After participants had completed the three valuation questions, they were asked to provide demographic information including gender, age, and education. Finally, participants were thanked and given a code to enter into the M-Turk system.

Results and Discussion

This study effectively replicates prior work that finds that women are more risk averse than men. Again, what was tested in this experiment were objective probability gambles, and the findings indicated that for this type of decision, women are behaving in a more risk averse manner than men, at each given level of objective probability.

Variables representing the natural log were created for two variables: the amount the participant was willing to accept for the ticket, scaled between 0 and 1, by dividing the amount the participant indicated by 100; and the probability variable scaled between 0 and 1. In this study, the natural log was calculated for the variables of interest: likelihood of outcome and participant valuation (price). Additionally, for all the studies included in this manuscript the education variable is dummy coded as either less than a four year college degree (0), or a four year college degree of higher (1). As expected, women and men showed significant differences

in risk aversion for the three questions asked: Question 1 with a probability of 1/3, $M_{\text{women}}=10.05$, $M_{\text{men}}=20.64$, $p<.001$; Question 2 with a probability of 1/2, $M_{\text{women}}=15.46$, $M_{\text{men}}=29.66$, $p<.001$; and Question 3 with a probability of 2/3, $M_{\text{women}}=20.82$, $M_{\text{men}}=43.77$, $p<.001$. In fact, we can see that the effect of male gender effectively doubles the willingness to pay to play these games of chance. This effect is significant even when controlling for the stated probability of the gamble, participants' age and education (see Table 1). In the non-linear regression, the coefficient of the sex variable (Male=1) is .80 which means that on average men pay $\exp(.8)$ or 2.2 times the amount women pay for these objective probability gambles (games of chance). In the linear regression, the coefficient of the sex variable (Male=1) is 16.43, which means that on average men pay \$16.43 more than women pay for the same gambles. Both models confirm that for these gambles, under conditions of risk, women are showing greater risk aversion than men.

Table 3-1: Regression Results for Valuation of Games of Chance

Variable	Non-Linear		Linear	
	β	SE	β	SE
Constant	.77***	.20	.42	4.56
Sex (Male=1)	.80***	.10	16.43***	1.93
Probability	1.19***	.17	48.92***	7.02
Age	-0.02***	.00	-0.37***	.08
Education	.17	.10	4.68*	1.95
Adjusted R ²	.33		.33	
F	35.44***		35.76***	
N	291		300	
* p < .05; ** p < .01; *** p < .001				

STUDY 2: Mediation of Subjective Expectancies in Decisions with Risk

We can see from the first experiment that when probabilities are objective, or provided to the participant, we do find gender differences in risk aversion. We hypothesized that perhaps in decisions under risk, where probabilities are objective and known to participants, women and men may have different subjective expectancies of these objective risks². Therefore, we sought to create a situation where participants could provide a valuation to a risky gamble, and measure their subjective assessment of their likelihood of winning to determine if one's subjective expectancies mediate behaviors in objective probability gambles.

Method

Design and Procedure

One hundred and twenty-one participants were recruited and paid through Amazon's Mechanical Turk (M-Turk) and the study was administered online. Two participants were excluded from the study because their IP address was a repeat, and we wanted to eliminate the possibility that multiple responses from the same participant were included in the final sample. Another three participants were excluded because they took longer than 3 standard deviations above the mean in terms of time spent of the survey, (there were not any participants who spent less than 3 standard deviations below the mean in time taken to complete the survey). The final sample included 116 participants (62 women, 54 men).³ Participants answered some unrelated questions along with the question of interest, which was a decision under risk, how much they

² We thank Wendy Wood, USC Provost Professor of Psychology and Business for her feedback and for suggesting this mechanism.

³ Participants were randomly assigned to one of two conditions, in which one condition was designed to promote conformance with gender role stereotypes by inserting the extra sentence in the instructions: "*Your responses will be evaluated by our research team against other same sex participants, and the results of the choices provided may be disclosed on a decision making research website.*" The manipulation was unsuccessful resulting in no statistical differences in the results between the two conditions, perhaps due to the difficulty in priming gender normative behaviors when participants remain anonymous, such as with M-turk. Since the manipulation was unsuccessful, the conditions are collapsed for the remaining analyses.

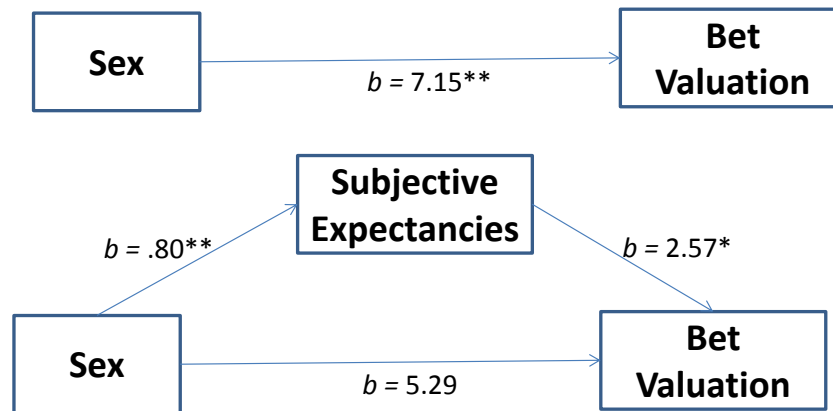
would pay to play a game involving a 50% probability of winning by drawing a ball from an urn. For the 50-50 gamble, we also measured participants' subjective likelihood of winning by asking the following question at the end of survey, "*On the scale below, please indicate how likely you believe you are to win the Urn gamble.*" Participants were to indicate on a sliding scale which of the following options express their beliefs, *Almost Impossible, Unlikely, Possible, Toss-Up, Good Chance, Probable, Almost Certain*, the degree to which they believed they would win the gamble. This measure was adapted from prior research related to the terminology used to express probability expectations (Wallsten, Budescu, Rapoport, Zwick, & Forsyth, 1986). Participants did not see any values, but instead saw the words listed to describe how likely they felt the event would be, however the scale recorded a value for the participant's response depending of the location of the sliding bar, from 1 to 10. "*Toss up*" was in the exact middle of the scale which was recorded by the survey program as a response of 5 on the scale, indicating a 50% likelihood of winning. Finally, participants were asked to provide some demographic information, then thanked and given a code to enter into M-Turk.

Results and Discussion

We hypothesized that subjective expectancies would mediate the gender difference in objective probability gambles or decisions under risk. To test this hypothesis we followed the directions outlined by Baron and Kenny (1986), which stipulates the steps for mediation testing. We used the linear model for testing mediation. First, we confirmed that there was a gender difference in the valuation of the urn gamble, $b = 7.15$, $t(112) = 2.14$, $p = .035$. Next, we established the relationship between the independent variable, participant sex, and the proposed mediator, subjective expectancies, $b = .80$, $t(111) = 2.61$, $p = .010$. Finally, we included both participant sex, the independent variable, and subjective expectancies, the proposed mediator in

the regression to find that the effect of participant sex on the dependent variable was no longer significant $b = 5.29$, $t(111) = 1.54$, $p = .127$; while the mediator remained highly significant, $b = 2.57$, $t(111) = 2.48$, $p = .015$. A Sobel test confirmed that subjective expectancies fully mediates the effect of participant gender on risk aversion ($z = 1.95$, $p = .05$).

Figure 3-2: Mediation of Subjective Expectancies on Bet Valuation



Results for bet valuation of 50-50 gamble in Study 2: mediation of the effect of subjective expectancies on bet valuation. Males were coded as 1, and females as 0. Asterisks indicate the significance of the coefficients (* $p < .05$, ** $p < .01$).

Next, we investigated if these differences in subjective expectancies were driven by men perceiving a higher likelihood of winning than the objective probability would suggest (50%), or women perceiving a lower likelihood of winning than the stated probability, or if both effects were present concurrently. Although women's subjective expectancies were slightly below the expected value of 5, indicating 50% probability (labeled "toss-up"), ($M_{\text{Women}}=4.85$), a t-test confirmed that this value was not significantly different from the expected value, $t(58) = -.73$, $p = .47$. On the contrary, men's subjective expectancy of the likelihood of winning ($M_{\text{Men}}=5.65$) was significantly higher than the mean scale value indicating the gamble was a *toss-up*, and closer to the *good chance* scale label, $t(53) = 2.91$, $p < .01$, indicating slight optimism in men. This result is not surprising in light of the prior research which has found evidence of men's

overconfidence (Barber & Odean, 2001; Bengtsson, Persson, & Willenhag, 2005; Klayman, Soll, Gonzalez-Vallejo, & Barlas, 1999). However, it should be noted, that in spite of these higher than justified subjective expectancies men are still not willing to pay the expected value of the gamble of \$50. It seems that in this case, men's optimism is not contributing to risk seeking behaviors, but instead slightly mitigating the required risk premium. Additionally, it appears that women's more accurate (in terms of objective likelihood of winning) subjective expectancies, contribute to a lower gamble valuation.

In summary, it appears that in games of chance men have more optimistic expectations of winning than women, and therefore are willing to pay more to play the game. This finding is consistent with the well accepted subjective utility model for decisions involving risk, because even for an objective probability gamble, e.g. toss of a fair coin, if people have different expectancies, then they should provide different valuations. Since this result implies that gender differences in risk valuation are non-existent when subjective expectancies are relied on, we hypothesized that decisions under uncertainty, where probabilities are not provided, and therefore one must rely on one's own expectancies, would not produce gender differences in risk aversion. We tested this hypothesis in studies 3, 4 and 5.

STUDY 3: Golden Globe and NFL Playoffs: Willingness to Accept

In this study, we explored decisions under uncertainty to determine if gender differences held for real events when valuations are based on one's subjective expectancies of outcomes, rather than on objective probabilities.

Method

Design and Procedure

One hundred and eighty-five participants (98 women; 87 men) were recruited and paid through Amazon's Mechanical Turk (M-Turk) and the survey was run online. Participants first completed a consent form and then were randomly assigned either a block of four questions related to the upcoming 2011 Golden Globe awards, or the upcoming NFL playoffs. When the first block of questions was complete, the second block of questions was administered. The questions that related to the Golden Globe awards asked participants to select the option that they thought would be the winner from the list of nominees for each of the following categories: best motion picture, best director, best actor and best actress. The questions related to the NFL playoff games asked participants to select which team would win each of four upcoming NFL playoff games: Seattle vs. Chicago, Baltimore vs. Pittsburgh, New York vs. New England, or Green Bay vs. Atlanta. Each prediction task was followed by a question asking the participants to imagine they had a ticket that would pay them \$10 if the option they selected won (and nothing otherwise), and to indicate the minimum price they would be willing to sell the ticket for (indicated on a sliding scale of \$0 to \$10). Next, participants were asked to indicate on a scale of 0 to 100% how confident they were that the option they selected would win (expectancy measure or $p(E)$) (Roese & Sherman, 2007). After completing this question, participants were asked to indicate, on a five point Likert scale, how knowledgeable they were for each topic (movies, directors, actors and actresses nominated, and the teams playing in that particular NFL playoff game). Finally, participants were asked to report their gender, age and education, thanked and given a code to enter into M-Turk.

Results and Discussion

For the non-linear model, variables representing the natural log were created for two variables: the amount the participant was willing to accept for the ticket, scaled between 0 and 1,

by dividing the amount the participant indicated by 10; and the expectancy variable (probability or subjective likelihood) scaled between 0 and 1, by dividing the value indicated by 100. But for the linear model the valuation was unaltered and ranged from \$0 to \$10. Initially, each bet was dummy coded, however there were no statistical differences in bet valuation between any of the movies, or any of the NFL games. Therefore we dummy coded whether the gamble was related to a Golden Globe movie award (1), or an NFL game (0), for simplicity in interpreting the results. Additionally, as in all other regressions in the manuscript, Education is dummy coded as a 4 year college degree or higher (1), or less than a four year college degree (0).

