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Closing the Gender Gap in Entrepreneurship Education

A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy in Higher Education

by

Carolyn J. Rodeffer
University of Maryland College Park
Bachelor of Arts in Economics, 1982
University of Chicago
Master of Business Administration, 1984

August, 2022
University of Arkansas

This dissertation is approved for recommendation to the Graduate Council.

Ketevan Mamiseishvili, Ph.D.
Dissertation Director

Michael T. Miller, Ph.D.
Committee Member

John W. Murry, Jr., Ph.D.
Committee Member

Jason W. Ridge, Ph.D.
Committee Member

Abstract

Entrepreneurship education in higher education has been cited as a key strategy in filling the entrepreneurship talent pool, preparing students with the skills and confidence needed to start new ventures (Westhead & Solesvik, 2016). However, outcomes of entrepreneurship education for female students are less positive than for their male counterparts (Shinnar et al., 2012; Westhead & Solesvik, 2016; Wilson et al., 2007). Working within the frameworks of Bandura's self-efficacy theory (1977), Azjen's theory of planned behavior (1991), and Steele and Aronson's stereotype threat theory (1995), this quantitative study utilized an experimental research design to assess the impact of role model exposure, specifically, matched-gender versus mismatched-gender versus no role model, on self-assessed entrepreneurial self-efficacy (ESE) and entrepreneurial intentions (EI). Specifically, female and male students enrolled in six sections of a new venture development course at a research institution in the mid-south were randomly assigned to one of three treatment groups. Based on their treatment group, students were given an assignment by their course instructor to read and reflect on an article about a matched-gender entrepreneur role model, a mismatched-gender entrepreneur role model, or an article that provided success tips for young entrepreneurs (no role model). Students who completed the reading and reflection assignment were then invited to complete an online survey instrument. The survey instrument asked students to report gender identity and course section, then respond to a set of questions to measure self-assessed ESE and EI. A total of 83 students completed both the reading assignment and responded to the survey. Results indicate a significantly lower level of EI for female students who were exposed to a mismatched-gender role model as compared to male students in this group. Analysis across the three treatment groups indicate that the impact of role model exposure is not moderated by gender, nor are the

main effects of gender or role model exposure significant. The main effect of course section, a control variable, was significant in the ANOVA model for EI. More research is needed to better understand the impact of different curricular approaches in the development of ESE and EI among college students. Given the persistent nature of gender gaps, particularly for self-efficacy (Shinnar et al., 2014; Wilson et al., 2007), it is likely that more significant interventions are needed to close these gaps.

Keywords: entrepreneurship, entrepreneurship education, gender, gender gap, entrepreneurial self-efficacy, self-efficacy, role models, entrepreneurial intention, new venture development, higher education, universities, stereotype threat.

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“You can’t teach an old dog new tricks.” Thank heavens the members of the admissions committee in the Higher Education department did not believe this to be true and admitted at 59-year-old feminist with an MBA into their doctoral program three years ago. In late June 2019, I walked into the classroom for the first course of my doctoral studies. It had been over 35 years since I had last been a graduate student, and I was reasonably confident that this was a big mistake. It didn’t help that in that first class, in explaining why, in some cases, median is a better measure of central tendency, the professor asked for each of us to write our age on the board, and I became the poster child for a statistical outlier. But this class, and the ones that followed, reminded me how much I love to learn and how energizing it is to be in a classroom with inspiring faculty and engaged (and engaging) fellow students.

During the first few semesters of coursework, I certainly learned a lot, but was increasingly concerned about the looming dissertation requirement. Concerned is probably the wrong word: panicked is closer to the truth. In January 2021, I walked into (well, actually, logged into) the first session of Dr. Ketevan Mamiseishvili’s course, Research Techniques in Higher Education. By the end of the semester, I had both a dissertation idea and a fantastic advisor to help me shape my idea into a cohesive research plan that blended my interests in higher education and entrepreneurship, with my passion for advocacy on behalf of underrepresented students. I am deeply indebted to Dr. Kate Mamiseishvili for her encouragement and support, her ideas and pointed questions, and most of all, her absolute conviction that I would indeed complete this dissertation.

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I decided to tackle one more big, bad, difficult thing way too late in life. I am grateful that I was surrounded by an army of supporters who were always there for me. I couldn't have done it without all of you!

Dedication

I dedicate this work to the memory of my father, Robert K. Rodeffer, who passed away just two months before I completed my dissertation and was awarded my doctorate. He was a constant source of support and encouragement through my life and was so proud that I took on the new challenge of a doctoral program late in life. During our daily phone calls over the last few months of his life, we discussed my progress. He never expected anything short of brilliant success. When I expressed nervousness about defending my dissertation proposal, he told me I had nothing to worry about, proclaiming “that university has never seen anyone like you!”

I also dedicate this work to my partner, Gary Barrow, who patiently listened as I explained Bandura and Azjen and the assumptions of ANOVA models. He held my hand and said “there, there,” as I plowed through my courses, and was supportive and understanding when I cancelled social plans to free up time to write. “What can I do to make things easier?” was a phrase I heard from him countless times over the past several years, and for that, I am forever grateful.

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Chapter I

INTRODUCTION

Context of the Problem

Women in the U.S. continue to grapple with issues of advancement and compensation in the workplace, with most experiencing at least one “glass ceiling” event as they progress through their careers (Sandburg, 2013). The “glass ceiling,” that is, the unofficial but very real barrier to corporate career advancement, continues to be an impediment for women pursuing business careers in the United States. According to the U.S. Bureau of Labor Statistics (2020), while the majority of employed persons in management and professional occupations are women (51.7%), they hold only 29.3% of business executive positions. As of 2013, just 21 of the CEOs at Fortune 500 firms were women, and women held only 17% of board of directors’ positions at those firms (Sandberg, 2013). While the number of women in CEO positions at the 3,000 largest U.S. companies increased between 2010 and 2020, there are still only 180 (6%) of these companies that are led by female CEO’s (Bachman, 2020).

Women’s progress through the management ranks lags that of men across multiple business disciplines. Women managers represent less than one-third of total managers in architecture and engineering (9.5%), transportation and distribution (21.3%), industrial production (22.6%), information systems (26.6%), general management (30.5%), and sales management (30.9%) (U.S. Bureau of Labor Statistics, 2020). Overall, women managers have made greater progress in administrative departments (human resources, legal, public affairs), while far fewer women are appointed to key leadership roles with profit-and-loss (P&L) responsibility, which provide a pathway to top executive positions (Bachman, 2020).

In addition to facing glass ceiling issues, female employees in the U.S. earn consistently less than their male counterparts. The average salary for a woman employed full-time in the U.S. is just 81.5% of that of a man employed full-time and the ratio of women's to men's earnings has remained in the 80-82% range since 2004 (Horan, 2020). While this differential is often attributed to the fact that women tend to be disproportionately employed at the lower levels of organizational hierarchies (Kephart & Schumacher, 2005), the gender salary gap for managers is even larger. As recently as 2020, women managers earn 76.4% as much as their male counterparts (U.S. Bureau of Labor Statistics, 2020).

Perceptions of the corporate glass ceiling is theorized to be a significant driver of entrepreneurial activity for women, particularly for younger women (Fisher, 2004; Hisrich & Peters, 2016; Kephart & Schumacher, 2005; Kuratko, 2017). The displacement theory of entrepreneurship asserts that new business formation is triggered by cultural displacement, that is, gender, cultural, or racial barriers that block progress in "traditional" business professions (Kuratko, 2017, p. 10). This theory suggests that young women who perceive barriers to progress in a corporate setting, such as a glass ceiling, will be more motivated to pursue entrepreneurial opportunities, viewing them as an opportunity to achieve to their full potential (Hisrich & Peters, 2016). Displacement theory further suggests that high-potential women who perceive barriers to progress in a corporate setting, where corporate culture tends to favor majority populations, will view entrepreneurship opportunities as a level playing field where results are rewarded regardless of gender, class, ethnicity, or country of origin (Hisrich & Peters, 2016; Spinelli & Adams, 2016). This displacement framework in which entrepreneurship provides the solution to glass ceiling issues is summarized in a compelling way by Kephart and Schumacher (2005), who

posit that female entrepreneurship will likely be judged to be “the new women’s liberation movement of the 21st century” (p. 2).

That said, rates of entrepreneurship for women continue to lag those of men. In 2021, women owned just 42% of small businesses in the United States (Head, 2021). Data from the 2018/2019 Women’s Entrepreneurship Report (Elam et al., 2019) support a finding that there is a gender gap in U.S. entrepreneurship, and that this gap is likely to continue for the foreseeable future. Estimates of women’s involvement in nascent (idea-stage) and early-stage entrepreneurship activity in the U.S. range from 60.5-80.0% of that of their male counterparts (Elam et al., 2019; Fairlie & Desai, 2021). Further, rates of early entrepreneurship activity for women have remained virtually unchanged since 1999 (Fairlie & Desai, 2021).

In order to fully capture the economic benefits of an entrepreneurial economy, focus is needed on balancing the entrepreneurship talent pipeline by attracting more women to pursue entrepreneurial ventures. Entrepreneurship education would seem to be a key strategy to achieve this goal by providing women with skills, encouragement, and self-confidence to pursue new business creation (Westhead & Solesvik, 2016). That said, female students are less likely than male students to even enroll in entrepreneurship courses, let alone complete entrepreneurship degree programs (Choi et al., 2012; National Center for Education Statistics [NCES], 2018). Based on an analysis of 1996-2008 data from the Integrated Postsecondary Education Data System (IPEDS), Choi et al. (2012) observed that women represent just 44.4% of students enrolled in any type of post-secondary entrepreneurship education or training program. The majority of these female students (54.4%) will only complete a certificate program rather than a degree. In contrast, the majority of male students enrolled in post-secondary entrepreneurship education will complete either an associate’s (44.4%) or bachelor’s degree (23.1%) (Choi et al.,

2012). NCES data from the 2017-2018 academic year indicate that while women were awarded the majority of bachelor's degrees (57.2%) during the 2017-2018 academic year, only 46.9% of undergraduate business degrees were awarded to women. Women are even more underrepresented in undergraduate entrepreneurship degree programs, with just 34.6% of degrees in entrepreneurship or small business management awarded to women (National Center for Education Statistics, 2018).

For those female students who do enroll in post-secondary entrepreneurship courses, evidence of the impact of these courses in enhancing their confidence in their skills and ability to start a new venture (entrepreneurial self-efficacy or ESE) is mixed (Shinnar et al., 2014; Westhead & Solesvik, 2016; Wilson et al., 2007). In a longitudinal study across two semesters of entrepreneurship coursework at a U.S. university, Shinnar et al. (2014) found that while male students reported significant increases in ESE, their female counterparts reported no increase, indicating the courses were less effective for women. Westhead and Solesvik (2016) conducted research at three universities in Ukraine, comparing a group of students who completed entrepreneurship courses with those who did not. Their analysis yielded a finding that while entrepreneurship education (EE) was positively correlated to ESE for male students, there was a strong, negative correlation between EE and ESE for female students. While Wilson et al. (2007), found a positive correlation between entrepreneurship education and ESE for female students, their study was conducted among female MBA students who were attending highly competitive graduate business schools, a sample that is not representative of the experience or confidence level of a female undergraduate student.

Researchers have suggested several possible explanations for the differential impact of entrepreneurship education on female versus male students (Gupta et al., 2009; Pollock et al.,

2012; Jones, 2014; Shinnar et al., 2014). Entrepreneurship courses tend to focus on the accomplishments of male entrepreneurs, reinforcing the stereotype of entrepreneurship as a career path more appropriate for male students (Gupta et al., 2009; Hsu, et al., 2019; Shinnar et al., 2014). Entrepreneurship texts continue to present a traits-based model of the entrepreneur, reinforcing a perspective that entrepreneurship ability is fixed rather than malleable (Kuratko, 2017; Spinelli & Adams, 2016). In addition, the characterizing traits of entrepreneurs are perceived as highly male-congruent: courage, assertiveness, independence, individualism, risk-taking (Gupta et al., 2009; Pollock et al., 2012). The presentation of imagery and stereotypes of entrepreneurship that are gendered and male are likely to elicit issues of stereotype threat, undermining female student confidence in their ability to succeed in the field (Bandura, 1993; Jones, 2014).

A significant body of research exists that measures the impacts and outcomes of entrepreneurship education courses and initiatives in higher education and assesses differences in outcomes between male and female students (Chowdbury et al., 2019; Gupta et al., 2009; Shinnar et al., 2014; Westhead & Solesvik, 2016; Wilson et al., 2009). However, few studies have focused on identifying specific curricular interventions and assessing their impact in increasing entrepreneurial self-efficacy (ESE) and entrepreneurial intention (EI) among female students in higher education (Javadian & Modarresi, 2020; Pollack et al., 2012).

Glass ceiling issues have long been viewed as a barrier for women in achieving their full potential in corporate business settings. Entrepreneurship has been viewed as a potential solution to glass ceiling issues for women, and entrepreneurship education has been suggested as a key strategy to increase entrepreneurship rates for both men and women. However, research suggests that entrepreneurship education is less effective in increasing entrepreneurial self-efficacy and

entrepreneurial intention for women, and women continue to pursue new business start-ups at lower levels than do men. Additional research is needed to identify effective and actionable strategies to close the gender gap in entrepreneurship education, and thereby support women in achieving their potential in an increasingly entrepreneurial business environment.

Purpose of the Study

The purpose of this quantitative study was to assess the impact of role model exposure on self-assessed ESE and EI for female and male students enrolled in an introductory new venture development course at a mid-size public research institution in the mid-south. Specifically, this study measured differences in ESE and EI between female and male students who read about a matched gender role model, that is, a female role model for female students and a male role model for male students. These results were compared to EI and ESE for male and female students who read about a gender-mismatched role model, as well as to ESE and EI for a control group of students who read an article unrelated to role models.

It is important to note that this study focused on differences in entrepreneurial intentions and self-efficacy based on gender rather than biological sex. Gender, for purposes of this study, refers to gender identity, that is, the gender which an individual identifies with and perceives that others attach to them. Research indicates that it is gender identity, rather than biological sex that is critical to how an individual perceives societal norms, expectations, and roles, and is key in impacting attitudes and intention as it relates to careers in general and entrepreneurship in particular (Gupta et al., 2009; Marlow & McAdam, 2012; Shinnar et al., 2018). For this study, female/male and women/men are used interchangeably to refer to self-identified gender identity. While students who identified as non-cisgender or declined to report their gender identity had the opportunity to participate in this study, their responses were excluded from the analysis.

Research Questions

This experimental quantitative research study answered the following research questions:

1. What differences in ESE and EI exist between female and male students who read about a matched-gender entrepreneur/role model?
2. What differences in ESE and EI exist between female and male students who read about a mismatched-gender entrepreneur/role model?
3. What differences in ESE and EI exist between female and male students who do not read about an entrepreneur/role model?
4. How do ESE and EI differ among the matched-gender role model group, the mismatched-gender role model group, and the control group?
 - a. Are there differences across groups for the combined student sample?
 - b. Are there differences in EI and ESE across groups for female students?
 - c. Are there differences in EI and ESE across groups for male students?

Definitions

The following terms appear frequently in the research literature for higher education and entrepreneurship education. These terms may be unfamiliar to individuals outside the higher education or business education environment. Therefore, definitions of a number of these key terms are provided below.

Entrepreneur: an individual who is willing to take on the financial risk associated with founding and growing an innovative and profitable organization (Kuratko, 2017)

Entrepreneurship: the activities associated with applying innovation and passion to setting up a business or social enterprise (Spinelli & Adams, 2016).

Entrepreneurship education (EE): courses and experiential learning opportunities focused on preparing students with the knowledge, skills, and motivation needed to start a business or social enterprise (Shinnar et al., 2014).