Table 3-2: Regression Results for Study 1 (All Conditions)

	Non-Linear		Linear	
Variable	β	SE	β	SE
Constant	-.62***	.07	.18	.34
<i>Sex (Male=1)</i>	-.05	.03	-.10	.13
Expectancies	.75***	.05	7.48***	.40
Domain Knowledge	.05***	.01	.08	.06
Age	.01***	.00	.02***	.01
Education Dummy	-.10***	.03	-.50***	.13
Domain Dumm (Movies =1)	.14***	.03	.62***	.14
Adjusted R ²	.30		.33	
F	95.16***		109.97***	
N	1305		1309	
* p < .05; ** p < .01; *** p < .001				

We can see from the regression results in Table 2 that coefficient of the variable representing the participants' gender is not statistically significant in either the non-linear or the linear model. All the questions in this experiment were decisions under uncertainty, where the participant must rely on his or her own subjective expectancies, prior experience or knowledge to

pick the most probable winner, and value a bet of their pick actually winning. In these circumstances we find no evidence of any effect of gender, although interestingly we find that several other control variables are significant. The regressions provide evidence that what matters most to ticket valuation (risk aversion), carrying the highest beta weight in both the linear and non-linear models, is one's own subjective estimate of the likelihood of winning, or expectancy, consistent with the subjective expected utility model. Additionally, although domain knowledge and age also significantly predict how much one is willing to accept to sell a ticket, their effects are very small. Education does seem to matter to ticket valuation, such that if one has at least a four-year college education, he or she is on average paying 50 cents less. Finally, in this sample it seems that participants were willing to bet more on movies than NFL games. Although we do not know for sure why that is, we speculate that participants may feel more competent about their ability to predict movie award winners than NFL playoff winners.

STUDY 4: Certainty Equivalent and Willingness to Accept: Baseball and Reality TV

Because of the robust, well accepted finding that women are more risk averse than men, we sought to replicate the results of the prior experiment in another context, with a different value elicitation method – but still frame the decision as one involving uncertainty instead of risk. Prior literature has found that different value elicitation methods may result in different valuations (Simonsohn, 2009). We designed this follow-up study to explore whether the certainty equivalent method and the willingness to accept method would yield gender differences in valuation when one must rely on internal subjective expectancies to determine valuation.

Method

Design and Procedure

Two hundred and ten participants were recruited and paid through M-Turk, and again, the study was run online. Four participants were excluded from the analysis since they responded to the survey from an IP address that had already responded and there was no way to ensure that the same participant did not take the survey twice under a separate M-Turk account. The final sample included 206 participants (103 women; 103 men). Participants first completed a consent form and then answered questions about baseball and reality TV; it was randomly determined for each participant whether they answered the questions about baseball or reality TV first. In this study, two different value elicitation methods were employed and randomly assigned for each domain (e.g. baseball or TV shows): certainty equivalence (CE) and willingness to accept (WTA). For each domain, there were four questions: the first question asked participants to predict a future outcome of an event (see details below), the second question was the value elicitation question of a gamble related to their prediction, the third question asked participants to indicate their confidence that their prediction was correct (expectancy), and the final question asked about their knowledge of the domain of the event.

We included event prediction questions for an upcoming baseball game, and Nielsen ratings for primetime TV shows. The baseball question was worded as follows: “*On Thursday, April 21, the Atlanta Braves will be playing against the LA Dodgers. Which team do you expect to win the baseball game?*” Participants then chose between the two teams. The primetime TV show question was worded as follows: “*Which of the following two primetime TV shows do you expect to have a larger audience for the upcoming week (as measured by Nielsen Ratings)?*” Participants then chose between Dancing with the Stars or American Idol (Weds).

For each prediction task the participant was randomly assigned either a certainty equivalent or willingness to accept question that elicited the value of a ticket (on a sliding scale of \$0 to \$100) that would pay \$100 if the prediction was correct (and nothing otherwise). The certainty equivalent question was worded as follows, *“Please indicate below the amount of money that would be of equal value to you as the ticket so that you would be indifferent between receiving that amount of money or receiving the ticket”* (Hershey & Schoemaker, 1985). The willingness to accept question was worded as follows, *“What is the minimum amount of money you would sell the ticket for?”* Participants were then asked to provide demographic information including gender, age and education, thanked for their participation and given a code to enter into M-Turk.

Results and Discussion

For the non-linear model, valuations and expectancies were scaled between 0 and 1; but for the linear model valuations were unaltered and ranged from \$0 to \$100, or 0 to 100% for expectancy. A dummy code was created to indicate the domain (TV Shows =1, Baseball = 0). Again, participants answered both blocks of questions: those related to their predictions of the baseball game *and* the Nielsen ratings of TV shows. However, for each of these question topics, the value elicitation method was randomized to either solicit a willingness to accept or certainty equivalence valuation. In contrast to some prior research, we did not find any significant differences in the valuations obtained between the two elicitation methods employed (Baseball: $M_{WTA} = 49.94$, $M_{CE} = 49.81$, $p = .97$; TV Shows: $M_{WTA} = 57.18$, $M_{CE} = 57.71$, $p = .88$). Table 3 shows the regression results by valuation elicitation method.

Table 3-3: Regression Results for Willingness to Accept & Certainty Equivalent

	Certainty Equivalent				WTP			
	Non-Linear		Linear		Non-Linear		Linear	
Variable	β	SE	β	SE	β	SE	β	SE
Constant	-.37	.27	16.46	12.26	-.02	.22	19.65*	9.30
Sex (Male=1)	-.07	.09	-1.63	3.51	-.06	.08	-.81	2.86
Expectancies	.83**	.31	53.55***	16.16	.92***	.24	65.17***	11.62
Age	-.01	.00	-.14	.14	-.01*	.00	-.29*	.13
Education Dummy	.06	.10	3.85	3.59	.12	.08	4.22	2.93
Domain (Baseball=1)	.04	.11	.81	3.96	-.10	.09	-1.71	3.01
Domain Knowledge	.02	.05	.78	1.98	-.02	.04	-.98	1.43
Adjusted R ²	.07		.10		.13		.20	
F	3.75***		4.91***		5.84***		8.89***	
N	206				195			
* p < .05; ** p < .01; *** p < .001								

Again, we found no evidence that men and women are valuing outcomes differently in these decisions under uncertainty using either the linear or non-linear model. We can see that what matters to valuing decisions under uncertainty is one's own subjective expectancies of the likelihood of outcomes. Although participant age is a significant predictor for the WTP elicitation method, its effect is tiny. The results of this study replicate those of Study 3, and illustrate that the findings are robust across valuation elicitation methods: no gender differences in risk aversion for decisions under uncertainty.

STUDY 5: Real Incentives: Certainty Equivalent

Finally, to address a potential critique of our work, we sought to replicate the results when participants had real economic incentives for providing their true valuations, even though research has found that participant responses are consistent across decisions for hypothetical gambles and those for real payoffs (Kuhberger, Schulte-Mecklenbeck, & Perner, 2002). Therefore, for this study we randomly selected some participants to play the gambles according

to their preference. We provided yet another context for valuations under uncertainty, where one's subjective expectancies dominate the valuation – and this time the experiment was conducted in person, at a large West Coast University.

Method

Design and Procedure

Participants were recruited from the main walkway of a major west coast university two days before a Division 1 collegiate baseball game between that university's team and its closest rival in the league. Passerby's were asked to participate in a short survey in exchange for their choice of cookie, candy bar, bag of nuts, or fruit and a chance to be randomly selected to play the game on the survey for cash value rewards. Sixty-four people participated: 33 women and 31 men. Participants were handed a two-part lottery ticket along with the questionnaire and asked to provide their name and contact information on one part of the ticket and return it to the experimenter, and were told that some participants would be randomly selected to actually play the game according to the choices indicated on their survey. Four participants were randomly selected to play their gambles and the average compensation per participant selected was \$10.25 paid via Amazon gift e-mail.

The survey asked participants to provide their first name, gender, age, and education level. A consent paragraph was included in the survey and the survey indicated that the UCLA baseball team would be playing against Arizona State in two days, and asked participants to indicate who they thought would win the game. Next, the survey indicated that, *"You are being offered a ticket to play a game that pays you \$20 if the team you selected (Arizona St or UCLA) wins the game (and pays nothing if they lose)"*, and it asked, *"What is this ticket worth to you?"* Participants were presented with 19 choices for each, of which they indicated if they would

prefer a sure sum of money or to play the game (take the gamble). The sure sum of money varied from \$19 to \$1 in decrements of \$1. Thus, the first choice was \$19 or the gamble, the second choice was \$18 or the gamble, and so on, ending with the last (19th) choice which was \$1 or the gamble. The following information was provided: “Note: *Some participants will be selected to play for real money.* If you are selected to play, then one of your choices will be selected at random and you would receive either the amount of money indicated or play the game according to your preference indicated. It is in your best interest to represent your preferences correctly.” Participants were then asked to indicate (as a %) how confident they were that the team they selected would actually win (expectancy measure) and how often they watch college baseball games.

Results and Discussion

For the non-linear model, the dependent variable is the natural log of the certainty equivalent valuation provided by the participant. The certainty equivalent is inferred from the crossover point in the valuation choices. The regression results are shown in Table 4. Again, the coefficient for the dummy variable sex is insignificant in both the linear and non-linear models; implying that there are no gender differences in valuation when real incentives and a choice-based procedure is used to elicit valuations. Again we find that men and women are not exhibiting systematic differences in decisions under conditions of uncertainty.

Table 3-4: Regression Results for Study 5 using Real Incentives: Certainty Equivalent

	Non-Linear		Linear	
Variable	β	SE	β	SE
Constant	-.45	.32	.92	2.14
<i>Sex (Male=1)</i>	<i>.10</i>	<i>.15</i>	<i>.85</i>	<i>.96</i>
Expectancies	.94**	.30	13.22***	2.98
Domain Knowledge	.02	.09	.03	.59
Age	.00	.01	-.01	.06
Education Dummy	.05	.17	.96	1.12
Adjusted R2	.12		.24	
F	2.67*		5.01***	
N	64			
* p < .05; ** p < .01; *** p < .001				

Conclusion

It is generally accepted that women are more risk averse than men (Croson & Gneezy, 2009), and that these differences cut across domains (Byrnes et al., 1999). In this research we analyze decisions under risk, when the probability of outcomes is known, and under uncertainty, when one must rely on one's own internal guidance systems to estimate subjective probabilities of the events. In several experiments using established economic measures for eliciting risk preferences, we identify the conditions under which gender differences in risk aversion are more likely to manifest (decisions involving risk) and when they are less likely to manifest (decisions under uncertainty). We alternated value elicitation methods (willingness to pay, willingness to sell, and certainty equivalent) to ensure the robustness of the results. Prior research related to gender difference in risk aversion has failed to differentiate between objective probability gambles (risk) and how risk aversion operates in "real world" settings via subjective assessments, or *expectancies* of the outcomes. Objective probability gambles have become the standard for measuring and quantifying risk attitudes in economics (Holt & Laury, 2002), and is

perhaps the reason why the findings of gender differences in risk aversion have not always been replicated in behavioral domains.

We also identify the key mechanism that leads to gender differences in risk aversion: differences in subjective expectancies. We find the gender differences in subjective expectancies of outcomes, in objective probability gambles, mediate the different valuations men and women have of the same gamble. Our findings suggest that men pay more than women for the same objective probability gamble because men have higher subjective expectancies of positive outcomes than justified by the objective probabilities in decisions involving risk – an effect which partially mitigates their risk premium. When subjective expectancies are accounted for the differential risk aversion between men and women disappears in decisions under risk.

The main contribution of this work is that we refute the simplistic commonly held assumption that women are more risk averse than men. Yes, we find a large and statistically significant gender difference in games of chance. Men pay more than women for the same gamble, and make up the vast majority of professional gamblers. However, these kinds of gambles represent only one specific kind of decision, in which the outcome probabilities are known. The vast majority of decisions we face on a day-to-day basis are those where the probability of the outcomes is unknown, decisions under uncertainty. In three studies we examine gender differences in risk aversion in decisions involving uncertainty, when the participant must rely on their own internal subjective expectancies. We find no evidence of gender differences in risk aversion in these decisions under uncertainty.

The generally accepted conclusion that women are normally more risk averse than men should be revisited. This research serves to delineate when and why gender differences in risk aversion are likely to manifest. Future research may seek to explore the both the boundary

conditions of gender differences in decisions involving risk as to not foster a unfounded stereotype that may become a prescriptive norm, and explore the antecedents of gender differences in subjective expectancies.

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CHAPTER 4: COGNITIONS AND DECISIONS: AN EXPLORATION OF GENDER AND ENTREPRENEURIAL CHOICE

While there is a substantial body of research that addresses when and why women are disadvantaged in corporate America, a phenomenon termed the glass ceiling (Powell & Butterfield, 1994), there has been less inquiry related to the factors that continue to hamper gender equality even when the institutional forces that limit gender equality are no longer a factor: when entering entrepreneurial pursuits. To date, there has been an abundance of research suggesting that men and women start different types of businesses (Anna, Chandler, Jansen, & Mero, 2000; Kepler & Shane, 2007; Powell & Eddleston, 2008), and make different investments in their businesses in terms of financial resources, time and energy managing the business (Alsos, Isaksen, & Ljunggren, 2006; Morris, Miyasaki, Watters, & Coombes, 2006; Orser, Riding, & Manley, 2006), leading to different, usually worse, outcomes for female entrepreneurs. Some research suggests that these outcomes are based on deliberate decisions of female entrepreneurs to achieve work-life balance and attend to family matters (Powell & Eddleston, 2008), while other research suggests that entrepreneurship is a masculine-typed endeavor (Gupta & Bhawe, 2007; Gupta, Turban, & Bhawe, 2008; Gupta, Turban, Wasti, & Sikdar, 2009), and incongruent with the feminine gender role. Despite the regularity with which the differential outcomes of male and female entrepreneurs have been studied, the underlying assumptions that lead to decisions which result in inequalities have received no systematic attention from organizational researchers. That is, if female entrepreneurs are to achieve parity with male entrepreneurs, it is important to know which factors do and do not contribute to differential outcomes, holding motivational factors constant.

New venture decisions, such as opportunity selection and investments, are intricately related to one's cognitions about how likely the venture is to be successful, and the extent to

which an entrepreneur believes he or she has the capacities and resources to manage the venture toward successful outcomes. These cognitions may be influencing sex differences in entrepreneurial behaviors. This research explores the notion that the different behaviors of male and female entrepreneurs are the result of cognitions influenced by one's gender. Sex refers to the biological distinction between male and female, while gender is socially constructed and refers to the roles and norms associated with one's sex in society. One's gender is a very salient social identity that acts as a lens through which one views the world (Rudman & Glick, 2008). The term *gender schema* refers to cognitive frameworks or concepts that organize and interpret information consistent with one's gender (Bem, 1981). We expect that gender schemas may influence entrepreneurial decisions through a host of social-cognitions, including self-perceived competence (self-efficacy) in running the business, the amount of social resources available to assist in starting and managing the business, how risky the venture is perceived to be and how attractive, or desirable the venture appears. We therefore suggest that entrepreneurship, in and of itself, is not sex-typed, but that different entrepreneurial opportunities appeal differently to each sex due these gendered cognitions (schemas), resulting in self-selection into gender-congruent entrepreneurial opportunities. The differential outcomes of male and female entrepreneurs observed in prior literature may well be partly due to these often subtle differences in how the risks and rewards of pursuing any given venture may be assessed.

Although we acknowledge that there may also be structural and perhaps motivational factors that contribute to sex differences in decisions and outcomes of entrepreneurs, this work explores the socio-cognitive processes, and related outcome expectancies, that underlie venture selection and investment decisions. The theory presented herein merges the literature in social psychology related to career selection (Lent, Brown, & Hackett, 1994), social cognitive gender

influences (Bussey & Bandura, 1999), self-efficacy (Bandura, 1997), and judgment and decision making to formulate and test a conceptual model that can be applied to how entrepreneurs make decisions about venture initiation and investments.

The literature is lacking a general theory or conceptual framework that explicates how gender cognitions influence entrepreneurial decisions. Furthermore, the role of social resources has been under-examined in decision-making and business decisions even extending beyond entrepreneurship. Hence, researchers know little about how cognitions and social resources operate in tandem to affect decisions. Accordingly, a primary aim of the present study is to investigate cognitive mechanisms in addition to perceptions of how others may support these entrepreneurs and present a holistic model for how gender cognitions influence entrepreneurial decisions.

A Theory of Decision Making and Venture Selection

Social Cognitive Career Theory (SCCT) (Lent et al., 1994; Lent, Brown, & Hackett, 2000) and social cognitive theory of gender (Bussey & Bandura, 1999) suggest that some constructs matter more than others to career-related decisions, such as feelings of self-efficacy, a person's belief in his or her own competence, and outcome expectancies, or inversely, perceived riskiness of an option, all of which influence choices. SCCT is derived from general social cognitive theory (Bandura, 1986) which emphasizes how people exercise personal agency (decisions to act) in the career development process, and the situational factors including support systems, and demographic constructs such as gender, that enhance or constrain agency.

Additionally, Social Role Theory (Eagly, Wood, & Diekmann, 2000) suggests that different sexes are likely to feel more or less competent in different domains, due to gender role expectations and experiences. This line of reasoning is consistent with the Competence

Hypothesis (Heath & Tversky, 1991) that posits that people prefer “betting on their own judgment when they feel knowledgeable and competent, but not otherwise” (p. 9). This theory can be extended to entrepreneurial decisions as well: people “bet” that is, they select and invest in, venture opportunities they feel relatively more competent at; furthermore, these feelings of competence may be influenced by one’s gender.

Since people also receive messages of support or backlash for conformance or non-conformance with gender norms (Heilman, 2001), we expect that the decision-maker will also anticipate greater or lesser social resources as a function of his or her successful conformance to others’ gender norm expectations. Together these theories suggest that outcome expectancies entail consideration of one’s available resources, both from self and others, that may be deployed in the mitigation of venture risk, thereby increasing the expectancy value of a gender-congruent venture, or alternatively, decreasing perceptions of venture risk, and increasing the likelihood of the ventures selection and recognition as a viable opportunity.

Figure 4-1: Model of Affective Factors for Venture Choice

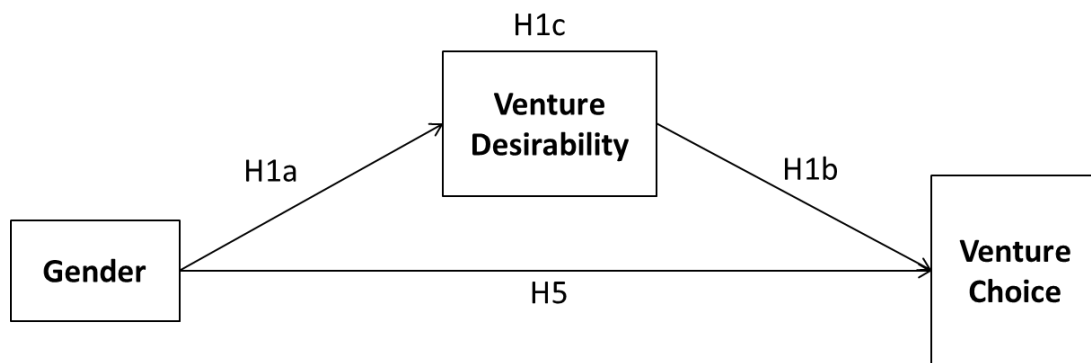
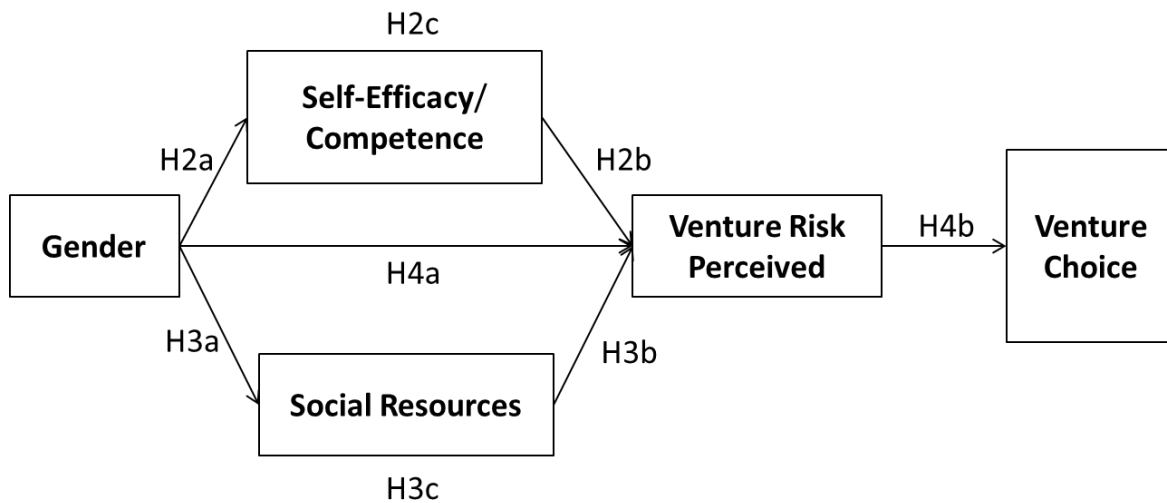


Figure 4-2: Model of Cognitive Factors for Venture Choice



Venture Desirability

Recent research finds that people whose gender identity is important to them, as measured by scores on feminine and masculine traits, experience more positive self-concepts when they behave in conformance with those identities/ideals (Witt & Wood, 2010; W. Wood, Christensen, Hebl, & Rothgerber, 1997). For example, in observing individuals in various social interactions, Witt and Wood (2010) found that emotion and self-evaluative signals emerge naturally as part of these interactions, influencing peoples' chronic self-assessments, and that individuals became more positive when they acted in ways that confirmed rather than disconfirmed personal gender standards because of these self-regulatory mechanisms.

Additionally, there has been much research that people choose options that are consistent with their social identities (Bem, 1981; Leary, Wheeler, & Jenkins, 1986), and gender is the primary social category, for which an identity is developed very early in life (Rudman & Glick, 2008). Therefore, we posit that individuals will find high salience between their gender and opportunities that are assessed as being congruent with their own gender. We expect that an option that represents a gender-congruent activity or role will be viewed as more attractive or

desirable to individuals, and the desirability of the opportunity will positively influence its selection. Therefore, we predict that:

Hypothesis 1a: *Individuals will find the venture opportunity that is gender role congruent more desirable than the venture opportunity that is gender role incongruent.*

Hypothesis 1b: *Venture desirability will be positively related to venture choice.*

Hypothesis 1c: *Venture desirability will mediate the effect of gender congruency on venture choice.*

State Self-efficacy/ Competence

Self-efficacy refers to the belief in one's own competence (Bandura, 1997) and corresponds to one's willingness to take actions to achieve a desired goal. Research has consistently showed that those who have higher self-efficacy for a certain task or domain are more likely to pursue and persist at the task (Bandura, 1997). Self-efficacy has been found to be related to the career decisions of men and women (Betz & Hackett, 1981; Hackett & Betz, 1981; Lent et al., 1994), such that differences in women's self-efficacy beliefs have been cited as a factor that inhibits women's entry into male dominated occupations.