Entrepreneurial self-efficacy (ESE): an individual's confidence in their abilities to perform the tasks necessary for starting and running an entrepreneurial venture (Chen et al., 1998).

Entrepreneurial intention (EI): the state of mind, attitudes, and beliefs that precede behavior and focus on starting an entrepreneurial venture (Moriano et al., 2012).

Gender stereotype threat: a situation where a stereotype about an individual's ability based upon their gender adds sufficient pressure so as to interfere with performance (Spencer et al., 1999).

Limitations

This study focused on students who were enrolled in a new venture development course in the business college at a single mid-size public research university in the mid-South, limiting the projectability of findings to the total population of U.S. university students, or university business students.

Numerous studies have identified non-gender factors that correlate to differential level of ESE and EI. These factors include leadership experiences (Chowdbury et al., 2019; Kickul et al., 2008), prior entrepreneurship experiences (Chowdbury et al., 2019; Dempsey & Jennings, 2014), cultural background (Shinnar et al., 2012), and exposure to family entrepreneurial role models (Entrialgo & Iglesias, 2017; Westhead & Solesvik, 2016). However, sample size limitations for this study restricted the ability to analyze subgroups beyond gender.

Significance of the Study

This study makes several contributions to the entrepreneurship education literature. First, the study assessed the impact of role models, and specifically, matched- versus mismatched-gender role models in impacting ESE and EI for female and male students. The specific intervention was based on Bandura's (1977) self-efficacy theoretical framework, but also integrated more recent research supporting gender differences in the development of self-efficacy (Lockwood, 2006) . While Bandura posits that enactive mastery, that is, the experience of practicing the skills needed to be successful, is the most critical element for building self-efficacy, more recent research indicates that for women, vicarious experience, that is, access to role models, is a more critical factor in the development of self-efficacy for women (BarNir et al., 2011; Entrialgo & Iglesias, 2017; Lockwood, 2006).

This study expands on insights provided in research by Lockwood (2006) on the importance of gender-matched role models in enhancing female students' career confidence in pursuing careers in traditionally male fields. Specifically, this study measured differences between female and male students in the impact of matched-gender versus mismatched-gender role models on ESE and EI, rather than on more generalized career confidence.

Further, this study provides insights into the impact of a simple instructional intervention in improving EE outcomes for female students. While a significant body of research documents gender differences in EE outcomes, there is scarce evidence supporting specific interventions that effectively close the gender gap. The proposed intervention, which entails a single, low-stakes assignment, provides a starting point towards the development of a less male/gendered presentation of entrepreneurs and entrepreneurship in EE that is more effective in building confidence and intention towards entrepreneurship for female students.

Finally, the use of an experimental design with random assignment of students to treatment and control groups provides greater statistical validity in assessing differences in outcomes, thereby providing stronger internal validity for this study and enabling use of robust statistical analysis (Gamst et al., 2008). This design is in marked contrast with much of the body of entrepreneurship education literature, which is largely based on cross-sectional explanatory designs and lack the rigor of random assignment or control groups.

Theoretical Framework of the Study

Three foundational theories related to self-efficacy, behavioral intention, and stereotype threat provide the basis for this study. Bandura's theory of self-efficacy (1977) provides the first model for the study and has provided the theoretical basis for a number of research studies related to entrepreneurial self-efficacy in a college student population (Dempsey & Jennings, 2014; Duval-Couetil et al., 2014; Pollock et al., 2009; Shinnar et al., 2014; Wilson et al., 2007; Wilson et al., 2009). Based on his research on the precursors of lasting behavioral change, Bandura (1977) proposed that while cognitive processes mediate behavioral change, those cognitive events are shaped by an individuals' perceptions of their own abilities in implementing the behavioral change. Specifically, Bandura's model of self-efficacy proposes that both outcome expectancy, that is, an individual's belief that a certain behavior will lead to a desired outcome, as well as efficacy expectations, that is, an individual's belief that they can effectively perform the behavior, are necessary precursors to behavioral change. Further, perceptions of self-efficacy will influence both the initiation of behavior and its persistence (Bandura, 1977, 1993).

Bandura's model of self-efficacy posits that efficacy expectations are influenced by four key factors: enactive mastery, vicarious experience, verbal persuasion, and emotional arousal. Enactive mastery or having experienced repeated success in performing the task in question, is

the strongest driver of perceived self-efficacy. Vicarious experience, that is, seeing others master the behavior, is also a key driver of perceived self-efficacy, albeit a less important influence as compared to enactive mastery. Verbal persuasion, or encouragement to initiate the task, and positive feedback regarding one's performance, can also play a role in improving perceptions of self-efficacy. Finally, emotional arousal, an individual's level of either positive or negative emotions regarding task performance, also influences perceived self-efficacy: positively, in the case of excitement or positive emotional arousal, or negatively, when the primary emotion is fear or anxiety (Bandura, 1977).

Key to Bandura's model is the distinction made between *perceptions* of self-efficacy as compared to *objectively measured* skills, abilities, or talents. In his subsequent exploration of the application of self-efficacy theory to academic development, Bandura (1993) documents the role of perceived self-efficacy in impacting student motivation. Students who perceive that they have high self-efficacy as it relates to an academic subject set higher performance goals for themselves in that academic subject and demonstrate higher levels of motivation to achieve those goals (Bandura, 1993). Similarly, in applying self-efficacy theory to career choice, Bandura (1997) observes the significant role that beliefs about personal self-efficacy play in impacting choice of careers, with low self-efficacy beliefs causing individuals to perceive some career paths as non-viable. He further observed that gender stereotyping impacts perceptions of self-efficacy for women, specifically as it relates to scientific and mathematical confidence, resulting in a self-limiting of career choices for women (Bandura, 1997).

Azjen builds upon Bandura's theory of self-efficacy in shaping his theory of planned behavior (1991). He notes that models of behavior built upon attitudes, personality traits and individual dispositions provide relatively poor predictive power as it relates to individual

behaviors. Rather, the central factor predicting an individual's likelihood of performing a behavior or task is that individual's intention to perform the behavior or task (Ajzen, 1991). That intention, according to Ajzen, is shaped by three key factors: attitude toward the behavior, that is, how favorable is the individual's assessment of the behavior; subjective norms or pressure from peers or society to either perform or not perform the behavior; and perceived behavioral control or self-efficacy. As in Bandura's self-efficacy theory (1977), Ajzen emphasizes that behavioral control is anchored in self-confidence, based upon perceptions of the ease or difficulty in performing a behavior, which may or may not be consistent with actual resources, opportunities, or barriers (Ajzen, 1991).

Ajzen's theory (1991) further posits that the combination of intention and perceptions of behavioral control is a strong predictor of behavior. Further, and consistent with Bandura's theory of self-efficacy (1977), Ajzen's theory links perceptions of behavioral control or self-efficacy to levels of motivation. An individual who believes they have the ability to successfully master a task or behavior will exert a greater level of energy and persistence to perform the task or behavior (Ajzen, 1991).

Steele and Aronson's stereotype threat theory (1995) provides the final theoretical lens for this study. Stereotype threat theory posits that the perceived risk of confirming a negative stereotype about one's group puts performance pressure on members of that group to the degree that it negatively impacts performance and confidence (Steele & Aronson, 1995). As applied to gender, this theory has strong research validation relative to female student performance in STEM (Marra et al., 2009; Nankervis, 2011; Spencer et al., 1999). A common defense employed by individuals in response to stereotype threat is domain avoidance, which is to simply avoid activities, courses, or career paths where the stereotype applies (Steele et al., 2002). Domain

avoidance is likely in evidence in low rates of female student enrollment in male dominant courses and majors, including STEM, business, and entrepreneurship.

Steele et al. (2002) further posit that the individual internalization of stereotype threat leads to a more pervasive sense of social identity threat, that is, a concern that individuals have that their image is threatened by the activation of a negative group stereotype. Social identity threat is triggered in situations where the proportion of people with a given social identity is low. Social identity threat is exacerbated in situations where there are clear cues as to the predominate culture in the situation and the importance of identity in the setting is highlighted, leading to perceptions of low acceptance of and importance placed on diversity in the setting (Steele et al., 2002).

Chapter Summary

Entrepreneurship has been described as a business equalizer, reducing the opportunity gap between men and women in American business. However, business start-ups for women remain at levels significantly below that of men. The gender gap in entrepreneurship appears unlikely to close in the near future, as women report lower intention to start a business (EI) and less confidence in their entrepreneurial ability (ESE). Entrepreneurship education efforts in higher education do not appear to be as effective in building intention of self-confidence for female students.

This study measured gender differences in entrepreneurial self-efficacy (ESE) and entrepreneurial intention (EI) among female and male students enrolled in a new venture development course and was designed based on the theoretical models of self-efficacy (Bandura 1977, 1993), planned behavior (Ajzen, 1991), and stereotype threat (Steele et al., 2002). This study is significant in that it was designed to document the impact of exposure to matched-

gender versus mismatched-gender role models in closing the gender gap in ESE and EI that persists in entrepreneurship education. Insights from this study provide direction for entrepreneurship educators in adapting curriculum to build ESE and EI more effectively for both female and male students.

CHAPTER II

REVIEW OF THE RELATED LITERATURE

Entrepreneurship Education: Growth, Outcomes, Disparities

Entrepreneurship is a key driver of growth in the modern global economy (Nabi et al., 2018). Government policy makers in both developed and developing economies cite entrepreneurship and innovation as key to achieving and maintaining economic competitiveness (Dreisiebner et al., 2018; McClure, 2015; Von Graevenitz et al., 2010). This has led to both public- and private-sector support for entrepreneurship education, which is widely viewed as an effective way to increase both the quantity and quality of new entrepreneurial ventures (Cox et al., 2002; Hytti et al., 2010; Matlay, 2006; Piperopoulos, 2012).

Entrepreneurship education (EE) has been identified as one of the fastest growing subject areas in higher education (Katz, 2003; Mwasalwiba, 2010; Ratten & Usmanij, 2021). What began as a single course in the Harvard University MBA program in 1947 has grown to over 2200 programs offered at 1600 colleges and universities in the United States (Katz, 2003; Kuratko, 2005). In the year 2000, it was estimated that over 200,000 students participated in EE in the United States alone (Katz, 2003). EE, that is, the courses and experiential learning opportunities designed to prepare students with the knowledge, skills, and motivation to start a business or social enterprise (Shinnar et al., 2014), has exhibited even faster growth on a global basis (Sieger et al., 2018).

According to results from the 2018 Global University Entrepreneurial Spirit Students' Survey (GUESSS), 24.4% of college and university students worldwide reported that they had participated in an elective EE course, while 20.5% of students reported participating in a compulsory EE course (Sieger et al., 2018). That said, the participation of women in EE

continues to lag that of men in the U.S. (Choi et al., 2012; National Center for Education Statistics, 2018) and on a global basis (Hahn et al., 2019). The gap in participation in EE for women, combined with the perceptions of societal and institutional gender barriers likely contribute to the ongoing gender gap in entrepreneurship behavior (Choi et al., 2012; Shinnar et al., 2012; Westhead & Solesvik, 2016).

The expansion of both EE programs and funding has generated debate among educators and researchers as to the effectiveness of EE in building entrepreneurship skills and career intentions in students. Critics have cited a lack of consistency in definitions, objectives, and pedagogical approaches to EE, as well as issues with the quality of the research used to assess student outcomes (Henry, 2005b; Mwasalwiba, 2010; Wu & Gu, 2017). The growing body of research examining outcomes has failed to provide conclusive support for the positive impact of EE in improving student attitudes toward entrepreneurship as a career, increasing their intention to start a business, or building their confidence in their ability to do so. While several studies have correlated EE to increases in positive attitudes towards entrepreneurship as a career, ESE, and EI (Arranz et al., 2017; Nilsson, 2012; Rauch & Hulsink, 2015; Sanchez, 2011), other studies have failed to document positive outcomes of EE (Cox et al., 2002; Nabi et al., 2016; Oosterbeek et al., 2009; Piperopoulos, 2012; Salavou et al., 2021; Von Graevenitz et al., 2010).

A review of the literature on outcomes of EE for women suggests that not only does EE fail to correlate to more positive attitudes, increased confidence, and greater intention to pursue entrepreneurship, that participation in entrepreneurship courses in some instances actually correlate to reductions in these key measures. These more negative outcomes of EE have been hypothesized to be a result of the different motivations, expectations, and self-assessed skillsets women bring to EE as compared to their male counterparts (Dempsey & Jennings, 2014; Duval-

Couetil et al., 2014; Wilson et al., 2009). Other researchers posit that EE presents a narrative of entrepreneurship that is gendered and male, thus discouraging the development of motivation and intention in female students (Gupta et al., 2009; Jones, 2014).

This literature review is divided into three sections. The first section will provide an overview of the growth of EE in the context of higher education and will discuss the evolution of pedagogical approaches to EE in higher education. The second section will provide a review of research assessing the impact of EE in terms of outcomes for students in higher education. The third section will discuss research findings on EE as it relates more specifically to the experiences, motivations, and outcomes for female students in higher education. This chapter will conclude with an assessment of gaps in the research and implications for future work.

The literature search was conducted using the ProQuest Central, ERIC (Education Resources Information Center), and Business Source Complete (EBSCO) databases available through the Mullins Library at the University of Arkansas. Searches related to EE included combinations of the following search terms: entrepreneurship, new venture, new business, start-up, teaching, education, pedagogy, higher education, college, university, outcomes, assessments, gender, gender differences, women, female, entrepreneurial self-efficacy, and entrepreneurial intention. Studies were sorted by target student population, including education level (undergraduate versus graduate school), gender, and geographic scope of the research. Studies were also screened to focus on articles published in peer-reviewed journals.

To narrow the focus of the analysis, research studies which focused on student populations at higher education institutions in the United States, Canada, Europe, the United Kingdom, and Australia were included. Research on entrepreneurship pedagogy and outcomes conducted with student populations in Latin America, Africa, and Asia were not considered in

this analysis because of significant differences in economic conditions, culture, and attitudes towards entrepreneurship. Emphasis in the search process was on identifying relatively recent research, with the majority of articles cited in this review published within the past ten years (2011-2021). That said, a number of older articles are included in this review. These older articles are included when they provide historical context for understanding the progression of EE and EE pedagogical approaches or represent widely cited, foundational studies.

Evolution of Pedagogy

As noted earlier, the growth of EE as an academic discipline at colleges and universities on a global basis has been accompanied by a rapid expansion in the range of both the curricular and co-curricular programs offered to students. Vesper and Gartner (1997), after conducting a global survey of business school deans (n=311), confirmed that entrepreneurship education in colleges and universities encompassed a broad range of topics including new venture creation and launch, family and small business management, and high-growth business management. Solomon et al. (2002) affirmed these findings with their own global survey of administrators at 2-year and 4-year colleges and universities (n=240). Their research confirmed that the most prevalent courses offered at 4-year colleges and universities are small business management (offered at 35% of institutions), entrepreneurship (25%), and new venture creation (15%). Katz (2003), in his analysis of business programs at major 4-year colleges and universities in the U.S. identified a broader range of entrepreneurship course offerings, including family business, free enterprise, and entrepreneurial finance, as well as entrepreneurship courses focused on specific student groups, including women and ethnic minorities.

Hytti et al. (2010) articulate three specific pedagogical approaches to entrepreneurship education: teaching about entrepreneurship, that is, focusing on building awareness and

understanding of entrepreneurship as an economic driver and potential career option; teaching through entrepreneurship, that is, using case studies and experiential learning tools to aid students in developing general business and strategy skills; and teaching for entrepreneurship, with focus on preparing students to launch their own start-up. These very different course objectives contribute to the broad array of course offerings and teaching approaches to EE.