Additionally, recent research in entrepreneurship has explored the role of self-efficacy in pursuing entrepreneurial career options (Zhao, Seibert, & Hills, 2005). Zhao and colleagues found that although both women and men reported similar levels of a trait measure of entrepreneurial self-efficacy, women reported significantly lower entrepreneurial intentions - one's intent to become an entrepreneur - suggesting that how gender influences entrepreneurial intentions was more complex than the authors anticipated. The authors did not speculate as to the mechanisms that lead to women having lower entrepreneurial intentions, however, we speculate that the results could be a function of the trait measures of self-efficacy and

entrepreneurial intentions employed by the researchers, instead of state measures based on a particular domain (type of venture in this case), as Bandura (1986) originally conceptualized the construct of self-efficacy. Therefore, we predict that a state measure of self-efficacy, dependent on the nature of the venture evaluated, as opposed to the trait measures most frequently used in the literature, will be inversely related to venture risk perceptions and positively related to venture choice. Additionally, we can deduce that a venture opportunity will be perceived as less risky if one believes in their ability to successfully execute the behaviors that will lead to venture success, thus anticipating state self-efficacy to mediate the effect of gender on venture risk perceptions. Therefore, we hypothesize:

***Hypothesis 2a:** Individuals will show higher levels of state self-efficacy, or feelings of competence for running a venture, if the opportunity is gender role congruent.*

***Hypothesis 2b:** Greater feelings of self-efficacy will be related to decreased perceptions of venture risk.*

***Hypothesis 2c:** Self-efficacy will mediate the effect of gender congruency on risk perceptions.*

Social Resources

In this research we define social resources as social support, usually signifying emotional support, *and* tangible resources such as time, money, and mentoring from friends and family members to support the entrepreneur and his or her business. We anticipate that people will perceive social resources to be provided or withheld based on one's successful conformance to gender stereotypes. Gender stereotypes refer to the features assigned to men and women in society based on the social roles each sex takes on. Gender stereotypes, like all stereotypes, have a descriptive element, but they also have a more restrictive prescriptive element (Rudman &

Glick, 2008). The descriptive element of stereotypes simply describes typical roles of men and women; the prescriptive element, however, dictates how men and women should behave, and is enforced through social sanctions, generating social punishments if violated, sometimes termed ‘backlash’. Due to the pervasive nature of prescriptive gender stereotypes, and the social approval or reprisals that go along with conformance or non-conformance to these stereotypes, men and women are likely to anticipate greater social resources and support if they embark on a business venture that is congruent with their prescribed gender role. Therefore:

***Hypothesis 3a:** Individuals will perceive access to greater levels of social resources if the venture opportunity evaluated is gender role congruent.*

While the role of social support, (e.g. emotional support) has been examined at length in health psychology, it has been underexplored in how the perception of this resource may affect decision-making. Numerous studies have explored the health and stress reduction benefits that perceived social support provides (Cohen, 2004; Cohen & Janicki-Deverts, 2009; Cohen & Wills, 1985; Ilies, Johnson, Judge, & Keeney, 2011; Lambert, Burroughs, & Nguyen, 1999; Rosenthal, Gesten, & Shiffman, 1986). The “buffering hypothesis” (Cohen & Wills, 1985) suggests that social support acts to alleviate life stress, facilitating one’s ability to cope with stress and adapt to change. Likewise, we expect that anticipated social support (emotional support) will also ease anxiety and risk perceptions inherent in starting a new venture.

In a separate, but related vein, decision-making researchers have proposed a “cushioning hypothesis” (Hsee & Weber, 1999) of social resources in research related to financial risk taking in cross-cultural studies (China and USA). Specifically, the hypothesis suggests that those with social resources (the Chinese) may be more financially risk-seeking, than those without such resources (the Americans). The theory suggests that access to social resources enables people in

a collectivist society to take greater financial risk than those in an individualistic society due to the expectation of availability of financial help if needed.

Both these lines of research related to social support and resources are relevant to the management of risk inherent in entrepreneurial opportunities. If one perceives greater social resources, or social support, he or she may also anticipate the buffering effects that those resources provide, both for stress management benefits and the economic “cushion”, and that those resources may be leveraged to mitigate venture risk. Additionally, we expect that social resources also mediate the effect of gender on venture risk perceptions. Therefore, we posit the following:

***Hypothesis 3b:** Increased levels of anticipated social resources will be related to decreased perceptions of venture risk.*

***Hypothesis 3c:** Anticipated social resources will mediate the effect of gender congruency on venture risk perceptions.*

Risk Perceptions

Research has shown that those who actually embark on an entrepreneurial opportunity perceive their chances of success to be much higher than the average success rate in that industry, irrespective of either education level or experience in the industry (factors that have been positively correlated with venture success) (Cooper et al., 1988). Other recent research has found that it is actually the *perception of risk*, and not one's *risk propensity*, which is an individual difference variable that signifies how much one can tolerate risk, that influences whether one chooses to start an entrepreneurial venture (Simon, Houghton, & Aquino, 2000). Therefore, we are more interested in *perceived risk*, which is the subjective assessment of the likelihood of sustaining losses, which has been found to influence actual decisions.

Byrnes and colleagues (1999) hypothesized that the context of a given risk will hold different expectancies and values to different people, such that some contexts may promote greater risk-taking in different genders (Byrnes et al., 1999). We theorize that different kinds of entrepreneurial opportunities represent contexts that may illicit sex differences in perceived risk and risk-taking in the form of venture initiation choices. If stereotypes associated with an entrepreneurial venture favor men (e.g. technology development), men may feel relatively more competent at running the business, and perceive lower venture risk. Logically, the more one believes he or she possesses the competencies needed to make a venture successful, the lower his or her risk perceptions, and the higher the likelihood to initiate the venture. Therefore:

***Hypothesis 4a:** Individuals will perceive lower risk for opportunities that are gender role congruent.*

***Hypothesis 4b:** Perceptions of venture risk will be negatively related to venture selection.*

Venture Choice

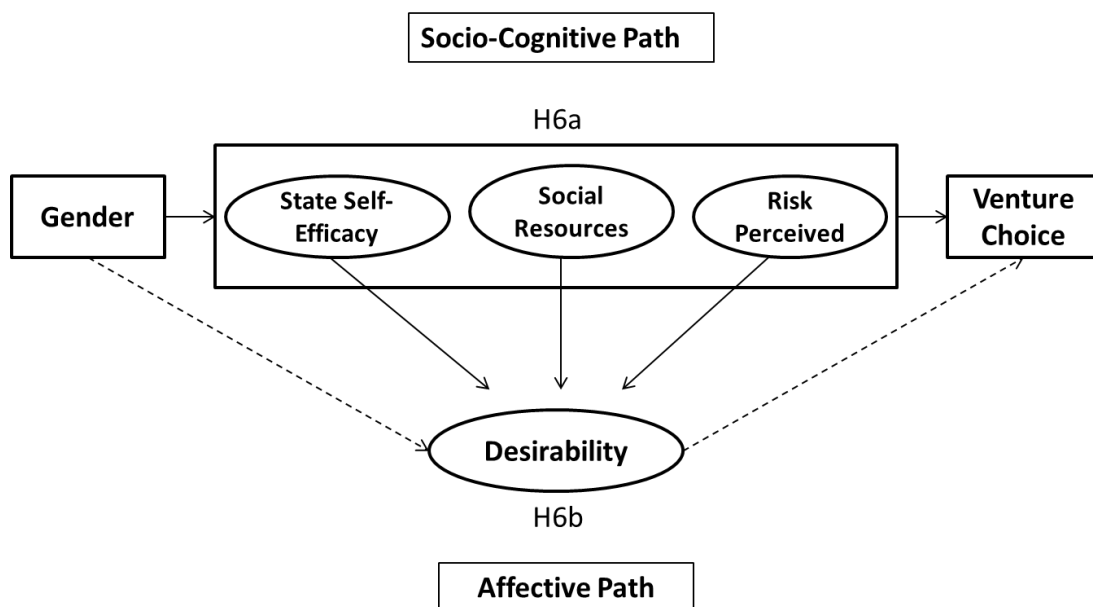
Which venture opportunity participants would actually select - if they had to select one - was also measured. In the model, venture choice represents the choice between a venture opportunity congruent with the masculine gender role or a venture opportunity congruent with the feminine gender role. We posit that participant gender (as measured by participant sex) will significantly predict the opportunity selection, such that participants will select the opportunity congruent with their own gender role.

***Hypothesis 5:** Individuals will be more likely to select a gender-congruent venture opportunity.*

Risk as Feelings

Finally, current research related to ‘risk as feelings’ (Loewenstein, Weber, Hsee, & Welch, 2001) suggests that people get a gestalt feeling about whether a decision is good or bad, and these feelings are based more on emotional reactions than on weighted expectation based calculations for each possible outcome. We therefore expect that venture risk perceptions and its antecedents, self-efficacy and social resources, will be related to the affective measure of venture desirability, which will also predict venture choice (see Figure 3).

Figure 4-3: Affective and Socio-Cognitive Paths to Venture Choice



However, since the ‘risk as feelings’ hypothesis also suggests that the affective reactions to a decision often trump cognitive calculations of expectancy values, we therefore expect the affective measure of venture desirable to provide an alternate, more robust (in terms of variance explained) path directly to venture choice, than the path representing risk appraisals. Therefore we hypothesize:

Hypothesis 6a: *State self-efficacy, perceived social resources, and perceived risk will be related to the desirability of the venture opportunity.*

Hypothesis 6b: *Venture desirability, as a measure of affect, will predict venture choice with greater accuracy than cognitive appraisals of risk, social resources and self-efficacy.*

METHODS

STUDY 1: Entrepreneurial Decision Model

Respondents

Amazon Mechanical Turk. To test the hypothesis presented, Amazon's Mechanical Turk (M-Turk), an online labor market, was used to recruit and pay participants. Several recent studies have verified the advantages and appropriateness of this subject population for survey and experimental research (Eriksson & Simpson, 2010; Paolacci et al., 2010; Reips, 2002). Paolacci and colleagues (2010) gathered data on the demographics of M-Turk participants and found that the self-reported education level was, on average, slightly higher than that of the US population as a whole. Additionally, the authors suggest that, "Internet subject populations tend to be closer to the US population as a whole than subjects recruited from traditional university subject pools" (Paolacci et al., 2010: 412). The authors also conducted a comparative study between M-Turk participants online and participants from a large Mid-Western University in a lab. The authors found similar results across both samples, with significantly lower response error from the M-Turk sample, confirming the M-Turk sample as a reliable alternative to university subject pools.

Participants.

Five hundred twenty-four participants, 293 women and 231 men, all from the United States, participated in the study. Seven participants were excluded from the study because they completed the survey in less than 4 minutes (an unreasonably short time to complete the survey), and 3 participants were excluded because they took longer than 35 minutes to complete the

survey (3 standard deviations above the mean). Either case may indicate that these participants did not pay close attention. After the exclusion of these cases, the mean time spent on the survey was 10 minutes, 39 seconds ($SD=4.13$). The final sample consisted of 514 participants (287 women, 227 men). The participants had an average age of 32.3 years, with 56.6% of the sample having a college degree or higher and 30.5% of the sample currently attending college. 82.1% of the sample was Caucasian, 4.3% African-American, 4.1% Hispanic, 6.2% Asian, and 2.9% American Indian or Other.

Procedure

The survey was administered online after participants completed a consent form. Participants were randomly assigned two scenarios describing entrepreneurial opportunities, one masculine-typed, one feminine-typed, a within-subjects design. The design included eight scenarios in total, four of masculine-typed ventures, four of feminine-typed ventures; however participants were only shown a subset of two of the total scenarios available. Multiple different types of sex-typed venture opportunities were included in the design to ensure results were not limited to one kind of venture – but could be generalized to all ventures that maybe sex-typed in some way. This design choice allows us to extrapolate to various kinds of entrepreneurial ventures and provides greater external validity. See Appendix A for venture scenario details. All scenarios were counterbalanced so that the masculine-typed venture was presented first about half the time and the feminine-typed venture was presented first the rest of the time. After each scenario, items measuring each of the constructs of interest were presented in a randomized order. As a manipulation check, participants were asked what they believed was the “*predominant sex of the business owners for this kind of venture*”. After the survey was completed for the first scenario assigned, the second venture scenario was presented, and

participants were again asked to complete the items measuring the constructs of interest. After participants had completed the questions related to both ventures, they were asked to select which venture they would choose to start if they had to select one of the two they just evaluated. Finally, information on personality and demographics was collected.

Measures

Research in entrepreneurship, decision making and gender psychology were considered when developing the measures to include in this study. All scale items were administered twice, in accords with a within-subjects design - once when the participant evaluated the feminine-typed opportunity, and again when the masculine-typed opportunity was evaluated. All items were measured using a 1-7 point Likert scale, except for the venture choice variable which was a dichotomous choice between the two venture opportunities viewed. The venture choice variable was presented after participants had evaluated both venture opportunities.

Desirability. To assess how desirable the different venture opportunities were, four items were created. Since *desirability/venture attractiveness* was the only measure in the study not adapted from a published scale, an exploratory factor analysis was conducted on the items in a pilot study before including them in this study. The original set of desirability items consisted of 5 items, however, one item showed slightly higher loading on a second factor. The four items that showed significant loading on one factor were selected for inclusion in this study. The four item measure of state venture desirability included the following items: “*How attractive is this business to you personally?*”, “*How interested are you in running a business like this one?*”, “*A business like this would be a very good fit for me*”, and “*Would you seek to start a business such as the one described?*” (Cronbach’s α Male Venture =.95; Female Venture =.94).

Self-efficacy/Competence. Self-efficacy scales, both for general use (Chen, Gully, & Eden, 2001) and those which measure entrepreneurial self-efficacy (McGee, Peterson, Mueller,

& Sequeira, 2009; Zhao et al., 2005), were reviewed. Since these scales were designed to assess trait self-efficacy, or relatively constant feelings of self-efficacy, they were inappropriate for this study because it is hypothesized that feelings of self-efficacy are subjective and dependent on the venture opportunity evaluated, consistent with Bandura's (1986) original conception of the construct. Four questions from the trait measures of self-efficacy were adapted to create a state self-efficacy measure related to leading an entrepreneurial venture. The venture dependent measure of *state self-efficacy* or *self-perceived competence* consists of the following four items, "I am confident in my ability to perform the skills and the tasks that would lead to the success of the business", "I believe I have sufficient education and training to successfully run a company such as this", "I believe I have the training and competence to make a business like this successful", and "I am adequately qualified to run a business like this" (Cronbach's $\alpha_{\text{Male Venture}} = .95$; $\alpha_{\text{Female Venture}} = .95$).

Social resources. To measure social resources, the relevant scales that measure this variable, notably the Social Support Questionnaire (Sarason, Levine, Basham, & Sarason, 1983) and the Social Support Inventory (SSI) (Timmerman, Emanuels-Zuurveen, & Emmelkamp, 2000), were reviewed. Neither scale was designed to assess adequacy of social resources (and emotional support) related to running a business. Therefore, three items were adapted from the SSI to assess state levels of instrumental social support, (a concept consistent with our definition of social resources), dependent on the nature of the business opportunity. The three item measure of state social resources included the following items: "Would your friends or family provide you with resources, such as mentoring and contacts, to start this business?", "Would your friends and family support you with time to help you start this business?", "Would your

friends and family lend or give you money to start this business?” (Cronbach’s α Male Venture =.84; Female Venture =.85).

Risk Perceptions. There has been some debate in the literature about how to measure risk perceptions. Sitkin & Weingart (1995) proposed a four item measure to assess risk perceptions that included responses to the following items, rated on a 7-point Likert scale: “How would you characterize the decision?” 1=significant opportunity to 7=significant threat, 1=potential for loss to 7=potential for gains (R), 1=positive situation to 7=negative situation, and “What is the likelihood of success [in this endeavor]?” (Sitkin & Weingart, 1995). Later research critiqued this measure and argued it measures perceived return, and instead proposed a one item measure, “How risky is the prospect?” (Ganzach, Ellis, Pazy, & Ricci-Siag, 2008), and found that this one item measure provided the highest validity. Since good scale construction relies on multiple items that correlate with each other to measure the underlying construct (DeVellis, 2003), the work of these researchers was combined to develop a four item measure of risk perceptions (dependent on the venture opportunity) with good internal reliability (Cronbach’s α Male Venture =.86; Female Venture =.84). The final risk perception measure included the following items: “How risky do you think this business is?”, “How likely do you think this venture is to be successful (Survive more than 2 years)?” (Reverse coded), “How likely do you think this venture is to fail within the next two years?”, and “How safe, in terms of investing time and money into, do you think this venture is?” (Reverse coded).

Venture Choice. To measure participants’ preferences of which opportunity they would select between the two opportunities presented, participants were simply asked, “If you had to select one of the businesses presented to start, which would it be?”, and were provided a short description of the two ventures they had just evaluated.

Nascent Entrepreneur. The Nascent Entrepreneurship scale (McGee et al., 2009) was included in the survey. The scale consists of six questions to which participants indicate a “yes” or “no” response. If a respondent answers “yes” to at least two of the six scale items, according to scale developers, he or she qualifies as a nascent entrepreneur. This cut-off to determine who is a nascent entrepreneur is somewhat arbitrary for the purposes of this study; therefore, the total score, for all 6 questions (No=0, Yes=1), was included for all participants to control for the extent to which they had previously engaged in entrepreneurial activities, from 0, indicating no activities, to 6, for participants who indicated “yes” to all six items. Examples of scale questions include the following items: “*Attended a ‘start your own business planning’ seminar or conference*”, “*Put together a start-up team*”, and “*Developed a product or service*”.

Entrepreneurial Self-Efficacy. The Entrepreneurial Self-Efficacy Scale (ESE) (McGee et al., 2009), was included in the survey to establish discriminant validity from the state measure of self-efficacy hypothesized to be related to venture choice. Table 2 provides some evidence of discriminant validity: state self-efficacy, both for the masculine and feminine venture scenarios, is only moderately correlated with the ESE scale (ρ = .42 to .46).

Participant Sex/Gender. In this research we use the participant’s biological sex as a proxy for gender, which again, is social construed (Helgeson, 2008). This design choice was made because the current measurement of masculinity and femininity has been found to be problematic, both conceptually and methodologically, due to shifting ideas as to what constitutes typical male or female characteristics (Eagly, Beall, & Sternberg, 2004). Additionally, research has suggested that although there are cases where people are cross-typed, e.g. men with feminine gender roles or women with masculine gender roles, such cases are a small minority of the population (Bem, 1974). Additionally, one of the most prolific gender scholars of our time

suggests that both the terminology sex differences and gender differences should be considered correct, because there is little consensus regarding distinctions between the terms (Eagly, 2000).

Gender Congruency. To reclassify the responses from the scenarios that were either masculine-typed or feminine-typed to enable testing of our hypotheses related to gender congruency, a dummy variable (0,1) was created to signify the set of gender-congruent responses (1) from those of the gender incongruent responses (0). Therefore, if the participant was a man responding to the masculine-typed venture, or a women responding to the feminine-typed venture, the gender congruency variable is 1, and if the respondent was a man responding to the feminine-typed venture or a women responding to the masculine-typed venture, the gender congruency variable is 0. The assigning of a dummy code to represent gender congruency allows for a direct test of the effect of gender match vs. mismatch with the sex-type of the venture scenario, and allows us to estimate the effect that participant sex may have over and above the gender congruency effect. For example, if the variable sex is still significant after controlling for gender congruency, men and women may be responding systematically differently in terms of scale, indicating higher or lower values, to the construct regressed.

RESULTS

Manipulation Check

Sex-Type of Venture. To assess the success of the sex-typed venture manipulation, a hierarchical regression was executed in which the sex of the participant was entered as a control variable on the first step, followed by the main effect of condition on the second step. As expected, there was a significant main effect of condition on the perceived sex of business owners for the venture ($\beta = -.84$, $t(1032) = -20.45$, $p < .001$). For the feminine-typed venture scenarios, 66.5% of participants indicated they believed women to be owners of that kind of

business, and another 27% indicated they believed owners were a 50/50 split between men and women. For the masculine-typed venture scenarios, 81.3% of participants believed men were predominantly owners of that kind of venture, and another 17.5% believed that owners were a 50/50 split between men and women. All cases were included in the analysis, regardless of the manipulation check response to facilitate external validity of the study. We acknowledge that including all cases, including those that did not answer the manipulation check as predicted, facilitates a more conservative test of the hypotheses and conceptual model.

Correlations and Scales

Table 1 presents the means, standard deviations, and correlations among the predictors. Mean calculations of scale items were used to construct the scale summary variables. All scale Cronbach's Alpha statistics were sufficiently high (ranging from .84 to .95) as to indicate good internal reliability (DeVellis, 2003), and again, the state measure of self-efficacy and the entrepreneurial self-efficacy scale were only moderately correlated indicating discriminant validity between the two measures. To ensure each construct of interest in this study was independent of the others, an exploratory factor analysis was conducted for all the responses to the masculine and feminine-typed scenarios separately. Principal components analysis was used as the extraction method and the rotated solutions (varimax) confirmed that each of the constructs measured loaded on a separate factor; indicating some evidence of discriminant validity between constructs over and above the face validity of the item groupings.

Table 4-1: Descriptive Statistics and Correlations ^a

Variable	Mean	S.D.	N	1	2	3	4	5	6	7	8	9	10
1. Venture Choice	.49	.50	452										
2. Desirability (Masc.)	2.90	1.67	452	.63**									
3. Desirability (Fem.)	2.92	1.61	452	-.48**	-.08								
4. Self-Efficacy (Masc.)	3.29	1.79	452	.50**	.71**	-.02							
5. Self-Efficacy (Fem.)	3.54	1.76	452	-.25**	.02	.64**	.23**						
6. Social Resources (Masc.)	3.90	1.61	452	.34**	.53**	.01	.44**	.08					
7. Social Resources (Fem.)	4.00	1.59	452	-.15**	.07	.43**	.15**	.38**	.56**				
8. Perceived Risk (Masc.)	4.51	1.25	452	-.41**	-.64**	.02	-.43**	-.02	-.43**	-.10*			
9. Perceived Risk (Fem.)	4.35	1.29	452	.34**	.10*	-.57**	.08	-.35**	.00	-.33**	.04		
10. Nascent Entrepreneur	1.39	1.64	452	.14**	.20**	.034	.35**	.21**	.12**	.08	-.08	.02	
11. Entrepreneurial Self-Efficacy	3.50	.76	452	.16**	.25**	.18**	.46**	.43**	.22**	.20**	-.17**	-.12**	.52**

^a For venture choice, 0 = “feminine,” 1 = “masculine.”

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

Hypothesis Testing

To test the predicted relationships, mixed model and regression analysis were employed, with controls entered for participants' prior nascent entrepreneurial activities (measured by the Nascent Entrepreneurship Scale) and the demographic variables. To test the hypotheses related to gender congruency, Hypotheses 1a, 2a, 3a, and 4a, mixed models, with a participant ID as a random effect and the gender congruency variable, nascent score, participant sex, age and education as fixed effects, were executed for each continuous variable that was hypothesized to be influenced by gender congruency: venture desirability, state self-efficacy, anticipated social resources, and perceived venture risk. As seen in Table 2, gender congruency significantly predicts perceptions of venture desirability, self-efficacy, social resources and venture risk, in support of Hypothesis 1a, 2a, 3a, and 4a, respectively. Further, the weight for gender congruency is much larger than for any other variable in the model. Finally, it can be seen that the effect of having some entrepreneurial experience (Nascent Score) is positively related to desirability, self-efficacy and anticipated social resources.