Learning objectives and teaching approaches in EE vary widely. EE offerings range from traditional lecture-based courses focused on creating awareness and understanding of theoretical foundations of entrepreneurship to experiential courses designed to prepare students for launching and scaling their own new ventures (Henry et al., 2005a; Hytti et al., 2010; Maritz & Brown, 2013; Vesper & Gartner, 1997). Popular course designs incorporate case studies, presentations by local entrepreneurs, business plan development projects, business simulations, consulting opportunities with local entrepreneurs, and student-run new venture launch and management experiences in addition to traditional, lecture-based approaches (Dreisiebner et al. 2018; Henry, 2005b; Kuratko, 2005; Matlay, 2006; Mwasalwiba, 2010; Wu & Gu, 2017).

Based on a semi-systematic literature review of 108 articles focused on entrepreneurship pedagogy, Mwasalwiba (2010) identified a varied mix of teaching methods ranging from traditional lectures to case studies, team-based projects focused on developing the business plan for a start-up, consulting projects with local entrepreneurs, business simulations, guest speakers, field visits to start-ups, workshops, pitch competitions, and creation of student-run small business ventures. The researcher concluded that there is no consensus on which methods of teaching are most effective.

Mandel and Noyes (2014) confirmed that EE, at least as it is offered in top U.S. business schools, is evolving towards a greater emphasis on experiential learning. Based on their survey

of the twenty-five top-ranked U.S. business schools, the researchers concluded that the overarching focus at these elite institutions is centered on student-driven new venture creation projects, including business plan development, pitch competitions, advancing concept and product development in on-campus new venture “incubation facilities” (Mandel & Noyes, 2014, p. 168) and seeking funding for start-up. Wu and Gu (2017), based on their own systematic review of the literature, provide further evidence that the focus of teaching in entrepreneurship education is beginning to shift away from a teacher-centric lecture-based approach to “active, competence-based experiential learning” (p. 155). However, their findings suggest that this trend towards experiential learning is not as pronounced outside the top U.S. business schools reviewed by Mandel and Noyes (2014).

While experiential learning models are becoming more prevalent, lecture-based pedagogy continues to be a significant component of the entrepreneurship curriculum. In the United States, difficulty in attracting practicing entrepreneurs to university teaching has resulted in courses at many institutions being taught by academics who continue to rely on a traditional curriculum and a lecture-based teaching approach (Kuratko, 2005; Solomon et al., 2002). In their assessment of entrepreneurship education, Rideout and Gray (2014) posited that EE teaching methods at most institutions continue to be lecture and case-study focused, “with perhaps a few guest speakers thrown in” (p. 332). At public universities in Europe and the U.K. where a change to curriculum often represents a significant bureaucratic challenge, traditional teaching and assessment approaches endure (Arranz et al., 2017; Piperopoulos, 2012).

Student outcomes of EE

The expansion of EE has led to a corresponding increase in the number of published research studies assessing its effectiveness. While policy makers articulate the goals of EE in

terms of the economic impact of new ventures, the often-significant time lag between EE and new venture launch makes assessments of economic impact difficult. As a result, published studies of EE programs tend to focus on more immediately measurable outcomes, including students' stated intentions to launch a new venture (entrepreneurial intention, or EI), their confidence that they have the skills needed to launch a new venture (entrepreneurial self-efficacy, or ESE), or their overall attitudes towards entrepreneurship (Balan & Metcalfe, 2012; Henry et al., 2005a; Matlay, 2006; Mwasalwiba, 2010). And even these studies focused on more immediately measurable student outcomes have failed to document consistently positive outcomes.

Traditional Pedagogy

Assessments of the traditional, lecture-based approach to EE have yielded mixed results. While two of the reviewed studies found a positive correlation between EE and attitudes towards entrepreneurship and ESE (Arranz et al., 2018; Piperopoulos & Dimov, 2015), other researchers were unable to identify any meaningfully positive outcomes associated with this educational approach (Piperopoulos, 2012; Salavou et al., 2021). Methodological issues with several of the reviewed studies limit their generalizability.

Arranz et al. (2018) assessed the impact of both EE and co-curricular entrepreneurship activities on attitudes towards entrepreneurship, perceptions of behavioral control (a surrogate measure for ESE), and EI among students (n=1475) at two universities in Spain: ESIC (Escuela Superior de Ingenieros Comerciales) Business and Marketing School and the University School of Design, Technology, and Innovation (ESNE). ESIC has a well-developed entrepreneurship curriculum and established co-curricular activities. In contrast, ESNE has integrated entrepreneurship education into a broad range of its courses and degree programs including

interior design, graphic design, fashion design and video game development. Based on data from this cross-sectional explanatory study, researchers concluded that neither EE nor co-curricular activities at either school were significantly correlated with EI. That said, both EE and co-curricular activities at ESIC were significantly and positively correlated with attitudes toward entrepreneurship and perceived behavioral control. At ESNE, EE was positively and significantly correlated with attitudes, but not perceived behavioral control, and there was no significant correlation between co-curricular activities and either of these measures.

While the positive impact of EE on students' entrepreneurial attitudes is encouraging, the lack of impact of either EE or co-curricular activities on EI suggests that neither program is supporting future entrepreneurship activity to a meaningful degree. Methodological issues with this study, however, limit generalizability of findings, particularly as they relate to differences between outcomes at the two universities. Conclusions from this study were based on data collected from a convenience sample of students at the end of the university term. This makes it difficult to assess whether the differences between program outcomes are a result of the curricular and/or co-curricular interventions, or merely reflect differences between the two samples that were present at the beginning of the term. Given the strong reputation of ESIC for both entrepreneurship courses and co-curricular programs, it is likely that students with positive entrepreneurship attitudes would self-select into this program at a higher level than for ESNE, thereby amplifying differences on key measures between the two programs.

Piperopoulos and Dimov (2015) also sought to understand the impact of EE on EI in their study of business students at a major British university (n=114). This study compared the impact of two different entrepreneurship course designs: a lecture-based course focused on entrepreneurship theory, and an experiential-learning course emphasizing acquisition of skills for

entrepreneurship. Researchers found significantly lower levels of both ESE and EI among students in the traditional courses as compared to those in the experiential learning course. Even more compelling was their finding of significant differences in the relationship between ESE and EI for the two student groups. Students enrolled in the traditional course exhibited a significant and negative correlation between ESE and EI, as compared to the significant and positive relationship between these two measures for students in the experiential course. This suggests that for students in the traditional course, learning more about entrepreneurship actually reduced their interest in starting a business of their own. The researchers posit that the traditional course, which emphasized theory, or what entrepreneurs should do, created for students a sense of confidence in their own abilities (ESE), but also an understanding of how difficult it is to enact those theories in practice, thereby negatively impacting EI.

As with the study by Arranz et al. (2018), methodological issues weaken the generalizability of findings. Conclusions for Piperopoulos and Dimov's study were based on data from convenience samples gathered at the end of the term. Because data were collected only at the end of the course, it is impossible to assess whether statistical differences between the samples on key measures are a result of the difference in pedagogical approach or simply a reflection of pre-course differences between the student groups. Since students self-selected into either the traditional or experiential learning course, it is quite likely that students who had a higher degree of interest in entrepreneurship selected the experiential course. This self-selection bias would be a threat to the study's internal validity, resulting in an overstatement of differences in outcomes between the two student groups.

Two studies of the impact of EE on student outcomes at universities in Greece yielded negative results (Piperopoulos, 2012; Salavou et al., 2021). Piperopoulos (2012) used an

explanatory mixed methods study design to assess the impact of EE at two public universities which followed a traditional lecture and exam curriculum for entrepreneurship. This study focused on measuring differences in perceptions of entrepreneurship and entrepreneurial intention between first year and fourth year students ($n=542$), and, through follow-up structured interviews, gaining insights into those differences. Findings from this study indicated that EI among fourth year students was significantly lower than EI for first year students, with fewer than 20% of fourth year students reporting that they were likely to pursue entrepreneurship as a career, as compared to over half of first year students. Perceptions of entrepreneurship as an engaging career option were also markedly lower for fourth year students, who viewed entrepreneurship as focused on success or failure. This was a marked contrast to attitudes of first-year students who viewed entrepreneurship as an opportunity for creativity and self-expression. While cross-sectional in design, data collection from students at the beginning (first year) and end (fourth year) of the EE experience reduces issues of self-selection bias present in the earlier studies cited. The use of clustered random sampling, that is, randomly selecting course sections from which to sample students, also represents an improvement versus a convenience sample but does not fully eliminate issues associated with sampling error (Creswell & Guetterman, 2019).

Salavou et al. (2021) also assessed the impact of the traditional approach to EE in Greece and compared outcomes for students who completed a university entrepreneurship course to those of young adults who participated in community-based entrepreneurship programs, specifically pitch contests and new venture incubators. Researchers used a stratified random sampling design to ensure that both the EE ($n=62$) and non-EE ($n=141$) groups included a readable subsample of both male and female respondents. Results of this study support Piperopoulos's (2012) findings that the traditional approach to EE in Greece was not effective in

motivating students to pursue entrepreneurship as a career. Rather, Salavou et al. (2021) found EI to be significantly lower for the EE group as compared to the non-EE group. Female students who completed EE reported significantly lower EI than females who participated in community-based entrepreneurship programs. EI for females in both groups was significantly lower than that of their male counterparts. As with the previous studies, research conclusions for the study are based on cross-sectional rather than longitudinal data, again raising questions as to whether self-selection bias drove differences between the EE and non-EE groups.

Insights into the limitations of traditional classroom-based EE are provided by research linking a range of teaching approaches to student engagement outcomes (Balan & Metcalfe, 2012). In their study of undergraduate students enrolled in two foundational entrepreneurship courses at a public university in Australia (n=393), Balan and Metcalfe (2012) evaluated a six different teaching approaches, including both traditional teaching and assessment approaches (in-class lectures, tests, and presentations by local entrepreneurs) as well as more experiential approaches (team-based business idea development, an entrepreneurship aptitude survey and debrief, and poster presentation sessions for business plans). Traditional teaching approaches correlated to significantly lower levels of academic engagement, with presentations by local entrepreneurs assessed to be the least engaging teaching tool. In contrast, the team-based business plan projects and poster presentation sessions were significantly and positively correlated to student academic engagement. Results of this study support the conclusion that traditional teaching approaches in EE are limited in their ability to cultivate student engagement, and therefore are likely to be relatively ineffective in positively impacting either student attitudes or intentions towards entrepreneurship. This study utilized the Australasian Survey of Student Engagement (AUSSE), the local equivalent of the well-validated National Study of Student

Engagement (NSSE). The use of a well-validated instrument combined with the broad range of pedagogical approaches modeled in the classroom provide a credible foundation for understanding the relatively poor outcomes from traditional entrepreneurship education approaches documented in the studies cited above.

Qualitative research conducted by Ilonen and Heinonen (2018) provides additional insight into the student experience and learning process in traditional lecture-based entrepreneurship courses. This study focused on affective learning outcomes among undergraduate business students (n=74) who completed a required course in entrepreneurship in the business college of a multi-disciplinary university in Finland. Using Bloom's taxonomy as a framework for thematic analysis of students' learning diaries, the researchers concluded that students were generally interested in the course material and were able to provide accurate descriptions of the content. However, fewer than half the students connected to the material on an emotional or personal level. While they were able to rationally state the pros and cons of a career in entrepreneurship, they did not connect insights into entrepreneurship to their own skills and intentions. And, fewer than one-third of respondents expressed any emotional connection to entrepreneurship or an entrepreneurial career or identity, suggesting limited levels of affective learning. The failure of the traditional classroom approach to EE to inspire an emotional connection to entrepreneurship provides additional insight into the generally negative findings from the quantitative studies cited above.

Experiential Learning

Experiential learning in entrepreneurship education represents a marked contrast in approach to the traditional lecture-based pedagogy discussed above. The range of experiential learning approaches is wide and varied, reflecting a range of teaching philosophies and student

audiences. While experiential approaches to entrepreneurship education are increasingly prevalent, particularly in business schools in the United States (Mandel & Noyes, 2014), this approach is not without its critics. The popular curricular approach of teaching fundamentals, then focusing student teams on the development of a new venture business plan, an approach utilized at 78 of the top 100 U.S. universities (Matlay, 2006), likely over-emphasizes the role of planning versus action in the career of an entrepreneur. New venture pitch competitions, while a motivating element in many EE programs, likely over-emphasize the importance of competition versus the networking and collaboration skills that are critical to successful entrepreneurial activity (Watson & McGowan, 2020). Group projects likely provide a more accurate replication of the experience of innovating a new business but require careful facilitation and creative tasks anchored in learning objectives (Maritz & Brown, 2013). Finding talented instructors to effectively facilitate experiential learning courses can be difficult: research faculty are often uncomfortable with teaching experientially, and practicing entrepreneurs are often poor teachers (Mandel & Noyes, 2014).

As with research on traditional approaches to EE, research findings on the effectiveness of experiential EE are, as yet, inconclusive. Specifically, studies of the impact of experiential strategies in promoting positive attitudes towards entrepreneurship, increasing ESE and EI, or motivating entrepreneurship activity have yielded mixed results, with some studies documenting positive outcomes (Nilsson, 2012; Rauch & Hulsink, 2015; Sanchez, 2011), while others conclude that experiential EE has either a neutral or negative outcome in terms of these measures (Cox et al., 2002; Nabi et al., 2016; Oosterbeek et al., 2009; von Graevenitz et al., 2010).

In their 18-month longitudinal study, Rauch and Hulsink (2015) tracked two groups of students at the Rotterdam School of Management at Erasmus University in the Netherlands: a

treatment group enrolled in a 1-year MS program in entrepreneurship (n=62) and a control group of students enrolled in a 1-year MS program in supply chain (n=54). Researchers found that participation in the EE program correlated to significantly higher levels of both EI and perceived behavioral control as well as significantly more positive attitudes toward entrepreneurship. Further, the higher level of EI for the treatment group correlated to a higher level of entrepreneurial behavior over the 18-month time frame of the study. The robust longitudinal quasi-experimental design, which included both a pre-EE and two post-EE data collections, as well as a non-EE control group represents sound research practice, building confidence in the generalizability of the findings.

These positive findings are supported by research assessing the impact of participation in an elective undergraduate entrepreneurship course encompassing both experiential and theoretical elements at Castilla and Leon University in Spain (Sanchez, 2011). This longitudinal explanatory study compared pre- and post-course ESE and EI for two groups of students: a treatment group (n=404) participating in an entrepreneurship course; and a control group (n=460) who did not participate in the course. Findings from this study showed significant increases between pre-course and post-course ESE and EI for the treatment group. Additionally, post-course ESE and EI were significantly higher for the treatment group as compared to the control group, supporting a conclusion that EE was effective in increasing both skills and intention related to entrepreneurship. These two studies (Rauch and Hulsink, 2015; Sanchez, 2011) were well-designed, with robust sample sizes, pre/post data collection, and control groups for contrast. That said, neither study provided details about the experiential learning approach(es), nor did they provide any perspective on the quality of the teaching. Non-random assignment of students to treatment and control groups, as well as a single-university focus limits

generalizability. That said, both of these factors represent relatively standard practice for educational research design.