Table 4-2: Mixed Model Analysis of Effects of Gender Congruency ^a

Predictor	Model 1: Desirability	Model 2: State Self- Efficacy	Model 3: Social Resources	Model 4: Perceived Risk
Constant	3.06***	3.14***	4.16***	4.17***
Sex ^b	.05	.17	.12	.03
Nascent Score	.14***	.32***	.12***	-.04
Age	-.10***	-.14***	-.16***	.08***
Education	-.09**	-.02	.01	.03
Congruency ^c	.84***	.77***	.28***	-.30***

^a N = 509; ^b For sex, 0 = "female," 1 = "male." ^c For congruency, 0 = "no," 1 = "yes."

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

Venture Choice

To test Hypothesis 5, that people will be more likely to choose a gender-congruent venture, we conducted a logistic regression analysis with venture choice as the outcome variable (1=masculine-typed, 0=feminine-typed) and participant gender (male=1, female=0), prior entrepreneur experience, age and education as the independent variables (see Table 3). We find that gender predicts venture choice, such that the effect of being male reverses the selection of a feminine-typed opportunity to a masculine-typed opportunity (masculine-typed opportunity =1), in support of Hypothesis 5a. Finally, we find that the effect of having some entrepreneurial experience also increases the likelihood of selection of the masculine-typed opportunity.

Table 4-3: Results of Logistic Regression Analysis for Venture Choice ^a

Predictors	DV: Venture Choice		
	B	exp (B) _b	S.E. ^c
Constant	-.36	.70	.36
Sex ^d	1.58***	4.87	.21
Nascent Score	.19**	1.21	.07
Age	-.13**	.88	.05
Education	-.04	.97	.07
-2 log likelihood		536.83	
Overall χ^2		82.47	
df for overall χ^2		4	
pseudo R ²		.23	

^a N = 477

^b Note that exp (B) is the odds ratio.

^c Standard error values for b

^d For sex, 0 = “female,” 1 = “male”

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

Risk Perceptions

Hypotheses 2b and 3b posited that greater feelings of self-efficacy at running a particular business, and greater levels of anticipated social resources, will be related to decreased perceptions of venture risk. The results in Table 4 illustrate that both state self-efficacy and anticipated social resources have an independent direct effect on risk perceptions, such that higher levels of either construct are related to lower levels of perceived risk, in full support of Hypothesis 2b and 3b. The final regression includes both self-efficacy and social resources, and the analysis shows that each construct independently contributes to reduced perceptions of risk while controlling for the other.

Table 4-4: Results of Regression Analysis for Venture Risk Perceived

Predictor	DV: Venture Risk		
	Model 1	Model 2	Model 3
Constant	5.05***	5.34***	5.66***
Step 1: Control Variables			
Nascent Score	.05*	.00	.06*
Congruency ^a	-.08	-.22**	-.08
Sex ^b	.08	.07	.09
Age	.04*	.04*	.02
Education	.02	.04	.03
Step 2:			
Self-Efficacy	-.28***		-.21***
Social Resources		-.28***	-.20***
F	33.8***	30.7***	40.0***
R ²	.17	.15	.22
Δ R ²			.07
Adj. R ²	.16	.15	.21

N = 509; ^a For congruency, 0 = “no,” 1 = “yes.” ^b For sex, 0 = “female,” 1 = “male”
 * p < .05, ** p < .01, *** p < .001

Mediators of Perceived Risk

To test Hypotheses 2c and 3c, which theorized that both self-efficacy and social resources would mediate the effect of gender congruency on risk perceived, the procedures set forth in Baron and Kenny (1986) were followed. Already, we have shown that gender congruency is significantly related to venture risk perceived, state-self-efficacy and social resources (see Table 2); in Table 4, it can be seen that when self-efficacy is entered into the regression, this variable is highly significant and gender congruency is no longer significant. We also show that when social resources is entered into the model, the social resources variable is highly significant and the gender congruency variable has reduced significance. Finally, Sobel tests were executed that examined each of the variables independently. In support of Hypothesis 2c, state self-efficacy is shown to fully mediate the effect of gender congruency on perceived risk (Sobel test, $z=-6.99$, $p<.001$); and in partial support of Hypothesis 3c, social resources is found to be a partial mediator (Sobel test, $z=-4.01$, $p<.001$).

Venture Choice

To examine the influence of participant perceptions on venture choice, hypotheses 1b and 4b, we employed logistic regression analysis to account for the dichotomous outcome variable, venture choice. Difference scores, between the participant ratings for the masculine-typed venture, less their score for the feminine-typed venture for each repeated measure are used in these regressions since a mixed model design does not allow for a dichotomous outcome variable. This results in each participant having one score, a difference score, for each predictor variable: venture desirability, state self-efficacy, perceived social resources and perceived risk. The interpretation of this score is the strength of preference for the masculine-typed opportunity

if the coefficient is positive, and if it is negative, preference was given to the feminine-typed opportunity.

For example, to ascertain the participant's net desirability score, their desirability mean score for the feminine-typed opportunity was subtracted from their mean desirability score from the masculine-typed opportunity. This is an appropriate methodology for this study design because participants scores may be correlated, for example someone may be inclined to give either high or low ratings, and what matters is the difference in cognitions between the two conditions. Taking the difference between the two sets of ratings provides us a measure for how much the participant discriminates in their cognitions between the two conditions. Again, participant sex, age, education and prior entrepreneurial experience were included as controls. As seen in Table 5, full support was found for Hypothesis 1b, *venture desirability is positively related to venture choice*, and 4b, *perceptions of venture risk are negatively related to venture selection*.

Table 4-5: Results of Logistic Regression Analysis for Venture Choice on Risk, Self-Efficacy, Social Support, and Desirability ^a

Predictor	DV: Venture Choice											
	Model 1			Model 2			Model 3			Model 4		
	B	exp(B) ^b	S.E. ^c	B	exp(B)	S.E.	B	exp(B)	S.E.	B	exp(B)	S.E.
Constant	-.54	.58	.43	-.27	.76	.49	.04	1.04	.56	.04	1.04	.56
Step 1: Control variables												
Sex	1.69***	5.41	.25	1.33***	3.77	.30	1.01**	1.14	.24	1.04**	2.84	.33
Nascent Score	.22**	1.24	.08	.23*	1.26	.10	.16	1.17	.10	.19	1.20	.11
Age	-.13*	.88	.06	-.16*	.85	.07	-.15*	.86	.08	-.16*	.85	.08
Education	.01	1.00	.09	.02	1.02	.10	-.06	.95	.10	-.04	.96	.11
Step 2:												
Risk	-.81***	.45	.09	-.46***	.63	.10				-.15	.86	.12
Self-Efficacy				.58***	1.78	.10				.21	1.23	.11
Social Resources				.75***	2.11	.16				.30	1.35	.18
Desirability							1.43***	4.18	.16	1.15***	3.17	.18
-2 log likelihood		411.90			310.81			252.34			242.07	
Overall χ^2		207.36***			307.04***			366.95***			375.78***	
df for overall χ^2		5			7			5			8	
pseudo R ²		.49			.66			.75			.76	
Δ pseudo R ²					.17			.09			.01	

^a N = 447; ^b Note that exp (B) is the odds ratio; ^c Standard error values for B.

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

Although not originally hypothesized, it appears that self-efficacy and social resources are also significantly related to venture choice, independent of their contribution to risk perceived in the venture. As can be seen in Model 2 of Table 5, although participant sex is still a significant predictor of the venture opportunity selection, the β for this variable declines as the R^2 increases to .66. This indicates that the variables of state self-efficacy and perceived social resources contribute directly to the explanatory variables influencing venture choice, over and above their influence on risk perceived. Finally, when we include participant estimates of how desirable the venture is, our affective measure, the coefficient of the gender variable declines in both magnitude and significance, as the R^2 of the model increases to .75, supporting Hypothesis 6b. The final model in Table 6 includes all the socio-cognitive variables measured in this study. Interestingly, we see that the model R^2 only increases slightly to .76, and the other explanatory variables, other than gender, are no longer significant. This indicates that the effect of these explanatory variables is almost fully captured by the variable measuring venture desirability/attractiveness. Although further research should replicate the effects, these results may suggest that an affective process (emotional reactions) may govern opportunity selection, which encapsulates the deliberative (or rational), decision processes.

To test Hypothesis 6a which suggests the socio-cognitive variables, (state self-efficacy, anticipated social resources and perceived risk), could be subsumed in an affective measure, venture desirability was regressed on the variables of state self-efficacy, anticipated social resources and perceived venture risk. In support of Hypothesis 6a, Table 6 shows that state self-efficacy, perceived social resources and perceived risk, as well as participant gender, work together in predicting the desirability of the venture option ($R^2 = .72$).

Table 4-6: Results of Regression Analysis for Venture Desirability^a

Predictor	DV: Desirability
Constant	-.28
<i>Step 1: Control Variables</i>	
Nascent Score	.04
Sex ^b	.55***
Age	-.02
Education	.06
<i>Step 2:</i>	
Self-Efficacy	.45***
Social Resources	.43***
Perceived Risk	-.41***
F	184.45***
R ²	.72
Adj. R ²	.72

^a N = 508; ^b For sex, 0 = “female,” 1 = “male”

* p < .05, ** p < .01, *** p < .001

Analysis by Gender

Although the variable representing sex of the participant was not significant in any of the analysis which also included gender congruency, we still sought to explore if any of these relationships might be stronger or weaker in one gender verses the other. First, to test for main effects of participant gender we ran several independent regressions in which venture desirability, perceived risk, perceived social resources and state self-efficacy were dependent variables, and gender of the participant, prior nascent entrepreneurial experience, age, education

and condition (masculine or feminine-typed scenario) were independent variables. Participant gender (sex) was not a significant predictor of any of the dependent variables in these regressions, indicating that there is not a main effect of sex on these variables. Next, to further tease apart which, if any, factors may affect men and women differently in their venture decisions, we analyzed men and women separately to determine their reactions to the gender-congruent vs. gender incongruent venture. For each of the variables of interest, women rated the gender-congruent venture significantly more positive than the gender incongruent venture: Perceived Risk: $M_{\text{Congruent}} = 4.24$, $M_{\text{Incongruent}} = 4.64$, $p < .001$; Self Efficacy: $M_{\text{Congruent}} = 3.74$, $M_{\text{Incongruent}} = 2.82$, $p < .001$; Social resources: $M_{\text{Congruent}} = 4.02$, $M_{\text{Incongruent}} = 3.69$, $p = .013$; Venture Desirability: $M_{\text{Congruent}} = 3.23$, $M_{\text{Incongruent}} = 2.85$, $p < .001$. Men, on the other hand, did not perceive a significant difference between the ventures in Perceived Risk ($M_{\text{Congruent}} = 4.34$, $M_{\text{Incongruent}} = 4.50$, $p = .172$) or Social resources ($M_{\text{Congruent}} = 4.17$, $M_{\text{Incongruent}} = 3.96$, $p = .162$); yet did report significant higher levels of Self-Efficacy ($M_{\text{Congruent}} = 3.88$, $M_{\text{Incongruent}} = 3.29$, $p < .001$) and Desirability ($M_{\text{Congruent}} = 3.47$, $M_{\text{Incongruent}} = 2.53$, $p < .001$) for the gender-congruent venture.

Mediation

Next, both Self-Efficacy and Social resources were investigated as mediators of venture type on risk perceptions for women, but not for men since there was not a significant difference in risk perceptions by venture type for men. Again, mediation analysis was performed in accordance with procedures set forth by Baron and Kenny (1986), using regression equations that allowed controls for age, education and prior nascent entrepreneurship experience.

Self-Efficacy. Sex-type of venture significantly predicted risk perceived in venture for women, while controlling for age, education and prior nascent entrepreneurial experience ($\beta = .418$, $t(565) = 3.949$, $p < .001$). As expected, sex-type of venture significantly predicted self-

efficacy ($\beta = -.915$, $t(565) = -6.51$, $p < .001$), including the above mentioned controls; and self-efficacy significantly predicted risk perceptions ($\beta = -.277$, $t(565) = -9.326$, $p < .001$), while including sex-type of venture in the model which became insignificant ($\beta = .165$, $t(565) = 1.615$, $p = .107$) once self-efficacy was included in the model, indicating full mediation (Sobel test, $z = 5.33$, $p < .001$).

Social resources. Again, sex-type of venture significantly predicted risk perceived in venture for women, while controlling for age, education and prior nascent entrepreneurial experience ($\beta = .418$, $t(565) = 3.949$, $p < .001$), and predicted social resources ($\beta = -.333$, $t(565) = -2.545$, $p = .011$), while including the controls. Social resources significantly predicted risk perceptions ($\beta = -.314$, $t(565) = -9.979$, $p < .001$), while including sex-type of venture in the model which became less significant ($\beta = .314$, $t(565) = 3.191$, $p = .001$) once social resources was included in the model, indicating partial mediation (Sobel test, $z = 2.46$, $p = .014$).

STUDY 2: Entrepreneurial Investments

Study 2 is designed to extend the findings of Study 1 to investment decisions and replicate some of the relationships in the conceptual model in a between-subjects experimental design (rather than a within-subjects design), to ensure that the contrast effect of evaluating two ventures concurrently are not influencing the results. Although this design does not allow for a choice between venture opportunities, it does allow for the measurement of risk tolerance towards a particular type of venture without potentially anchoring the response with a value given for the first opportunity viewed: responses to the first scenario presented could hypothetically influence responses to the second scenario presented. Specifically, it was expected that controlling for both the risk and reward of a given venture opportunity, people

would be willing to invest more, (show greater risk tolerance), in a venture opportunity that is gender-congruent than incongruent. Therefore, we posited that:

Hypothesis 7: Individuals will choose to invest more financial resources in a venture opportunity that is gender role congruent.

Participants. Amazon's Mechanical Turk was used to recruit and pay participants. Two hundred, fifty-nine, 139 women and 120 men from the United States participated in the study. One participant was excluded because the IP address of the respondent was associated with two responses; in which case the second response was excluded from the analysis. The final sample consists of 258 participants (138 women, 120 men). Mean time spent on the survey was just under 5 minutes.

Procedure

An online survey was again administered after participants completed a consent form, and each participant was given the following instructions: *"You will be presented with an entrepreneurial opportunity and asked to rate your reactions to the opportunity: how appealing it is to you and how willing you would be to pursue a like venture. This is a short survey, please take your time and think about your responses."* Participants were randomly assigned to either a masculine-typed opportunity scenario, feminine-typed scenario or gender neutral scenario (see Appendix B for opportunity descriptions). In the masculine and feminine-typed opportunities, the industry growth rate was also controlled for: in these conditions participants were presented with the statement, "Growth Rate of Industry: 15%" after the scenario. After the venture opportunity was presented, participants were told, "The initial investment for this business is \$10,000 and the likelihood of long term success is 50%." In this way, risk was controlled for in

all the venture scenarios, and because this was a between subjects design, participants only evaluated one venture opportunity.

After the venture opportunity was presented, participants were asked the question below which was designed to control for both venture risk and reward expectations:

Imagine you could invest \$10,000 in the business described above. If the business succeeds you will make 3 times the amount you invest, and if it fails you will lose the amount you invested. (See table below for investment risk and return details.)

Investment	\$1,000	\$2,000	\$4,000	\$6,000	\$8,000	\$10,000
Cash on Hand						
If Succeeds	\$12,000	\$14,000	\$18,000	\$22,000	\$26,000	\$30,000
If Fails	\$9,000	\$8,000	\$6,000	\$4,000	\$2,000	\$0

How much would you invest in this business venture?

Participants selected one of six options (Invest \$1,000, Invest \$2,000, Invest \$4,000, Invest \$6,000, Invest \$8,000, Invest \$10,000), indicating how much they would choose to invest in the venture. Participants then completed items measuring social resources, state self-efficacy, venture desirability, and perceived risk, which were presented in a randomized order. Finally, a manipulation check was conducted and participants were asked to disclose some demographic information, and thanked for their participation.

Measures

The same measures were used in this study as in Study 1, except for perceived risk because this variable was controlled for by the study design. The Cronbach's alphas for each of the scales were as follows: Social Resources, $\alpha=.82$; State Self-Efficacy, $\alpha=.95$; Venture Desirability, $\alpha=.91$. Again, the Nascent Entrepreneurship Scale (McGee et al., 2009) was included in the survey to control for prior entrepreneurial experience.

RESULTS

Manipulation Check

Sex-Type of Venture Opportunity. Again, a hierarchical regression was executed in which sex of the participant was entered on the first step, followed by the main effect of condition on the second step. As expected, there was a significant main effect of condition on the perceived sex of business owners for the venture ($\beta = -.215$, $t(258) = -3.19$, $p < .01$). Although the regression was significant, since there were three conditions, responses for each condition were explored. As expected, 76% of participants believed that owners of the feminine-typed venture were either predominantly female or were 50/50 split between male and female owners, 95% of participants believed that owners of the masculine-typed venture were either predominantly male or were 50/50 split between male and female owners. However, the neutral venture scenario was perceived as masculine by the respondents with 94% of participants reporting that owners of this type of venture were either predominantly male (66%) or 50/50 split (28%) between male and female owners. Again, all cases were included in the analysis to facilitate external validity and provide a more conservative test of the hypotheses.

Willingness to Invest

To test Hypothesis 7, a gender congruency variable was created like in that Study 1, resulting 48 participants in a gender-congruent condition, and 75 participants in the gender incongruent condition, based on the masculine and feminine scenarios alone. Since the gender neutral condition was perceived as masculine-typed, it was coded for this analysis as gender-congruent for men and incongruent for women, resulting in a total of 102 participants in the gender-congruent condition and 156 participants in the gender incongruent condition. See Table

7 for the results of the regression analysis. In support of Hypothesis 7, the only significant predictor of willingness to invest in an entrepreneurial venture is gender congruency ($p=.012$).

Table 4-7: Willingness to Invest Predicted by Gender Congruency

Predictor	Willing to Invest
Constant	3.01***
Sex ^b	.03
Nascent Score	.12
Age	.01
Education	.17
Condition	.38
Congruency ^c	1.13*

^a N = 258; ^b For sex, 0 = “female,” 1 = “male.”

^c For congruency, 0 = “no,” 1 = “yes.”

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

Predictors of Risk Tolerance

To determine if the same factors that influence venture opportunity selection, also influence how much one is willing to invest in a venture, we employed hierarchical regression analyses with Willingness to Invest as the dependent variable. We entered the controls on the first step, and social resources, self-efficacy, or venture desirability on the second step. (see Table 8). It can be seen in Model 3 that as an integrated model, the effects of self-efficacy and social resources are subsumed by desirability, consistent with Hypothesis 6.

Table 4-8: Results of Regression Analysis for Willingness to Invest ^a

DV: Willingness to Invest			
Predictor	Model 1	Model 2	Model 3
Constant	2.54 [*]	1.94	.21
Step 1: Control Variables			
Nascent Score	-.01	-.20	-.15
Sex ^b	-.37	-.39	-.39
Age	.01	.02	.03
Education	.12	-.01	.11
Condition	.10	.04	-.16
Sex * Condition	.75	1.12	1.03
Step 2:			
Social Resources	.33 [*]	.05	-.06
Self-Efficacy		.60 ^{***}	-.06
Desirability			1.04 ^{***}
F	1	2.96 ^{**}	6.05 ^{***}
R ²	.04	.11	.22
Adj. R ²	.00	.07	.19

^a N = 508; ^b For sex, 0 = “female,” 1 = “male”

* p < .05, ** p < .01, *** p < .001

Finally, to determine if the relationships proposed in Study 1 hold for Study 2, a regression analysis was conducted with Venture Desirability as the dependent variable, and anticipated social resources and self-efficacy as predictor variables (see Table 9). It can be seen that self-efficacy and social resources are both significant factors that contribute to one’s decisions when evaluating entrepreneurial opportunities.

Table 4-9: Factors Affecting Venture Desirability ^a

Predictor	DV: Desirability
Constant	1.72 ***
Step 1: Control Variables	
Nascent Score	.03
Sex ^b	.00
Age	-.01
Education	-.11
Step 2:	
Self-Efficacy	.59 ***
Social Resources	.13 ***
F	48.86 ***
R ²	.54
Adj. R ²	.53

^a N = 253; ^b For sex, 0 = “female,” 1 = “male”

* p < .05, ** p < .01, *** p < .001

DISCUSSION

Prior research has found that male and female entrepreneurs differ on a wide range of motivations and outcomes, including: the effort they put into the business; the start-up capital available; the size of their start-up; the types of business started; performance expectations for the venture; preferences for venture risk; their confidence in their ventures; and the problems they face (Brush, 1999; Kepler & Shane, 2007; G. N. Powell & Eddleston, 2008). Specifically, prior research has noted that women elect to start ventures in lower growth and less economically rewarding industries (Anna et al., 2000; Kepler & Shane, 2007; Powell & Eddleston, 2008). Only 5% of all equity capital, and 3% of all venture capital, in the US goes to

women-owned businesses (Hamburg, 2010). While some literature suggests entrepreneurship is a masculine-typed occupation (Bruni, Gherardi, & Poggio, 2004; Gupta et al., 2008; Gupta et al., 2009), the Center for Women's Business Research found that for 2008- 2009 women were starting businesses at twice the rate of men, and owned approx. 40% of privately held firms.

To summarize the findings of this empirical research, we proposed as tested several hypotheses related to the effect of gender on cognitions related to self-efficacy, anticipated social resources, venture desirability, perceived venture riskiness and ultimately willingness to invest in the venture. Specifically we found that when the entrepreneurial venture opportunity was gender congruent, participants rated their self-efficacy higher, anticipated social resources greater, the desirability of the venture greater, perceived lower overall venture risk and were willing to invest greater amounts of money in the venture, even when risk was controlled for and objectively quantified. When given a choice of which venture participants would actually chose to start, participant gender significantly predicted the choice of the gender congruent venture. Additionally, we found support that feelings of self-efficacy, and anticipated social resources mediate how much risk one perceives in an entrepreneurial venture opportunity, and that venture desirability mediates the relationship between participant gender and venture choice.

This article presents a nuanced view of entrepreneurship, suggesting that entrepreneurship, in and of itself, is not sex-typed, but that different entrepreneurial opportunities appeal differently to each sex due to cognitions influenced by gender roles and schemas. A socio-cognitive conceptual model is presented that posits that decisions to start a venture are based on perceptions of self-efficacy, anticipated social resources, perceived risk and venture desirability which are all a function of one's gender, resulting in male/female differences in the types of venture opportunities selected to pursue. As a whole, the revelation of how these

cognitions are related provide some insight as to the internalized barriers to entry that limit women from founding high growth/high reward ventures which capitalize on technological advances. Additionally, the work suggests potential intervention points that may be leveraged to facilitate a more even distribution of women's and men's entry into more prestigious and economically rewarding ventures.