Like Rauch and Hulsink (2015), Nilsson (2012) attempted to document the positive impact of EE on entrepreneurship behavior, specifically new firm formation, in his study of graduates of a master's degree program in Sweden (Nilsson, 2012). This study assessed differences in levels of entrepreneurial activity between students who completed an entrepreneurship course module as part of their master's degree program (n=77) as compared to a control group (n=88) who did not. Both groups completed their degree programs between 1995 and 2005 and were surveyed in 2009. By 2009, 36% of students who completed EE during their master's program had established new firms as compared to just 12% of their non-EE counterparts, and the firms they founded were substantially larger and faster growing than those founded by respondents in the control group. The challenges in evaluating Nilsson's results lie in both the lack of detail regarding the EE intervention as well as the research methodology itself. The researcher provided no meaningful insights into the nature of the entrepreneurship course offered, other than the course title, "Entrepreneurship and new firms' formation" (Nilsson, 2012, p.43). A search of the subject university's website (Lulea University of Technology, www.ltu.se) suggests that the pedagogical approach blends both theory and practice. In addition, while this study is positioned as longitudinal, the researcher did not assess EI or ESE at the beginning of the EE program, nor immediately following course completion. This makes it difficult to evaluate the impact of self-selection bias, that is, the degree to which participants in EE were already committed to an entrepreneurial career when they enrolled in the graduate program. Further, utilizing results of a survey conducted four-fourteen years after completion of EE raises concerns regarding the ability to accurately assess the impact of the educational experience itself

as compared to events occurring during the intervening period that potentially impacted entrepreneurial activity. These factors limit both validity and generalizability of study results.

In contrast to these positive findings, Oosterbeek et al. (2009), Cox et al. (2002), Nabi et al. (2016), and von Graevenitz et al. (2010) found little evidence of positive student outcomes from experiential EE programs. Oosterbeek et al. (2009) in their widely cited study of an established experiential EE program for university students in the Netherlands, found a significant negative correlation between EE and EI among students participating in the program. This longitudinal study assessed the impact of participation in the Student Mini-Company (SMC) program, a well-established Junior Achievement initiative in the Netherlands, on EI. Researchers measured both pre- and post-program EI for SMC participants at two locations of a vocational college (n=189), as well as for a control group of non-participants (n=220). It is important to note that vocational colleges operate at the middle-tier of higher education in the Netherlands and are 4-year degree-granting institutions comparable to non-research colleges in the U.S. (Jenkins et al., 2018). Data from this study support the conclusion that the SMC program had a significant and negative impact on EI. Further, there was no significant impact on the development of entrepreneurial skills among program participants as compared to the control group. The sound longitudinal design of this study, which included multiple test sites and a control group, adds credibility to these findings.

Cox et al. (2002) assessed the impact of an undergraduate entrepreneurship course at a large public university in the southeast U.S. which blended elements of traditional, lecture-based pedagogy with a significant experiential learning module: development of a business plan for a new venture. This course is compulsory for business majors at the university. Students participating in the study were divided into two groups, with one group completing the survey

instrument on the first day of the course (n=394), and the second group completing it on the last day of the course (n=254). According to researchers, this methodology was adopted to minimize testing and maturation effects motivated by a desire to “please the professor” (Cox et al., 2002, p. 7). Results of this study indicate that ESE for the post-course group was significantly lower as compared to the pre-course group. Interestingly, accounting and information systems majors exhibited the largest negative difference in ESE between the pre- and post-groups, while international business majors showed a small but significant positive difference for the post-course group as compared to the pre-course group. Researchers theorized that the course perhaps provided students with valuable information regarding the skills required to start a business but conceded that this explanation would not explain the difference in results across majors. While the study design which compares data collected from different groups of students for the pre- and post-treatment measures is not ideal, this is a relatively credible study which affirms the challenges of inspiring entrepreneurial intentions with a semester-long course for a group of business students with a broad range of career interests and majors.

Similarly, Nabi et al. (2016) were unable to document any increases in EI after completion of an EE course for first-year students at a British university. Employing an explanatory mixed methods design, researchers collected data to measure EI as well as entrepreneurial learning (understanding of the entrepreneurship process and attainment of specific entrepreneurship skills), and entrepreneurial inspiration (experiences that either move students towards or away from an entrepreneurship career) at the beginning of a one-year entrepreneurship program (n=619), and again one year later (n=150). Data were also collected from a control group of students who did not participate in EE. While data from the study documented significant entrepreneurial learning over the course of the one-year EE experience,

researchers did not find any significant change in EI. Further, there was no difference in EI between students who completed the one-year course and students in the control group.

To contextualize the quantitative findings, Nabi et al. (2016) completed semi-structured follow-up interviews to understand the positive and negative factors impacting student EI and skills development. Findings from these interviews suggest that entrepreneurial inspiration played a key role in building EI in undergraduate students. That is, students whose EI increased recalled being exposed to successful entrepreneurs and discussing positive entrepreneurship outcomes in class, while students whose EI declined reported instances where instructors criticized student new venture ideas or highlighted examples of failed ventures. While the longitudinal design with a control group is sound, it is important to note that because of difficulties in re-contacting students for the second wave of data collection, there was a significant decline in number of respondents, and it is unclear the degree to which this high level of non-response compromised study validity.

Von Graevenitz et al. (2010) assessed the impact of a compulsory entrepreneurship course at the Munich School for Management at Ludwig-Maximilians-Universität (LMU), positing that pre-EE experience and aptitude are key factors impacting student outcomes. In this longitudinal explanatory study (n=196), researchers assessed the impact of EE on students' attitudes towards entrepreneurship, as well as ESE and perceived feasibility of a start-up project. Student perceptions of the feasibility of a start-up were significantly higher after EE. However, in contrast to findings by Rauch and Hulsink, von Graevenitz et al. documented a significant decline in EI as well as no significant change in attitudes towards entrepreneurship after completion of the course. Interestingly, students who entered EE with strong beliefs about their entrepreneurship aptitude showed no decline in EI, while students who entered EE with more

neutral perceptions of their aptitude demonstrated significant shifts in EI, with EI increasing for some, decreasing for others. This suggests that for students who were less committed to a possible entrepreneurship career when beginning EE, the course provided information on their aptitude, skills, and interests which allowed them to make a better-informed career choice. This was reflected in shifts in their post-course EI. The longitudinal design of this study, which facilitates an assessment of the treatment effect, and the compulsory nature of the course, which largely eliminates issues with self-selection bias, supports the generalizability of these findings.

Two qualitative studies provide additional insights into the variability in findings and conclusions from the quantitative studies cited above. Both Chang and Rieple (2013) and Haneberg and Aadland (2020) provide insights into how differences in the outcomes of experiential projects translate into differences in post-EE attitudes and intentions. These studies demonstrate that while experiential approaches to EE provide students with opportunities to build and practice critical entrepreneurship skills, the projects themselves introduce uncertainty, stress, and potentially negative outcomes that can undermine rather than bolster student confidence and negatively impact their attitudes and intentions towards entrepreneurship.

Based on their research among British undergraduate students (n=44) participating in a course in which students work to develop new business opportunities for local small business clients, Chang and Rieple (2013) concluded that this experience provided some positive outcomes in terms of personal growth and self-insight. However, the course experience appeared to have no meaningful impact on students' self-assessments of their entrepreneurship skills (technical, managerial, or creative). And for many, negative feedback from the local business clients highlighted limitations in students' understanding of key business fundamentals, thereby

diminishing rather than affirming confidence and feelings of self-efficacy. This ultimately led many students to report negative perceptions of entrepreneurship as a potential career.

Similarly, Haneberg and Aadland's (2020) qualitative study conducted among students in their final semester of a venture creation program at a Scandinavian university affirmed the potential negative impact of live projects on student learning and self-efficacy, particularly in cases where the project outcome is not positive. Researchers applied the Zaltman Metaphor Elicitation Technique (ZMET) to identify patterns in student perceptions of the learning process and educational outcomes of the venture creation program. They concluded that there were key differences between personal and professional development for students pursuing a successful venture as compared to students whose ventures were deemed to be non-viable and were abandoned before launch. While all students reported significant learning from the venture project experience, students pursuing a successful venture reported that the source of their learning was the venture experience itself and the opportunities and uncertainties it entailed. This successful venture experience translated into higher levels of motivation, as well as confidence that they had developed applicable skills to apply in future new ventures. In contrast, students whose ventures were non-viable cited learning from the team environment as well as the supportive culture in the program but reported little confidence in their ability to develop and launch a new venture and low levels of interest in doing so in the future.

Both of these qualitative studies illuminate the key challenges associated with experiential EE in achieving positive student outcomes in terms of entrepreneurial attitudes, self-efficacy, and intention (Chang & Rieple, 2013; Haneberg & Aadland, 2020). Experiential educational experiences are, by their very nature, unpredictable, with different students experiencing differences in project processes as well as outcomes. These process and outcome

differences likely translate to a wide range of student outcomes, further complicating the process of accurately assessing EE effectiveness.

The range of findings cited here illustrate the challenge in drawing solid conclusions as to the effectiveness of experiential learning approaches. That said, there do appear to be patterns of outcomes based on characteristics of student course participants. For example, evidence suggests that outcomes from experiential EE for students in master's programs (Rauch & Hulsink, 2015; Nilsson, 2012) are more positive as compared to those for undergraduate students (Cox et al., 2002; Nabi et al., 2016; Oosterbeek et al., 2010; von Graevenitz et al., 2010). This likely reflects the higher level of business skills and greater maturity and confidence that graduate students bring to entrepreneurship coursework, which enable them to navigate the uncertainty and stress inherent more effectively in experiential EE.

In addition, it appears that students who self-select into entrepreneurship courses as electives exhibit more positive outcomes as compared students enrolled in compulsory EE courses (Cox et al., 2002; Oosterbeek et al., 2010; von Graevenitz et al., 2010). This is likely because students enrolling in elective courses enter with a higher level of interest in, and potentially, a greater aptitude for entrepreneurship. Hahn et al. (2019), in their longitudinal analysis of data from the Global University Entrepreneurial Spirit Students Survey (GUESSS) provide some support for this hypothesis, at least as it relates to ESE. For their analysis, researchers identified a group of students (n=427) who participated in GUESSS in both 2013 (pre-wave) and 2016 (post-wave) and participated in EE during the period between the pre- and post-waves. Data support the conclusion that participation in elective EE is a significant predictor of higher levels of ESE, while the impact of compulsory EE is not significant in predicting ESE. Combining elective and compulsory EE to model ESE resulted in a non-

significant coefficient value, attesting to the lack of predictive power of this combined EE variable.

Insights from Meta-Analysis

In instances where a body of research yields inconclusive or conflicting results, meta-analysis is often an effective tool to clarify overall findings through the application of advanced statistical procedures to a large, aggregated sample (Creswell & Guetterman, 2019). A significant meta-analytic study (Martin et al., 2013) provides a more conclusive assessment of the impact of EE on key attitudinal and behavioral metrics related to student outcomes.

For their meta-analysis, Martin et al. (2013) identified 79 studies published between 1979 and 2009 that link EE interventions to entrepreneurial outcomes, including perceptions of entrepreneurship, ESE, and EI. To be included in this analysis, studies met the following criteria: EE or entrepreneurship training was included as a predictor variable; dependent variables were framed in terms of entrepreneurship attitudes, intentions, or outcomes; and data were reported as R-values or in a form that could be transformed to R-values for statistical analysis. These criteria narrowed the included studies to 42 and resulted in a large, aggregated sample ($n=16,657$) enabling robust statistical analysis.

Martin et al. (2012) found a significant and positive correlation between EE and perceptions of entrepreneurship ($r=.109$), entrepreneurship knowledge and skills ($r=.237$), and EI ($r=.138$). In addition, EE was significantly and positively correlated to entrepreneurship activities, which include writing a business plan, seeking funding, starting a new venture, and/or generating income from a new venture ($r=.159$). Academic programs were more positively correlated with positive entrepreneurship outcomes as compared with non-academic training programs. While these findings provide support for the pursuit of EE as a strategy to enhance

entrepreneurship skills and outcomes for students, it is important to note that the effect size for the correlations cited above would all be categorized as small, using Cohen's guidelines (Gamst et al., 2008). While the large sample size associated with this study provides sufficient power to detect small effect sizes, these results highlight the difficulty of detecting positive outcomes of EE in studies with more modest sample sizes.

This meta-analytical study aids in the interpretation of otherwise conflicting findings from research on EE outcomes. The small effect sizes identified by Martin et al. (2013) affirm the difficulty of identifying relationships between EE and key outcome variables without the benefit of the added statistical power inherent in large samples. This study also affirms key methodological shortcomings as it relates to EE research that should be addressed in future work. Martin et al. (2013) eliminated from inclusion 21 of the 79 research studies initially reviewed (26.6%) because of issues with research design, including failure to incorporate pre-post or treatment-control comparisons, and cited further issues with sample design and analytic frameworks for several studies included in the meta-analysis.

While Martin et al.'s 2013 meta-analysis provides some clarity, to understand differences in findings and to draw at least some preliminary conclusions from them, it is important to understand the array of differences that are reflected in the research studies reviewed in this chapter. These include differences in course or program objectives, pedagogical approaches, and characteristics of the student populations participating in EE. Because each reviewed study differed on many, if not all, of these characteristics, inconsistencies in research findings are not surprising. Further, few of the studies cited included meaningful subgroup analyses to assess differences in outcomes based on demographics, entrepreneurial experience, or access to role models or mentoring, all of which have been theorized to impact intentions and attitudes towards

entrepreneurship (Joensuu et al., 2013; Shinnar et al., 2014; Solesvik & Westhead, 2016; Wilson et al., 2009). If EE impacts on sample subgroups are different, these differences likely confound analysis of the sample in total. That is, subgroup differences will in essence, average out in analyses of the total sample, increasing the likelihood of either a finding of no significance or a small effect size. Further, differences in sample composition can thereby drive differences in findings across studies.

Finally, the studies I reviewed vary widely in their research approaches and the quality of research design, thereby limiting the generalizability of results. Issues with reviewed studies include small sample sizes (Nilsson, 2012; Chang & Rieple, 2013), lack of a control group (Cox et al., 2002; Piperopoulos, 2012), post-EE only data collection (Arranz et al., 2017; Piperopoulos & Dimov, 2015), and self-selection bias in the sample (Nabi et al., 2016; Salavou et al., 2021). While findings from Martin et al.'s meta-analysis (2014) do support a conclusion that EE correlates to higher levels of ESE and EI, the small effect sizes identified in this large-sample study highlights the challenges inherent in assessing student outcomes of EE.

Entrepreneurship Education and Women

While women have assumed a majority position in higher education in the U.S. and in Europe, they continue to be a distinct minority of students pursuing entrepreneurship education (NCES.gov, 2019; Eurostat, 2021). In the U.S. for the 2017-2018 academic year, 57.3% of bachelor's degrees and 60.1% of master's degrees were awarded to women (NCES.gov, 2019). That said, women were awarded less than half of bachelor's degrees in business (46.9%) and just 37.0% of degrees in entrepreneurship. This gap has remained virtually unchanged for the past ten years (NCES.gov, 2019).

In their study of gender and EE in Canada, Menzies and Tatroff (2006) observed that the gender gap in self-employment in Canada, where women represent just 33% of the self-employed adults, and only 15% of lead entrepreneurs, is mirrored in participation rates in EE. Their survey of 88 undergraduate courses and 35 graduate courses at 54 universities across Canada, indicate that women represent just 39% of students enrolled in undergraduate EE and 31% of students enrolled in graduate-level EE. Yi and Duval-Couetil (2021) observed similar patterns of enrollment in their 10-year longitudinal study of enrollment in a campus-wide entrepreneurship program at a large public university conducted between 2009-2018. Results at the campus-level indicate that enrollment in EE is disproportionately male, with women representing between 29% and 34% of students enrolled in the program over the ten-year period.

When women seek out EE opportunities, they are more likely to enter with lower levels of academic ambition as compared to their male counterparts. In their analysis of data from the Integrated Postsecondary Education Data System (IPEDS), Choi et al. (2012) identified significant differences in the types of EE programs pursued by female versus male students. While these data indicate that more female students are participating in EE, they are more likely to complete certificate programs, while male students are more likely to pursue degree programs. Further, while over half of women pursuing an EE credential do so at a community college, men are more likely to pursue a degree program at a research university (Choi et al., 2012).