Drawing from social-cognitive psychology and gender development research (Bussey & Bandura, 1999; Lent et al., 2000), we present a conceptual model that explores how gender and resulting social cognitions exert a powerful constraining influence on entrepreneurial decision-making; a phenomena under-explored in the entrepreneurship literature. Additionally, we find that entrepreneurial self-efficacy may be more appropriately expressed as a state measure rather than a trait measure since feelings of entrepreneurial self-efficacy are situationally dependent on the nature of the venture opportunity evaluated. Finally, the results indicate that perceptions of venture risk are not as powerful a predictor of venture choice as previous research suggests (Simon et al., 2000), with the coefficient weight of perceived risk at almost half the weight of the coefficient for the gender variable in this sample.

This research also explores the role that anticipated social resources have on the decision to start a venture. As expected, anticipated social resources work to mitigate perceived venture risk, and both men and women anticipate that they will receive greater support resources from friends and family if they embark on a gender-congruent venture. This finding is consistent with research on prescriptive gender stereotyping (Rudman & Fairchild, 2004; Rudman & Glick, 2001; Wendy Wood & Eagly, 2010), suggesting that both men and women may anticipate social rewards when selecting gender-congruent ventures, and anticipate "backlash" through lower levels of social resources when considering gender incongruent opportunities. From the fitted

models (Table 5), we can also see that anticipated social resources have a dampening effect on perceptions of venture risk, as well as a significantly positive effect on venture choice (Table 6). The implication of these relationships is that anticipated available social resources are a significant factor that weighs in on entrepreneurial decisions, and future research should address this area to gain a comprehensive understanding of how social resources affect such decisions.

Finally, we find evidence that an affective heuristic driven by social identity match with the venture opportunity substantively influences entrepreneurial decision making. Specifically, the results suggest that there may be a ‘short-cut’ path, how attractive or desirable the venture is perceived, that appears to be an affective response which subsumes the deliberative decision steps, including perceived risk, state self-efficacy and anticipated social support. This finding is consistent with the body of research indicating that in everyday situations risk is communicated to the decision-maker via ‘feelings’ (Loewenstein et al., 2001). The managerial and entrepreneurship literatures have underexplored the role that quick affective judgments play in option assessments and strategic direction. Further research is needed on this topic to flesh out the theory and implications.

Limitations

Ideally, entrepreneurship research should be conducted on entrepreneurs; therefore, the main limitation of this research is that the studies were run with a sample of participants that had varying levels of actual entrepreneurial experience. However, the benefits of this approach more than outweigh the limitations. Collecting the data online through Amazon’s M-Turk service enabled collection of a demographically diverse sample from all over the United States with varying levels of education, work experience and entrepreneurial experience shown to be of benefit in prior work (Ryan, Haslam, Hersby, & Bongiorno, 2010). Additionally, entrepreneurial

experience is controlled for in this study via the nascent entrepreneurship scale, allowing the estimation of a β weight for its effect. Finally, testing this theory in an experimental setting enables us to explore the psychological processes in isolation that result in women and men starting businesses in different industries, a well-documented finding in the entrepreneurship literature (Bruni et al., 2004; Brush, 1999; Eddleston & Powell, 2008; Kepler & Shane, 2007; Morris et al., 2006; Powell & Eddleston, 2008).

Another significant limitation of this study is that sex is used as a proxy for gender, instead of including a more direct measure of gender. However, the current measurement of masculinity and femininity has been found to be problematic, both conceptually and methodologically, due to shifting ideas as to what constitutes typical male or female characteristics (Eagly et al., 2004). Additionally, a leading gender scholar suggested that both the terminology sex differences and gender differences should be considered correct, because there is little consensus regarding distinctions between the terms (Eagly, 2000).

Furthermore, all the variables, excluding participant sex, are subjective measures. Because we are examining how one's cognitions influence entrepreneurial decisions, it is appropriate to use subjective measures in this study.

Finally, there may be concern about the novelty of these finding given that there has been an abundance of research finding that women are perceived as ill-suited for incongruent gender role occupations such as management (Heilman, 1995, 2001), and that such women are perceived to be deficient in femininity (Heilman & Okimoto, 2007; Rudman & Fairchild, 2004; Rudman & Glick, 1999), as has it been proposed for quite some time that people perceive the world through gender schemas (Bem, 1981). We believe that this research is novel because it examines how these forces integrate and work internally by biasing one's self-conceptions

related to congruent and incongruent gender role endeavors; as it allows for the separate measurement of the social environment one is embedded in through the measure of anticipated social resources.

Policy Implications

The conceptual model presented in this research suggests two points of intervention that may be leveraged in the entrepreneurial decision-making process. The first potential intervention point is that of self-efficacy. Prior research has found that entrepreneurship training does increase entrepreneurial self-efficacy for MBA students (Zhao et al., 2005), and we can see from this research that having nascent entrepreneurial experiences are significantly related to selecting a masculine-typed opportunity (Table 6). Likewise, providing basic training for would-be entrepreneurs in domains that are not normally considered gender-congruent may serve to increase feelings of self-efficacy in those domains.

The second possible intervention point is that of anticipated social resources. If governmental or professional association resources can work as a substitute for support from friends and family, these resources may provide some buffering for violating normative gender roles, and assist to mitigate the heightened risk perceived in incongruent venture opportunities.

Conclusion

In two studies we found that prescriptive gender norms exert a powerful influence over cognitions, such that actors perceive themselves to have greater self-efficacy, in gender-congruent opportunities and women perceive greater available social resources in gender-congruent opportunities. These factors, combined, have an effect on the amount of risk perceived in different ventures, influencing people to select ventures that are sex-role congruent, and to invest more in gender-congruent ventures. Additionally, if women feel less competent in

a field incongruent with their sex, (high technology), this lower confidence may not only predict that fewer women would enter or start these businesses, but may also imply greater aversion to more aggressive decisions related to growing and financing these businesses, and even limit the recognition of viable opportunities in these domains. The unattenuated result of these patterns of cognition may be the unequal distribution of men and women in the most rewarding and lucrative entrepreneurial opportunities.

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APPENDIX A: FEMININE AND MASCULINE-TYPED VENTURE SCENARIOS

Feminine-typed Scenarios

Business: Supplemental Staffing firm of Nursing Services

Responsibilities: Provide services of registered nurses, licensed practical or vocational nurses, certified nursing assistants, and allied health professionals as supplemental staffing solutions to healthcare facilities and homecare patients.

Clients are predominantly healthcare facilities and homecare patients.

Growth Rate of Industry: 15%

Business: Interior Designer

Responsibilities: Decorate and design the living space within homes and offices.

Clients are predominantly wealthy individuals and businesses.

Growth Rate of Industry: 15%

Business: Direct Seller and Producer of High Quality Kitchen Tools

Responsibilities: At in-home Cooking Shows, guests see and try products, prepare and sample recipes, learn quick and easy food preparation techniques and get tips on how to entertain with style and ease. Sales are made during these "Shows".

Customers are predominantly female.

Growth Rate of Industry: 15%

Business: Publisher of Children's Books and Magazines

Responsibilities: Create magazines and reading clubs for pre-schoolers and elementary school children, as well as publish children's books.

Customers are predominantly parents of school age children and elementary school teachers.

Growth Rate of Industry: 15%

Masculine-typed Scenarios

Business: Bricks and Mortar (Physical Store) Retailer of Consumer Electronics and Appliances

Responsibilities: Retail brand-name consumer electronics, personal computers, entertainment software, and large appliances.

Customers are predominantly middle income households.

Growth Rate of Industry: 15%

Business: Architectural Design and Construction of Home Theater Rooms

Responsibilities: Design and build custom home theaters.

Clients are predominantly wealthy individuals and businesses.

Growth Rate of Industry: 15%

Business: E-Commerce Design, Development and Hosting

Responsibilities: Help companies seize opportunities and solve problems through the innovative and practical use of technology. Builds and maintain e-Commerce websites for retailers that are pure-play online or multi-channel – creating captivating experiences so consumers will buy more, come back often and engage more with the retailer.

Clients are predominantly small business owners.

Growth Rate of Industry: 15%

Business: Investment Banking for evolving companies.

Responsibilities: Merger and acquisitions, including divestitures Healthy and distressed transactions Leveraged and management buyouts/recaps, Private placements of debt and equity securities, Fairness/solvency opinions

Clients are predominantly small businesses.

Growth Rate of Industry: 15%

APPENDIX B: STUDY 2 VENTURE OPPORTUNITY SCENARIOS

Gender Neutral Opportunity Description

Imagine a business with a high demand for its services and in a market that has been growing for the last several decades. Due to technological advances and the ease of use of the internet, there are now many opportunities for innovation within this market, and due to customer demand, it is a business with a relatively high success rate.

The initial investment for this business is \$10,000 and likelihood of long term success is 50%.

Feminine Opportunity Description

Gourmet Cooking Venture

There is a high demand for innovative kitchen tools, food products, and cookbooks aimed for preparing gourmet food in the home. This market has been growing for the last several decades. Due to changing population trends and healthier eating habits, there are now many opportunities for market expansion. Due to high customer demand, it is a business with a relatively high success rate.

Customers are predominantly female.

Growth Rate of Industry: 15%

The initial investment for this business is \$10,000 and likelihood of long term success is 50%.

Masculine Opportunity Description

Business Services Venture

There is a high demand for providers of accounting and financial services for small businesses.

This market has been growing for the last several decades. Due to technological advances and the ease of use of the internet, there are now many opportunities for innovation within this market. Due to customer demand, it is a business with a relatively high success rate.

Clients are predominantly small business owners.

Growth Rate of Industry: 15%

The initial investment for this business is \$10,000 and likelihood of long term success is 50%.

CHAPTER 5: CONCLUSION

How does gender influence decision-making? When and why would it matter? Through three research projects, I explored this topic and found some interesting results. First, although there has been an abundance of prior research suggesting that women are just not as competitive as men, and are less likely to enter competitions, we find that the effect does not hold across domains, such that women are more likely to compete than men in domains stereotyped to be gender congruent. Additionally, we find that how important beating others at competition is to one's self-worth mediates how important it is for one to be compensated for competitive performance. When examining the effects of gender on risk aversion we find that men and women have different subjective expectancies in decisions under risk, where outcome probabilities are objectively quantified, and this effect mediates the valuation provided for a given gamble. However, in decisions under uncertainty, where outcome probabilities must be inferred, and are subjective, we do not find any significant difference in the valuations men and women provide to participate in the gamble (our risk aversion measure). Finally, when examining the factors that influence entrepreneurial decisions we find that when people evaluate a gender congruent venture opportunity they perceive greater self-efficacy, access to greater amounts of social resources, higher affective desirability of the venture and perceive lower venture risk.

Taken together chapter one and three imply that gender is influencing feelings of competence in different domains, and it is these feeling of familiarity (chapter one) or self-efficacy and access to social resources (chapter three) that have a significant influence on decisions made. Chapter two suggests that both men's and women's decision-making is consistent with the subjective expected utility model when making decisions under uncertainty.

This implies that women are not any more risk averse than men for real world decisions, and that if sex differences in outcomes do exist, it may be because men and women may have different likelihood estimates of the desired outcome. This research implies that at least some of the differential we see in the decisions made by men and women are due to different risk/reward evaluations. These evaluations may, or may not, be weighted accurately, for example, in chapter one we find that women are competing less often in areas like math, even though there are not any sex differences in performance.

This research is not meant to imply that there is not any biological basis for some sex differences. However, the findings herein suggests that the context and domain of a given decision appears to trump any biological predispositions, toward competition or risk aversion. Additionally, although I describe some mean differences in the decisions of men and women, it should be noted that the range of within sex variation of these decisions is much greater than the between sex variation. Some men shy away from competition, some women are more risk tolerant than most men, and approx. 30% of participants selected a gender incongruent entrepreneurial venture. This work attempts to isolate the effects of gender normative behaviors from simple biological sex categorizations noted so often in prior research. Future studies may also include the measurement and estimation of hormonal and neurological factors that no doubt play some role in our decision-making predispositions.