Research on outcomes for women supports the conclusion that EE is less effective in motivating positive attitudes and self-efficacy as it relates to careers in entrepreneurship. Increasingly, evidence indicates that women enter EE with different motivations, expectations, and self-assessed skillsets. These differences in outcomes have been attributed to a range of issues, including the strongly gendered/male imagery associated with entrepreneurship (Gupta et

al., 2009; Jones, 2014), lack of meaningful role models (Entrialgo & Iglesias, 2017), and distorted perceptions of self-efficacy that persist from adolescence into adulthood (Wilson et al., 2004). In addition, research provides evidence that the attitudes, assumptions, and interests that undergraduate women bring to EE are sharply different than those of undergraduate men (Duval-Couetil et al., 2014; Chowdbury et al., 2019; Wilson et al., 2009). That said, the approach to EE continues to be driven by the interests and motivations of male students, with curricula grounded in a gendered perspective on entrepreneurship (Jones, 2014).

Understanding Motivations, Interests, and Self-efficacy

A growing body of research supports the conclusion that women enter EE with very different motivations as compared to undergraduate men, and that these motivations are evident long before these students enter higher education. In their cross-sectional descriptive study, Wilson et al. (2004) explored entrepreneurship motivations and intentions among a sample of teenagers in the U.S. (n=5000) to analyze the role of gender and ethnicity in shaping entrepreneurship motivation, perceptions of self-efficacy, and intention. This study supports a gender gap in entrepreneurial intention, with 42% of teen girls reporting that they are extremely or somewhat interested in entrepreneurship, as compared to 58% of teen boys.

Among girls, interest in entrepreneurship is higher for both African American and Hispanic students. Further, data from Wilson et al.'s (2004) study indicate that girls' motivations to pursue entrepreneurship were sharply different from those of boys. Specifically, girls were significantly more likely to link their interest in entrepreneurship to social factors, that is, a desire to help others and make the world a better place. Girls also reported being significantly more motivated by relational factors, that is, being respected by family and friends, working with other people, and having time with friends and family. Relational motivation is particularly

strong for Hispanic teen girls. In contrast, boys reported being significantly more motivated by “making a lot of money” (Wilson et al., 2004, p. 186) as well as the autonomy that working in one’s own business provides. Interestingly, money was also cited as an important motivator by both African American and Hispanic girls. In comparison, Caucasian girls reported a significantly lower level of financial motivation as compared to any other subgroup (Wilson et al., 2004).

Other studies suggest that girls carry these different motivations with them into higher education and ultimately, their careers (Duval-Couetil et al., 2014; Sullivan & Meek, 2012; Riebe, 2012; Yi & Duval-Couetil, 2021). In their 2014 cross-sectional descriptive study of undergraduate students enrolling in EE at a large land-grant university, Duval-Couetil et al. (2014) found significant differences in the motivations of female and male students in pursuing EE. While all students affirmed that their enrollment in EE was motivated by a general interest in entrepreneurship and a desire to broaden their career prospects, men were significantly more likely to be motivated by a desire to become an entrepreneur, and to report that they had a specific business idea in mind. In contrast, women were significantly more likely to report that their motivation for entering EE was to obtain an additional educational credential (Duval-Couetil et al., 2014) or broaden their career prospects (Yi & Duval-Couetil, 2021). Further, and consistent with Wilson et al.’s (2004) findings, women in this study were significantly more likely than men to report an interest in working for a non-profit organization.

Evidence further indicates that social and relational factors continue to be a more significant factor influencing women as they enter entrepreneurship careers. In their review of 60 articles related to gender and entrepreneurship published between 1993 and 2010, Sullivan and Meek (2012) conclude that in launching new business ventures, women are motivated more

significantly by a desire to have greater flexibility to sustain satisfying family relationships and to create a more pleasant and supportive work environment. This job-design motivation is significantly more important for female entrepreneurs than for their male counterparts. In contrast, men who pursue entrepreneurship careers are more likely to cite financial success and independence as more important considerations (Sullivan & Meek, 2012). These results are supported by Riebe (2012), who found that women view entrepreneurship as an opportunity to apply their values and beliefs to their work, and to create and lever interpersonal connections to empower others and serve the community.

Women's interests are also markedly different from men's as they enter EE courses in higher education. In addition to measuring differences in motivation between female and male students, Duval-Couetil et al. (2014) also found significant gender differences in student interest in course content. Undergraduate men were more likely to report higher levels of interest in a range of specific topics related to entrepreneurship, including product development, risk management, venture financing, and business plans. In contrast, women expressed lower levels of interest in these more technical aspects of entrepreneurship and were significantly more interested in topics related to leadership and managing teams (Duval-Couetil et al., 2014). This is consistent with findings from Wilson et al. (2004), Sullivan and Meek (2012), and Riebe (2012) that relational factors are key for women as they consider careers in entrepreneurship.

Probably the most significant gender difference as it relates to entrepreneurship education is the gender gap in ESE, that is, students' confidence in their ability to successfully launch and scale a new business venture. Multiple researchers have validated that women enter EE with significantly lower levels of ESE (Dempsey & Jennings, 2014; Nowinski et al., 2014; Wilson et al., 2007; Chowdbury et al., 2019). This is significant to understanding the gap in both EI and

entrepreneurship activity for women. Azjen's theory of planned behavior (1991) links perceptions of behavioral control or self-efficacy to levels of motivation. Specifically, if an individual believes they have the ability to successfully master a task or behavior, they will exert a greater level of energy and persistence to perform that task or behavior (Azjen, 1991). Applied here, the gap in ESE for women will almost inevitably lead to ongoing gender gaps in entrepreneurship activity.

Gendered Outcomes of EE

While the review of the research literature on outcomes for EE present a picture of mixed results for students in higher education as a group, there is a growing body of research that indicates that EE is less effective for female students in building confidence in entrepreneurial skills (ESE) or motivating intention to start a business (EI). While four studies documented a positive impact of EE on female students (Entrialgo & Iglesias, 2017; Nowinski et al., 2019; Wilson et al., 2007; Wilson et al., 2009), the majority of studies analyzed found that EE had either a neutral or negative impact on ESE and/or EI for female students (Chowdbury et al., 2019; Dempsey & Jennings, 2014; Gurel et al., 2021; Haus et al., 2013; Joensuu et al., 2013; Salavou et al., 2021; Shinnar, 2014; Westhead & Solesvik, 2016). Many researchers concluded that the formation of both entrepreneurial intention and self-efficacy appear to develop differently in women versus men, suggesting that a different approach to EE will be needed to improve outcomes (Hsu et al., 2019; Javadian et al., 2020; Joensuu et al., 2013; Pollack et al., 2012; Salavou et al., 2021; Shinnar et al., 2014; Sweida & Woods, 2015; Westhead & Solesvik, 2016).

Wilson et al. (2007), in their study of MBA students enrolled in EE at seven competitive MBA programs in the U.S. (n=933) assessed the impact of entrepreneurship education on ESE

and EI. In this cross-sectional descriptive study, EE is measured based on the students' selected area of concentration, and analysis conducted to assess differences in EI and ESE between MBA students with a concentration in entrepreneurship (EE) and those with concentrations in other business fields (non-EE). Both ESE and EI were significantly higher for male students versus their female counterparts, regardless of their selected concentration ($t=5.21$, $p<.001$).

Interestingly, there was a significant two-way interaction between gender and EE as they relate to ESE ($F=4.32$; $p<.05$). That is, for female students, EE correlates to significant increases in ESE, above what is seen for male students. Given the cross-sectional approach of this study, it is difficult to conclude that these results demonstrate that EE is the driver of a disproportionate increase in ESE. Instead, it is highly likely that this finding reflects self-selection bias, in that female students with high ESE chose a concentration in entrepreneurship.

In a follow-up study conducted in 2009, Wilson et al. expanded their sample to assess ESE among an early-career group ($n=807$). This group included adults who had completed their MBA six to ten years prior to participating in the study. The gender gap in ESE was still in evidence among this early career stage sample of adults. Encouragingly, however, this lower level of ESE reported by women in the sample did not correlate to significant gender differences in entrepreneurship activity, specifically business starts. Further, for women in this early career group, EE correlated to significantly higher levels of ESE as compared to women with no EE. The EE-ESE relationship was not significant for men in the early career sample (Wilson et al., 2009).

Entrialgo and Iglesias (2017) also applied a cross-sectional explanatory study design to assess the impact of EE on ESE, as well as to understand the impact of family business background and parental entrepreneurship role models in shaping EI in female versus male

business students in their final year of study at a university in Spain. For the total sample, researchers found a significant and positive correlation between EE and attitudes towards entrepreneurship ($t=2.713, p<.01$). However, EE was not significantly correlated to changes in perceived behavioral control, which was used in this study as a surrogate for ESE or for EI. Interestingly, for female students, EE was significantly and positively related to both attitudes towards a career in entrepreneurship ($t=2.05, p<.05$) and perceived behavioral control ($t=.153, p<.05$). In contrast, there was no significant correlation between EE and either of these measures for male students. Finally, for female students, the presence of family roles models was significantly correlated to both positive attitudes toward entrepreneurship ($t=3.71, p<.01$) and higher levels of perceived behavioral control ($t=3.59, p<.01$). Role models were not found to impact either of these outcomes for male students (Entrialgo & Iglesias, 2017).

These findings are interesting in that they support a conclusion that the development of ESE among female students may be shaped differently as compared to male students. Specifically, the finding of a positive impact of EE on the attitudes and confidence of female students as well as the stronger impact of relevant role models provides useful insights for evolving curricula to better meet the needs of female students. However, conclusions from these findings must be made carefully. As with the study by Wilson et al. (2007), self-selection bias challenges the validity of study findings. Because this study drew its sample from elective entrepreneurship courses, it is highly likely that students in the sample were already pre-disposed to careers in entrepreneurship.

Nowinski et al. (2019) sought to measure gender differences in the impact of EE on EI and ESE among students attending university in Visegrad countries (Poland, Slovakia, Czech Republic, Hungary, and Slovakia, $n=1022$) and to understand the interaction between EE and

ESE in shaping EI. Findings indicate that men reported higher levels of both EI and ESE as compared to women. Structural equation modeling for the total sample indicates that while there was no significant direct effect of EE on EI, EE contributed to EI by positively impacting ESE. Interestingly, when gender is integrated into the structural model, the impact of EE on ESE for women was significantly higher than for men, suggesting that EE is effectively driving positive outcomes for women (Nowinski et al., 2019). Researchers attributed this gender difference to the traditional lecture format of entrepreneurship education in the Visegrad countries, asserting that this is a more appealing teaching approach for female students, while male students prefer a more experiential learning approach. That said, researchers provided no specific evidence to support this assertion (Nowinski et al., 2019). As with the previously cited studies, the cross-sectional study design and potential for self-selection bias limit the generalizability of study conclusions.

In contrast to these positive findings on the impact of EE on outcomes for female students, a larger body of research documents less favorable outcomes for female students as compared to their male counterparts. In their cross-sectional explanatory study of MBA and BBA students pursuing EE at a large metropolitan university in the U.S., Chowdbury et al. (2019) documented similar gender differences in outcomes of EE. Specifically, researchers measured a significant, negative correlation between gender and ESE at the end of a simulation-based entrepreneurship course. While the correlation of gender and ESE in the model declines when business experience and process knowledge are included, even with these factors incorporated, a significant gender gap remains. Because this study is cross-sectional in nature, it is difficult to assess the degree to which differences in outcomes are a result of a differential

impact of EE on female students, or whether ESE differences post-course are simply a reflection of incoming differences in ESE between female and male students.

Similar to findings by Chowdbury et al. (2019), Westhead and Solesvik (2016) found significant differences in outcomes of EE for male and female students at three universities in Ukraine ($n=189$). The study sample was carefully designed to include a representative random sample of EE students as well as a randomized control group of students who had never participated in EE. The key outcome measure for this study was EI, specifically, intensity of EI. In addition to assessing the impact of gender on EI, researchers also evaluated the interactions of risk perception and risk propensity in shaping EI.

For the combined sample, EE participation was significantly and positively associated with high intensity of EI, with significant and positive differences in EI for the EE versus non-EE samples in total, and for male and female EE students versus their non-EE counterparts. However, the interaction between EE and gender/female is significantly and negatively associated with high intensity of EI ($p<.0001$), with significantly lower EI for female EE students as compared to their male EE counterparts ($t=-2.06$, $p<.01$). Researchers also modelled the interaction of gender, risk perceptions, and intensity of EI. Here too, gender differences emerged. Specifically, for women, increasing risk perception skills through EE was significantly and negatively correlated to EI. In contrast, higher risk perception skills for men correlated to higher intensity EI (Westhead & Solesvik, 2016).

As with previously cited studies, these findings support a conclusion that gender differences in perceptions and attitudes, in this case, relating to risk, warrant a different approach to entrepreneurship education for women. That is, while risk assessment is critical to the process of identifying and selecting new venture opportunities, a focus on risk will likely have a

disproportionately negative impact on EI for female students. While this study provides an interesting perspective on gender-based differences in EE outcomes, the results have low generalizability. Comparison of findings from the test group as compared to the randomized control sample indicates significant issues with self-selection bias (Westhead & Solesvik, 2016).

As discussed earlier, Salavou et al. (2021) assessed differences in student outcomes between academic EE and community-based entrepreneurship programs, such as pitch competitions and innovation incubators (non-academic EE). As with previously cited studies, this cross-sectional explanatory study found significant differences in EI between men and women. That said, while there was no significant difference in EI for men participating in academic versus non-academic EE, there was a significant difference for women. Women participating in academic EE reported significantly lower levels of EI as compared to those who participated in non-academic EE ($F=11.62, p<.001$). It should be noted that in Greece, as in Visegrad countries, academic EE is delivered in a traditional lecture-based format. In contrast to assertions by Nowinski et al. (2019) that this pedagogical approach is preferred by women, thereby leading to higher levels of EI, Salavou et al. (2021) conclude the opposite: EI in women is better cultivated through the experiential approaches offered in non-academic EE.

Longitudinal studies provide clearer insights into the impact of EE on outcomes for female students. In their study of undergraduate students in 12 sections of an introductory entrepreneurship course at a public university in the U.S. ($n=187$), Shinnar et al. (2014) measured differences in EI and ESE between male and female students, as well as changes to these measures at the end of the course as compared to the beginning. In contrast to several studies cited in this chapter (Dempsey & Jennings, 2014; Nowinski et al., 2019; Wilson et al., 2007), researchers found no significant difference in EI between male and female students at the

beginning of the semester. While there was no significant change to EI for the total sample or for the male or female subsamples, both of the gender-based subsamples showed directional change: directionally positive for male students, directionally negative for female students. As a result, by the end of the semester, EI for male students was significantly higher ($p < .05$) than that for female students (Shinnar et al., 2014).

In terms of ESE, researchers also found no significant difference in ESE between male and female students at the beginning of the semester. However, while male students' ESE increased significantly over the course of the semester ($+1.04, p < .001$), female students' ESE remained statistically unchanged ($+0.54, p = .154$). These shifts again resulted in a significant difference in ex-post ESE between female and male students. A hierarchical linear model which included both gender and ESE as predictors of EI yielded a finding that while ESE is positively correlated to EI for both male and female students, there is a significant interaction between gender and ESE. That is, for female students, the relationship between ESE and EI is significantly weaker than that for male students (Shinnar et al., 2014).

Conclusions from this study support research findings previously cited (Chowdbury et al., 2019; Salavou et al., 2021; Westhead & Solesvik, 2016) that EE is less effective in motivating EI in female students as compared to their male counterparts. Further, rather than building confidence in their abilities, EE appears to generate no significant improvement in self-efficacy for women (Shinnar et al., 2014). The pre-/post- data collection of this study support the statistical validity of this study. Further, the fact that the entrepreneurship course in which research was conducted was mandatory for business students minimizes the validity threat associated with self-selection bias.

Joensuu et al. (2013) assessed the development of entrepreneurial intentions among male and female students over a three-year timeframe in their longitudinal explanatory study conducted among students from seven universities of applied sciences in Scandinavia (n=296). The variables included in their latent growth curve model of EI included attitudes toward entrepreneurship and perceived behavioral control (a surrogate for ESE), as well as student perceptions of subjective norms and motivation to comply with these norms. As with other studies, researchers identified a significant difference in initial entrepreneurial intention between female and male students. Results of the study indicate that while entrepreneurial intention for male students remained fairly stable over the three-year study period, EI for female students declined significantly (Joensuu et al., 2013).

Further, latent growth curve modelling indicates that the decline for women was significantly correlated to a decline in perceived behavioral control. This finding is consistent with results from the study by Shinnar et al. (2014) and supports a conclusion that EE is less effective in building confidence among female students in their ability to start and scale a new business venture. The longitudinal design and multi-university sample of this study supports the generalizability of findings.

Consistent with other researchers in the field, Dempsey and Jennings (2014) applied self-efficacy theory (Bandura, 1973) to understand differences in ESE for female versus male students. The researchers hypothesized that women enter EE with lower levels of ESE than their male counterparts, shaped by less experience (enactive mastery), fewer relevant role models (vicarious experience), less positive verbal persuasion to pursue a career in entrepreneurship, and less intensity of emotion, either positive or negative (emotional arousal) to entrepreneurship as a career path. In their study of students at a major university in Canada (n=222), Dempsey and

Jennings (2014) implemented a quasi-experimental design, first asking respondents to provide information on their entrepreneurship experience, role models, feelings toward starting a business, and ESE. Students were then asked to complete an opportunity identification task for a new venture, for which they received positive, negative, or neutral feedback. After receiving feedback, students were asked to reassess ESE.

As in other cited studies, female students' baseline ESE was significantly lower than that of male students. Female students also reported significantly lower levels of entrepreneurship experience, fewer role models, and less intense feelings about a career in entrepreneurship. OLS regression modelling indicated that while the model including all three of these variables account for approximately 40% of the difference in ESE between male and female students, emotional arousal was the most influential mediator between gender and ESE (Dempsey & Jennings, 2014). This finding is quite interesting, in that other research studies have focused on the importance of enactive mastery and vicarious experience in driving ESE for both male and female students, with little exploration of gender differences in emotional arousal or its impact on ESE (Entrialgo & Iglesias, 2017; Shinnar et al., 2014; Chowdbury et al., 2019).

In addition, for female students, the impact of feedback (verbal persuasion) on ESE was related to the nature of the feedback. Specifically, while negative feedback correlated to lower post-experiment ESE, positive or neutral feedback had no significant impact on ESE for women in the study. Finally, consistent with previously cited studies, EE was not a significant predictor for ESE for female students, either pre- or post-experiment (Dempsey & Jennings, 2014).

Gurel et al. (2021) tracked the development of EI over a 4-year period among undergraduate students at five universities in Turkey (n=215). Similar to Westhead and Solesvik (2016), researchers integrated risk propensity into their predictive model for EI, which also

included gender and education. Consistent with other studies, EI for female students was significantly lower than that for male students ($t=-1.157, p<.01$). That said, when risk-taking propensity is added to the model, interesting insights into gender differences in the interaction among gender, risk-taking, EE and EI emerge. For men with low risk-taking propensity, EE correlates to lower levels of EI. In contrast, for women with low risk-taking propensity, EE correlates to higher levels of EI (Gurel et al., 2021). This result is consistent with findings from Wilson et al. (2007) that EE can enhance EI for women by increasing their confidence in undertaking a new venture opportunity. It also further supports the assertion that EE operates differently for women as compared to men.

As in the assessment of outcomes for EE for a broad student population, meta-analysis provides insights based on a synthesis of research on outcomes of EE. Bae et al. (2014) analyzed data from 73 studies ($n=37,285$), of which 59 focused on EE and 14 focused on more general business education courses. The general business education course data was used as the control group. Consistent with Martin et al.'s (2012) findings, Bae et al. (2014) found that EE was positively correlated to EI ($r=.143$), and this correlation was significantly larger than the correlation between general business education and EI ($r=.051$).

Bae et al. (2014) further evaluated moderating variables and their impact on the relationships between EE and EI. When researchers controlled for pre-EE EI, the correlation between EE and EI was non-significant, indicating that the characteristics of the student sample, including their incoming level of entrepreneurial interest and motivation, likely had a meaningful impact on research findings. This is important in that it affirms the impact of self-selection bias in studies of the impact of EE on post-course EI, thereby explaining differences in outcomes for compulsory versus elective courses. Further, this finding has interesting implications for

curriculum development in that it suggests that EI is potentially more stable than expected. This would indicate that EE interventions will need to be of higher quality or of greater intensity (or both) to elicit meaningful change in this variable. These studies further indicate that there are likely mediating variables that warrant further investigation.

Bae et al. (2014) also explored the mediating variable of gender in impacting the correlation of EE and EI and found no significant impact of gender on post-EE intention. This finding is somewhat surprising in light of the wide range of studies reviewed here that support a conclusion of significant gender differences in the impact of EE. It is important to evaluate this finding in the context of the relationship between pre-EE and post-EE EI. That is, there was no significant impact of EE on post-course EI when pre-course EI is controlled for. Given the number of studies supporting a conclusion of significant gender differences pre-EE, it is likely that pre-course EI and gender are correlated, thereby confounding the statistical analysis (Bae et al., 2014).

Why the Gender Gap in EE?

Multiple researchers have theorized on the drivers of differences in ESE and EI, the impact of EE, and ultimately, differences in entrepreneurship activity between men and women. Research supports a range of potential explanations including deep-rooted differences in self-efficacy for women (Wilson et al., 2007; Thebaud, 2010), societal norms that shape perceptions of gender roles and career choices (Brush et al., 2009; Shinnar et al., 2012), and perceptions of poor fit for women in an entrepreneurship career (Gupta et al., 2009; Hsu et al. 2019; Menzies & Tatroff, 2006). In addition, data from multiple studies support the conclusion that there are meaningful gender differences in the process through which women develop self-efficacy and EI (BarNir et al., 2011; Entrialgo & Iglesias, 2017; Javadian & Modarresi, 2020; Kickul et al.,

2008; Salavou et al., 2021; Shinnar et al., 2018; Sweida & Woods, 2015; Westhead & Solesvik, 2016). To date, there is little evidence that EE curriculum is evolving to effectively addressing these differences (Bamford & Bruton, 2019; Jones, 2014; Kuratko, 2017; Neck et al., 2018; Spinelli & Adams, 2016).

Wilson et al. (2007) assessed differences in entrepreneurial interest and ESE among a national sample of high school and middle school students (n=4292) and compared their findings to results of a parallel study among MBA students (n=933) at seven competitive graduate business schools. Results of the two studies were strikingly similar. Specifically, while 58% of teenage boys reported that they were interested in starting a business, only 42% of teenage girls expressed entrepreneurial intention. Teenage girls also reported significantly lower ESE than their male counterparts. Surprisingly, the gap in ESE is sustained into young adulthood, suggesting that meaningful life experience and education do not necessarily translate into confidence for women. Even more telling in these results is the fact that the study group of MBA students is drawn from highly competitive programs. The fact that women admitted to these programs exhibit significantly lower confidence in their abilities as compared to their male counterparts suggests that women carry distorted perceptions of self-efficacy with them into adulthood, and that these perceptions are likely to become barriers to entrepreneurship (Wilson et al., 2007).

Thebaud (2010) confirmed the finding of a persistent distortion in self-efficacy beliefs among women in her analysis of data from the Global Entrepreneurship Monitor or GEM (n=15,242). Based on logistic regression modelling, Thebaud concluded that men are more than twice as likely than women to report that they have the skills necessary to launch a new venture. Further, analysis of the data indicates that the relatively negative assessments of self-efficacy for

women translate to lower reported levels of entrepreneurship. Specifically, data support the conclusion that men are 1.61 times more likely to become entrepreneurs as compared to women. Even when income, age, employment, and experience or relationships with entrepreneurs are controlled for, men are 1.42 times more likely to pursue entrepreneurship careers (Thebaud, 2010).

Brush et al. (2009) incorporate insights into differences in societal norms and support for female entrepreneurs into a gender-aware framework for entrepreneurship. This framework, based on the premise that entrepreneurship is socially embedded, expands on the traditional Market-Management-Money framework (Kuratko, 2017), adding motherhood, that is, the impact of household and family roles on women's entrepreneurship activity, as well as the meso/macro environment. The Motherhood factor reflects gendered differences in roles and access to financial resources within the household. Incorporating a factor for meso/macro environment incorporates the impact of government programs and policies, cultural norms, including media portrayal of entrepreneurs, and support services available at the local level, which can disproportionately favor men (Brush et al., 2009). Applying this model as a framework for evaluating entrepreneurship performance for women provides a more nuanced lens by recognizing the additional challenges posed by household dynamics and societal norms. This lens also provides explanatory power for differences in EI for women who factor these challenges into their assessment of the feasibility of a career in entrepreneurship.

Shinnar et al. (2012), in their cross-sectional explanatory study of university students in three countries (n=761) assessed the degree to which the intersection of gender and the cultural context explain gender differences in entrepreneurial intention and activity in the U.S., China, and Belgium. The study focused on four key cultural paradigms that are demonstrably different

across cultures in the U.S., Asia, and Europe: individualism; uncertainty avoidance; power distance, which is the concentration of power and decision-making; and masculinity, which in this context refers to the emphasis on traditional gender roles for both men and women.

Researchers hypothesized that these cultural factors would result in different perceptions of barriers to entrepreneurship for women versus men, thereby explaining differences in the gender gap for entrepreneurship activity across cultures (Shinnar et al., 2012).

Consistent with other studies cited in this chapter, Shinnar et al. (2012) found significant gender differences in EI for the total sample, as well as for each of the country subsamples. Based on structural equation modeling, researchers concluded that across all three cultures, perceptions of barriers to entrepreneurship were significantly higher for women as compared to men. Interestingly, female students in the U.S. and Belgium placed a significantly higher importance on lack of competence and fear of failure as barriers to entrepreneurship as compared to their male colleagues. This affirms findings by Wilson et al. (2007) that gender gaps in perceptions of self-efficacy gaps evident in adolescents are sustained into adulthood and are resistant to education and life experience. Women across all three countries also reported lack of support as a barrier to entrepreneurship at significantly higher levels than did men, indicating that, despite cultural differences in gender egalitarianism across the countries included in the study, women do not feel supported in pursuing entrepreneurship (Shinnar et al., 2012). These findings support the expanded “5M” model of entrepreneurship proposed by Brush et al. (2009), providing quantitative evidence that social norms, in addition to perceptions of self-efficacy, are perceived as barriers to entrepreneurship for women.

Representation of contemporary entrepreneurs and the traits and characteristics associated with entrepreneurial success can also negatively impact ESE and EI by influencing

perceptions of career fit for women. In their longitudinal explanatory study ($n=345$), Gupta et al. (2009) assessed perceptions of the gendered nature of personality traits associated with entrepreneurship, the fit with male and female students' self-assessed personality traits, and the impact of these perceptions on EI. In phase one of the study, students were asked to assess their own personality traits as well as the personality traits they associate with entrepreneurs using the Schein Descriptive Index (SDI). In phase two (four to six weeks later), students were asked to describe the traits included in the SDI as either male or female, and to rate their own EI. This study, conducted among students in the U.S. ($n=123$), Turkey ($n=156$) and India ($n=66$) provides strong support for the conclusion that perceptions of the traits associated with entrepreneurs are decidedly male, and that these perceptions correlate to lower EI for female students across cultures. Specifically, the correlation between characteristics rated as male and characteristics attributed to entrepreneurs was very high ($r=.71, p<.01$). In contrast, there was no significant correlation between characteristics rated as female and characteristics attributed to entrepreneurs. There were no significant differences in findings across the country subsamples (Gupta et al., 2009).

It is of particular interest to note the impact of perceived fit between personal characteristics and characteristics of entrepreneurs, particularly as it relates to gender. While for the overall sample, there was no significant difference between EI for men versus women, when self-assessments of male versus female traits are incorporated into the model, an interesting pattern emerges. Specifically, the correlation between self-male congruence (that is, the degree to which the respondent self-ascribed more male characteristics, regardless of gender) to EI is moderate and significant ($r=.24, p<.01$). In contrast, the correlation between self-female congruence and EI is very low and non-significant ($r=-.10$). This supports the conclusion that

individuals who perceive themselves to have more male characteristics are more likely to have greater intention to pursue entrepreneurship careers, based on their assessment of fit with the traits associated with successful entrepreneurs (Gupta et al., 2009).

Research conducted by Hsu et al. (2018) supports these findings and affirms the importance of perceived career fit in driving EI. In a series of random assignment experimental studies researchers measured the relationship of gender, ESE, and student perceptions of the fit of an entrepreneurship career with their goals and interests (P-Ent fit). Consistent with previously cited studies, Hsu et al. confirmed lower EI for female students as compared to males. In modelling EI, researchers found that gender ($\beta = 0.138, p < .01$), P-Ent fit ($\beta = 0.565, p < .01$), ESE ($\beta = 0.127, p < .01$), and the interaction of P-Ent fit and ESE ($\beta = 0.094, p < .05$), were all significant predictors of EI. This study supports a conclusion that perceived fit of a career in entrepreneurship is a significant driver of EI (Hsu et al., 2018). Further, the researchers' model supports a finding that perceptions of fit are significantly more important in motivating EI for women as compared to ESE. This implies that even when ESE increases for women, this increase will not translate into stronger intentions to start a business (EI) if perceptions of fit are low.

Findings from Hsu et al.'s (2018) study on the impact of perceived fit on entrepreneurial intentions for women are supported by research by Menzies and Tatroff (2006). In their study of university students in Canada ($n=475$), women were significantly more likely to report that they perceived entrepreneurship to be a poor fit with their skills and personality as compared to their male counterparts. Given these findings, it appears likely that perceptions of entrepreneurship that are gendered and male lead many female students to conclude that a career in

entrepreneurship is a poor fit, leading to lower levels of participation in EE and lower EI (Menzies & Tatroff, 2006).

Finally, it is very likely that the current approaches to EE fail to address the emerging insights into the differences in the development process for self-efficacy and EI between male and female students (BarNir et al., 2011; Entrialgo & Iglesias, 2017; Javadian & Modarresi, 2020; Kickul et al., 2008; Salavou et al., 2021; Shinnar et al., 2018; Sweida & Woods, 2015; Westhead & Solesvik, 2016). Bandura's (1977) theory of self-efficacy provides a foundation that is reflected in many of the curricular developments in EE. Specifically, Bandura posits that the four key drivers of self-efficacy are: enactive master, that is, practicing a skill and experiencing repeated success; vicarious experience, or seeing another master the skill; verbal persuasion, or receiving encouragement to initiate a task and/or positive feedback on performance; and emotional arousal, or the positive or negative emotions associated with the task or skill. Of these four drivers, Bandura asserts that enactive mastery is the strongest driver of self-efficacy.

From an EE perspective, this theoretical foundation has led to an increased focus on experiential learning to provide students with the opportunity to practice the activities and build the skills associated with effective entrepreneurship: opportunity identification, business planning, and business pitches. However, a growing body of evidence suggests that for women, the path to ESE is different, and is more reliant on the influence of vicarious experience or exposure to role models, as well as the development of an emotional connection to entrepreneurship as a career (BarNir et al., 2011; Entrialgo & Iglesias, 2017; Kickul et al., 2008; Westhead & Solesvik, 2016).

In their cross-sectional explanatory study (n=393), BarNir et al. (2011) modeled the interaction of gender with role model exposure and ESE in predicting EI for undergraduate

students in their final two years of undergraduate study at a large public university in the southwest United States. As with previously cited studies, female students reported significantly lower levels of both EI and ESE as compared to their male counterparts. Using multiple hierarchical regression models to understand both main effects and interactions, researchers identified significant gender differences in the impact of role models on ESE, with role models exerting a significantly stronger pull on ESE scores for female students as compared to their male counterparts. In contrast, they were unable to identify a significant and positive correlation between role models and EI for either male or female students (BarNir et al., 2011).

The importance of entrepreneurial role models for women was confirmed in the previously cited research by Entrialgo and Iglesias (2017) who found a significant, positive correlation between parental entrepreneurship role models and both attitudes towards entrepreneurship as well as perceptions of behavioral control for women. Similarly, Westhead and Solesvik (2016) found a significant, positive correlation between parental entrepreneurship role models and EI. In both of these studies, the correlation of role models to EI was found to be non-significant for male students (Entrialgo & Iglesias, 2017; Westhead & Solesvik, 2016).

Sweida and Woods (2015) utilized a collective case qualitative approach to explore differences in the development of ESE among female entrepreneurs who launched ventures in predominately male versus predominately female industries. While the majority of female founders interviewed pointed to the importance of entrepreneurial role models in shaping their confidence and intention to launch a new business, the women who launched ventures in male-dominated industries were more likely to cite the strong influence of their father in shaping their entrepreneurial career path. This is consistent with findings from Entrialgo and Iglesias (2017) and Westhead and Solesvik (2016). Further, these female founders also were more likely to

receive support and encouragement (verbal persuasion) from business colleagues and described this encouragement with far greater specificity than did women who launched ventures in female-dominated industries (Sweida & Woods, 2015). These insights confirm the importance of supporting female students in developing strong role model relationships and providing meaningful support and encouragement to foster development of both ESE and EI.

A more definitive perspective on the importance of not only role models, but gender-matched role models in the development of self-efficacy for undergraduate women is provided by Lockwood's 2006 study of students at a university in Canada. In this study of 82 students pursuing a range of majors, Lockwood assessed the impact of gender-matched versus gender-mismatched role models on students' self-ratings on self-efficacy as well as their perceptions of their ability to achieve success in their respective fields. While for men, there was no significant difference in ratings of self-efficacy or potential to achieve success between the gender-matched and gender-mismatched role model groups, the difference for women was significant on both measures. Specifically, women who were exposed to a gender-matched role model reported significantly higher ratings on self-efficacy as well as potential for success in their field as compared to women who were exposed to a gender-mismatched role model (Lockwood, 2006).

In a follow-up study of 148 students at the same university, Lockwood (2006) surveyed students about the impact of influential role models. Gender significantly influenced choice of role models, with the vast majority (63.9% of women, 75.6% of men) selecting a gender-matched role model. Coding of open-ended questions about role model influence illustrate the role of gender-matched role models for women. These role models are critical in not only modelling career-specific achievement, but also success in overcoming gender-related barriers to achieve that success. This supports the conclusion that, not only are female role models

important in demonstrating that success and achievement are possible in a given field, but also that these gender barriers to achievement can be overcome (Lockwood, 2006). This is likely a critical factor for undergraduate women in entrepreneurship, where examples of successful entrepreneurs in textbooks and the business press are overwhelmingly male.

Stereotypes, both positive and negative, also appear to influence entrepreneurship attitudes and intention. In their 2020 experimental study, Javadian and Modarresi (2020) recruited a sample of women (n=298) and randomly divided them into one of three groups. Each group read a short, fictitious article regarding the traits of successful entrepreneurs: an article that attributed entrepreneurship success to male characteristics (negative stereotype); an article that attributed entrepreneurship success to female characteristics (positive stereotype); or an article that attributed entrepreneurship success to non-gendered characteristics (neutral). After reviewing the assigned article, respondents responded to questions regarding ESE and EI. While positive gender stereotypes were not significantly correlated to higher levels of EI, there was a significant and positive correlation between positive gender stereotypes and ESE. This study affirms the importance of presenting entrepreneurship examples and cases that support positive stereotypes that affirm the confidence and self-efficacy of female students.

Do current EE curricula reflect these insights into the differences women bring to EE as compared to men? As noted earlier, while there have been significant shifts in the pedagogical approach to EE towards experiential learning, traditional, lecture and textbook-based pedagogy continues to be a significant component of the entrepreneurship curriculum in higher education, both in the U.S. and on a global basis (Arranz et al., 2017; Kuratko, 2005; Rideout & Gray, 2014; Solomon et al. 2002). Content analysis of four popular entrepreneurship textbooks designed for undergraduate students indicates that, rather than addressing issues with gendered

perceptions of entrepreneurship, these course materials affirm the stereotype of the male founder. Specifically, 73% of case studies (n=121) are based on male founders, and 67% of entrepreneur name mentions (n=976) are male. Further, entrepreneurs who received multiple mentions in these textbooks were overwhelmingly male, with only a single female founder, Elizabeth Holmes (criminally indicted founder of the failed biotech start-up Theranos), receiving multiple mentions (Bamford & Bruton, 2019; Kuratko, 2017; Neck et al., 2018; Spinelli & Adams, 2016).

Based upon findings from her discourse analysis of entrepreneurship in higher education in the UK, Jones (2014) affirms that the narrative of both the entrepreneur and the entrepreneurship student is embedded with stereotypes that are not only gendered and male, but more specifically are western and white. This finding is consistent with the content analysis of popular U.S. entrepreneurship textbooks cited above (Bamford & Bruton, 2019; Kuratko, 2017; Neck et al., 2018; Spinelli & Adams, 2016). Based on her findings, Jones (2014) asserts that this entrepreneurship narrative is rooted in an outmoded traits-based theory of leadership rather than a more current framework based on skills, abilities, and outcomes. Jones posits that this stereotype-based narrative leads to entrepreneurship curriculum focused on the white, male entrepreneur, which serves to marginalize female and minority students and undermine their confidence (Jones, 2014).

The research cited in this chapter supports the conclusion that female students enter EE with different motivations and interests as compared to their male counterparts and exhibit lower levels of both ESE and EI. Further, a growing body of research suggests that both confidence and intention are shaped differently for women as compared to men. These differences explain the continuing gender gap in EE outcomes for female students and leads to a conclusion that an evolution of EE curriculum is required to level the playing field.

Chapter Summary

This review of the literature on the educational approaches and outcomes of entrepreneurship education provides insights into the range of teaching approaches and a varied set of conclusions regarding the effectiveness of those approaches. Because entrepreneurship is touted as a critical and dynamic force shaping the world economy, universities are increasingly under pressure to keep pace by providing students with educational programs and experiences that prepare them to thrive in this environment. However, it remains unclear that EE, at least as currently conceived, is achieving the outcomes to which it aspires. Rather, research on the impact of EE on student outcomes is far from conclusive. While some studies point to successful student outcomes, others are unable to find any meaningful correlation between participation in academic EE programs and attitudes towards launching a business.

The research literature reviewed in this chapter supports a conclusion that there are significant gender differences in the characteristics, interests, and motivations of students entering EE, as well as a gender gap in terms of outcomes, as measured by ESE and EI. That is, female students enter EE with lower levels of confidence, as well as different perceptions, interests, and motivations towards entrepreneurship as compared to their male counterparts (Duval-Couetil et al., 2014; Entrialgo & Iglesias, 2017; Kourilsky & Walstad, 1998; Wilson et al., 2007). Rather than supporting development of confidence and intention, EE appears to negatively impact both ESE and EI for female students by presenting an image of entrepreneurship and entrepreneurs that is gendered and male (Jones, 2014).

Further, evidence from the research indicates that women develop self-efficacy differently than do men. That is, while enactive mastery appears to support the development of self-efficacy in male students, vicarious experience, or role models, appear to be more critical in

the development of self-efficacy for women. This suggests that while the current trend towards experiential learning models for EE, particularly in the U.S. (Mandel & Noyes, 2014; Wu & Gu, 2017) will likely drive increasingly positive outcomes in terms of ESE for male students, this curricular approach will be less effective in improving outcomes for female students.

A review of the research literature on EE approaches and outcomes provides meaningful insights into the marked gender differences in perceptions of entrepreneurship, and specifically perceptions of the fit of personal traits, strengths, skills, and interests with an entrepreneurship career path. However, there are very few studies that assess the impact of programs or curricular interventions to close the gender gap. This study, which assessed the impact of role model exposure and specifically, the impact of matched-gender versus mismatched gender role models for both female and male students, represents a step in filling this research gap.

Finally, the synthesis of findings from the available body of research was at times confounded by issues with research design and analysis. Few well-designed studies assessing student outcomes of EE are available in the literature because business faculty are not trained in education assessment, and typically are not rewarded for publication focused on education (Yi & Duval-Couetil, 2021). As a result, published studies are often cross-sectional in nature and lack control groups, limiting the internal validity and generalizability of findings. In order to enhance our understanding of the impact of EE, future research must be conducted using best practices in design and analysis. Well-designed research that provides a deeper understanding of the needs and motivations of students engaging in EE and the processes through which attitudes and intentions towards entrepreneurship evolve will fuel development of high-impact curriculum and teaching practices that drive positive student outcomes. This study, conducted with a robust experimental design with random assignment of respondents to treatment groups, and a matched-

sample control, provides insights with solid validity and inferential power, thereby contributing to the body of research that will lead to the development of more effective pedagogical approaches to EE.

CHAPTER III

METHODS

Introduction

The rapid growth of EE in higher education over the past 30 years has led to an ongoing debate among educators and researchers as to its effectiveness in building entrepreneurship skills, confidence, and intention in students. Increasingly, research on EE outcomes has revealed marked differences between female and male students. While some researchers assert that differences in outcomes reflect gender differences in confidence, motivation, and attitudes towards entrepreneurship (Duval-Couetil et al., 2014; Chowdbury et al., 2019; Wilson et al., 2009), other studies support the conclusion that the formation of both entrepreneurial intention and self-efficacy develops differently in women as compared to men (Hsu et al., 2019; Javadian et al., 2020; Joensuu et al., 2013; Pollack et al., 2012; Salavou et al., 2021; Shinnar et al., 2014; Sweida & Woods, 2015; Westhead & Solesvik, 2016). The purpose of this quantitative experimental study was to assess the impact of role model exposure on self-assessed ESE and EI for female and male students enrolled in an introductory new venture development course at a mid-size public research institution in the mid-south. This chapter describes the research design for this study and discusses the appropriateness of the research design, the sample, the data collection method and instrumentation, and the analysis process used to address the purpose of the study.

Specifically, this study answered the following research questions:

1. What differences in ESE and EI exist between female and male students who read about a matched-gender entrepreneur/role model?

2. What differences in ESE and EI exist between female and male students who read about a mismatched-gender entrepreneur/role model?
3. What differences in ESE and EI exist between female and male students who did not read about an entrepreneur/role model?
4. How do ESE and EI differ among the matched-gender role model group, the mismatched gender role model group, and the control group?
 - a. Are there differences in EI and ESE across groups for the combined student sample?
 - b. Are there differences in EI and ESE across groups for female students?
 - c. Are there differences in EI and ESE across groups for male students?

Research Design

An experimental design was used in this study to measure differences in ESE and EI for female and male students enrolled in a new venture development course at a mid-size public research university in the mid-south after exposure to either a matched-gender role model, a mismatched-gender role model, or no role model (control). Specifically, the study was a 2 X 3 between-group factorial design. This study design enabled analysis of the interaction of gender and role model exposure (matched-gender versus mismatched-gender versus no role model) on the outcome variables, ESE and EI, as well as measurement of the main effects of gender and role model exposures on the outcome variables (Gamst et al., 2008). The 2 X 3 factorial design, because it allowed for analysis of both interaction and main effects, increased statistical power, thereby increasing the likelihood of discerning differences among the subsamples (Gamst et al., 2008). To control for differences in syllabus and teaching approach across the six sections of the course, a blocking variable for course section was incorporated into the study design. The

inclusion of a blocking factor increased the internal validity of the study by reducing the possibility that observed effects were due to differences in curriculum and teaching approach across the course sections. Further, by providing an additional variable to explain variance, the inclusion of the blocking factor increased statistical power (Glass & Hopkins, 1996).

The study adhered to key elements of experimental design, including randomization of participants, manipulation of treatment conditions, and use of a control group (Creswell & Guetterman, 2019). The application of an experimental design approach provided a strong foundation for drawing inferential conclusions regarding the relationship between the independent variables of interest, in this case, gender and role model exposure, to the outcome variables, EI and ESE (Creswell & Guetterman, 2019; Gamst et al., 2008; Maxwell et al., 2018).

Specifically, for this study male and female students enrolled in a new venture development course were randomly assigned to one of three treatment groups. Data were collected from female and male students for two treatment groups and for a control group. Treatment group one (coded 1) consisted of female and male students who were assigned to read an article about a gender-matched entrepreneur/role model, and to write and submit a brief reflection paper about that role model. Women in treatment group one read a short article about Katrina Lake, founder of the online fashion company Stitch Fix. Men in treatment group one read about Mark Dubin, founder of the direct-to-consumer personal care business, Dollar Shave Club.

Treatment group two (coded 2) consisted of female and male students who were assigned to read an article about a gender-mismatched entrepreneur/role model, and to write and submit a brief reflection paper about that role model. Women in treatment group two read a short article

about Mark Dubin, founder of Dollar Shave Club. Men in treatment group two read a short article about Katrina Lake, founder of Stitch Fix.

The control group (coded 3) consisted of female and male students who were assigned to read an entrepreneurship article unrelated to specific entrepreneurs or role models. Specifically, these students read an article that provided advice to young entrepreneurs for increasing the success odds for their new venture.

The three articles were sourced from the mainstream business press, and were edited to ensure consistency of content, tonality, language, and length. These articles are included in Appendix A.

Sample

The sample for this study was a convenience sample of 200 students enrolled in a new venture development course at a mid-sized public research university in the mid-South for the Spring 2022 academic semester. This course focuses on the identification of new venture opportunities and evaluation of their feasibility and is offered as an elective within the business college of the university. The course incorporates the teaching and application of specific business concepts and techniques in the context of new venture development, as well as in-class presentations by local entrepreneurs regarding their experiences in launching and scaling their businesses.

From a gender perspective, 63 students (31.5%) enrolled in the course self-identified as female, while the remaining 137 students (68.5%) self-identified as male (College Undergraduate Programs Office, 2022). This gender composition was somewhat below that for the business college as a whole, where female students represent 38.0% of undergraduate enrollment. It is worth noting that while female students represented fully 58.1% of

undergraduates in the university as a whole for the '21-'22 academic year, women were underrepresented in both the business college and the specific entrepreneurship course from which the sample for this study was drawn (Office of Institutional Research and Assessment, 2022; College Undergraduate Programs Office, 2022).

From an academic discipline perspective, business students comprised 82.9% of enrollment in the new venture development course. The remaining students (17.1%) represented a broad range of majors including engineering, computer science, biology, psychology, architecture, sports management, communication, and studio art. Of the business college students, just 2.5% were pursuing a degree program in entrepreneurship, while the remaining business students enrolled in this course as a business elective (College Undergraduate Programs Office, 2022).

To generate student interest in participating in the research study, I made in-person presentations about the research study and its objectives in each of the six sections of this course. During the presentation, I invited students to participate in the study. I also communicated with faculty members teaching the course to provide details about the study, and to ask that they encourage students to participate.

All students enrolled in the course received an assignment from the faculty member teaching their section of the course. The assignment entailed reading an entrepreneurship article from the business press and submitting a short reflection paper based upon what they read. After submitting the assignment, students received a link inviting them to participate in the study. This email included information on informed consent as well as a link to the study questionnaire. Participation in the study was optional. Students who participated in the study were entered in a drawing to receive one of five \$20 gift cards to a popular local restaurant.

Based on self-reported gender information provided to the university, students enrolled in the new venture course were divided into gender-based subgroups. This provided the basis for a preliminary assessment which was necessary to randomize the assignment of female and male students to treatment groups.

These gender-based subgroups were then randomly assigned to one of three treatment groups for the study: matched-gender role model, mismatched-gender role model, and no role model. The random-number generator feature in Microsoft Excel was used for the random assignment of students to groups. As noted earlier, 31.7% of students in the course were female and 68.3% were male. Students self-reported gender identity in the research questionnaire. Data analysis was based on this self-reported gender identity data.

Data Collection

Data collection occurred during the 12th week of the semester. As noted earlier, students were provided with information regarding the research project objectives and personally invited to participate in the study. Students were also provided with information regarding incentives to participate in the study. Students were then assigned a low-stakes assignment by their course instructor consisting of reading an article and writing a short reflection paper. The assigned article varied based on the students' treatment group assignment. Three of the course instructors awarded a small number of points towards the course grade to students who completed the assignment. One of the course instructors awarded no points to students who completed the assignment, resulting in a lower assignment completion rate in the three course sections that he taught.

Students who completed the assignment received an email within 24 hours with an invitation to participate in the study and a link to an online questionnaire. The email included

information on informed consent and a link to the questionnaire. The questionnaire was formatted to enable completion via either laptop or mobile device. A reminder email was sent to students 48 hours after the initial email. A second reminder email was sent 72 hours after the initial invitation to participate. Instructors also provided time in class for students to complete the questionnaire to encourage participation. Text for the email soliciting participation in the study and providing informed consent for participants is included in Appendix B. Text for the follow-up email is included in Appendix C.

Instrumentation

This study utilized a set of questions developed and validated by Linan and Chen (2009) to measure self-assessed EI and ESE. The instrument was validated with a large sample of university students ($n=519$), with resulting Cronbach's alpha of .943 for the 6-item ESE instrument, and .885 for the 6-item EI instrument (Linan & Chen, 2009). Cronbach's alpha measures the degree to which the instrument provides consistency and stability of scoring (Creswell & Guetterman, 2018). The Cronbach's alpha reported by Linan and Chen (2018) indicate strong instrument consistency.

Instrument validity, that is, the degree to which the instrument accurately measures the construct in question (Creswell & Guetterman, 2018) was assessed using factor analysis, specifically, the Kaiser-Meyer-Olkin test, which yielded a score of .912 (Linan & Chen, 2009). This supports a conclusion of strong instrument validity.

Variables

ESE and EI

The variables of interest for this study were self-reported ESE and EI. ESE, that is, an individual's confidence in their abilities to perform the tasks necessary for starting and running

an entrepreneurial venture (Chen et al., 1998) was measured using a six-item instrument developed and validated by Linan and Chen (2009). Each question in this instrument was measured using a seven-point Likert scale, enabling students to self-assess specific dimensions of self-efficacy. The questions included in the ESE instrument are listed below:

- Indicate your level of agreement with the following statements from 1 (totally disagree) to 7 (totally agree):
 - To start a firm and keep it working would be easy for me.
 - I am prepared to start a viable firm.
 - I can control the creation process of a new firm.
 - I know the necessary practical details to start a firm.
 - I know how to develop an entrepreneurial project.
 - If I tried to start a firm, I would have a high probability of succeeding.

While Likert scaled variables are statistically ordinal, there is support in the literature for analyzing Likert scale data using parametric tests typically applied in the analysis of metric data (Sullivan & Artino, 2013). Research supports the increased internal consistency of composite Likert-scale variables (Croasman & Ostrum, 2011), and provides direction that the analysis of these composite Likert-scale variables may be conducted using techniques such as ANOVA that are recommended for continuous, interval-scaled variables (Boone & Boone, 2012; Joshi et al., 2015). In this study, responses to the six questions were aggregated into a single score for ESE for each respondent, creating a 36-point scale ranging from 6 to 42.

Similarly, EI was measured using a six-item instrument (Linan & Chen, 2009) measured using a seven-point Likert scale. Responses to these six questions were also aggregated, creating

a single variable for EI, with a 36-point scale ranging from 6 to 42. As with ESE, EI was analyzed as a metric variable. The questions included in the EI instrument are listed below:

- Indicate your level of agreement with the following statements from 1 (total disagreement) to 7 (total agreement):
 - I am ready to do anything to be an entrepreneur.
 - My professional goal is to become an entrepreneur.
 - I will make every effort to start and run my own firm.
 - I am determined to create a firm in the future.
 - I have very seriously thought of starting a firm.
 - I have the firm intention to start a firm someday.

Permission to use the Linan & Chen (2009) instrument was provided via email. This email is included in Appendix D.

Gender Identity

This study compared gender differences in self-reported ESE and EI. It is important to note that this study focused on differences based on gender rather than biological sex. Gender, for purposes of this study refers to gender identity, that is, the gender which an individual identifies with and perceives that others attach to them. Research indicates that it is gender identity, rather than biological sex that is critical to how an individual perceives societal norms, expectations, and roles, and is key in impacting attitudes and intention as it relates to careers in general and entrepreneurship in particular (Gupta et al., 2009; Marlow & McAdam, 2012; Shinnar et al., 2018).

A question regarding self-reported gender identity was included in the study questionnaire. Students had the option of selecting: (a) identify as female, (b) identify as male,

(c) identify as neither male nor female, or (d) prefer not to respond. Gender was treated as a categorical variable, with responses assigned numerical values: 1=female, 2=male, 3=neither male nor female, 0=prefer not to respond. Data from students who reported a non-cisgender identity, or who declined to provide information on gender identity were not included in the data analysis for the study.

Finally, students were asked to identify the course section in which they were enrolled for the new venture development course. Course sections were identified based on the class meeting date and time. Course section data was used in the analysis to control for differences in course content and teaching approach across instructors. Given the focus of this study on the impact of gender role models on ESE and EI, it is worth noting that all faculty members teaching the course during the spring 2022 semester identified as male.

The complete instrument used in this study is included in Appendix E.

Data Analysis

Descriptive statistics, including mean, median, and standard deviation were calculated for each of the groups using SAS v.9.4 for each of individual measures of EI and ESE as well as for the aggregated measures for EI and ESE. Descriptive statistics were used to summarize overall patterns for each of the variables. Frequency distributions were evaluated for all key variables in total and for each of the three treatment groups.

Correlation analysis was conducted to provide an assessment of the validity of research results. Specifically, Pearson's r was calculated to assess the strength of the relationship between ESE and EI for the total sample, as well as for each of the gender identity-based subgroups.

After evaluating data to confirm that assumptions of normality and equality of variance between samples, t -tests were used to assess differences in means for EI between male and

female respondents in each of the treatment groups. Subsequently, *t*-tests were used to assess differences in means for ESE between male and female respondents in each of the treatment groups. A *t*-test is an appropriate statistical analysis approach for comparing means of two groups where the independent variable, in this case, gender identity, is categorical and the dependent variable, in this case, EI or ESE, is continuous (Creswell & Guetterman, 2019).

To understand the interaction of gender and role-model (matched versus mismatched versus no role model), a 2 X 3 between subjects factorial ANOVA with blocking was conducted using SAS v. 9.4. A factorial ANOVA analysis is appropriate for assessing differences in means across three or more independent groups in experimental studies in which the independent variables are categorical and the dependent variables are continuous (Creswell & Guetterman, 2019; Gamst et al., 2008; Glass & Hopkins, 1996).

As a first step, analysis was conducted to confirm that data met the ANOVA assumptions of normality and homogeneity of variance. Normality was assessed for each of the treatment groups as well as for each of the gender subgroups within each treatment group by evaluating skewness and kurtosis values. Homogeneity of variance was assessed for each of the treatment groups as well as for each of the gender subgroups within each treatment group using a Levene's Test.

An omnibus ANOVA model incorporating treatment*gender, treatment, and gender as well as a blocking factor for course section was first conducted to assess significance of the model as well as to determine effect size. The interaction effect was then evaluated to understand the degree to which the effect of treatment, that is, matched-gender role model versus mismatched-gender role model versus no role model, was impacted by gender identity. Because

the interaction effect was not significant, follow-up analysis was conducted to assess the main effects of treatment and gender identity on student-reported ESE and EI.

Limitations

This study focused on students who were enrolled in a new venture development course in the business college at a single mid-size public research university in the mid-South. This limits the projectability of findings to the total population of U.S. university students, or university business students.

The sample for this study was a convenience sample of students enrolled in a new venture development course. This sample design introduced a potential threat to internal validity of the study because of the self-selection of students into this course. The random assignment of students to treatment groups and use of a control group addressed this issue to some degree.

Students participated in the study late in the semester and were exposed to curricular content prior to participation in the study. This exposure or history effect represents an additional threat to internal validity in that it may have impacted EI and ESE and potentially confounded conclusions made regarding the impact of role model exposure.

The sample size of this study was small ($n=83$). This resulted in very small subsample sizes in treatment groups, particularly for female students, limiting statistical power to detect differences among subgroups.

Numerous studies have identified non-gender factors that correlate to differential level of ESE and EI. These factors include leadership experiences (Chowdbury et al., 2019; Kickul et al., 2008), prior entrepreneurship experiences (Chowdbury et al., 2019; Dempsey & Jennings, 2014), cultural background (Shinnar et al., 2012), and exposure to family entrepreneurial role models

(Entrialgo & Iglesias, 2017; Westhead & Solesvik, 2016). However, sample size limitations for this study restricted the ability to analyze subgroups beyond gender.

Chapter Summary

This chapter provided details on the methodology used to measure differences in ESE and EI for female and male students enrolled in a new venture development course at a mid-size public research university in the mid-south after exposure to either a matched-gender role model, a mismatched-gender role model, or no role model (control). The research design was defined as an experimental study with random assignment of female and male students to three treatment groups. This experimental study provided insights into the interaction of gender identity and role model in impacting ESE and EI for female and male students. Methods for identifying and randomizing the student sample, data collection, including instruments and variables, and the data analysis plan were presented. Descriptive statistics provided overall trends in the data, and while *t*-tests and ANOVA allowed for measurement of group differences.

CHAPTER 4

RESULTS

Introduction

Entrepreneurship has been widely cited as a key driver of growth in the global economy. Entrepreneurship education has been identified as a key strategy to develop skills, confidence, and intention toward entrepreneurship among college students. Two key constructs, entrepreneurial intention (EI) and entrepreneurial self-efficacy (ESE) have been utilized across a broad range of studies to assess the impact of EE among college students. A review of the literature of published studies suggests that outcomes of EE in terms of improving student commitment to entrepreneurship as a career (EI) and their confidence in their ability to do so (ESE) are, at best, mixed (Arranz et al., 2017; Nabi et al., 2016; Oosterbeek et al., 2009; Rauch & Hulsink, 2015). Further, research suggests that EE is less effective in building ESE and EI for female students as compared to their male counterparts (Chowdbury, 2019; Shinnar et al., 2014; Westhead & Solesvik, 2016). It has been posited that EE fails to incorporate insights into differences in motivations, expectations, and self-assessed skillsets that women bring to EE (Dempsey & Jennings, 2014; Duval-Couetil et al., 2014), as well as the lack of exposure of women in EE to non-male role models (BarNir et al., 2011; Gupta et al., 2009; Jones, 2014), contributing to less positive outcomes.

This chapter presents results of the data analysis to answer the following research questions:

1. What differences in ESE and EI exist between female and male students who read about a matched-gender entrepreneur/role model?

2. What differences in ESE and EI exist between female and male students who read about a mismatched-gender entrepreneur/role model?
3. What differences in ESE and EI exist between female and male students who did not read about an entrepreneur/role model?
4. How do ESE and EI differ among the matched-gender role model group, the mismatched gender role model group, and the control group?
 - a. Are there differences in EI and ESE across groups for the combined student sample?
 - b. Are there differences in EI and ESE across groups for female students?
 - c. Are there differences in EI and ESE across groups for male students?

Overview of the Study

The purpose of this quantitative study was to assess the impact of role model exposure on self-assessed ESE and EI for female and male students enrolled in an introductory new venture development course at a mid-size public research institution in the mid-south. The experimental design of the study allowed me to assess how gender identification moderates the impact of role model exposure on self-reported ESE and EI. Students enrolled in six sections of this course were randomly assigned to one of three treatment groups. Based upon their treatment group assignment, students were asked to complete an assignment to read an article about a matched-gender role model, a mismatched-gender role model, or an article that provided helpful tips for young entrepreneurs (no role model), and to write a brief paper reflecting on the article might impact their plans to start a business. Articles were sourced from the business press and edited to standardize for length, language, and tonality. Students who completed the assignment were then sent a link to the survey instrument. The survey instrument asked students to report gender identity and course section, then respond to a set of questions to measure self-assessed EI and

ESE using an instrument developed and validated by Linan and Chen (2009). This instrument consists of six questions to self-assess ESE and six questions to assess EI. Responses to each question were captured using a 7-point Likert scale. The complete research questionnaire is included in Appendix E.

Research Findings

Research Sample

The sample for this study consisted of students enrolled in the new venture class (n=200). In order to receive the survey, students must have completed an assigned reading and submitted a writing reflection assignment about that reading. Of the students enrolled in the new venture class (n=200), 70.0% completed the reading and reflection assignment, thereby reducing the number of students available to complete the survey to 140. Of these students, 92 (65.7%) completed the survey. A review of the data indicated that one student preferred not to respond to the question on gender identity. Responses for this student were eliminated from the analysis. An additional eight students failed to answer two or more of the questions related to EI and ESE. These students' responses were also eliminated, resulting in a final sample of 83 students (n=83). The sample size for the study was lower than expected, and this had a significant impact on statistical power. Table 1 provides an overview of assignment and survey completion results for the total sample and for each of the three treatment groups. As the data indicate, while completion rates on the assignment were relatively consistent between female and male students, survey response rates were markedly higher for female students.

Table 1
Response Rates: Assignment, Survey

Treatment Group	Gender	<u>Assignment Completion</u>		<u>Survey Response</u>	
		Number	Completion Rate	Number	Response Rate
Total	Female	42	66.7%	32	76.2%
	Male	98	71.5%	51	52.0%
Matched-gender	Female	15	71.4%	13	86.7%
	Male	34	73.9%	11	32.4%
Mismatched-gender	Female	12	57.1%	11	91.7%
	Male	34	73.9%	22	64.7%
No Role Model	Female	15	71.4%	8	53.3%
	Male	30	66.7%	18	60.0%

To provide an assessment of the validity of research results, a Pearson's correlation analysis was conducted. Pearson's r was calculated for the total sample, for female students, and for male students. Results of this analysis, shown in Table 2 below, indicate a strong and positive correlation for the total sample ($r(81) = .58, p < .0001$) and for each of the gender identity-based subsamples (for females, $r(30) = .66, p < .0001$; for males, $r(49) = .52, p < .0001$). The correlations between ESE and EI for this study are consistent with findings from Linan and Chen (2009) in their cross-cultural study used to validate the measurement instrument for ESE and EI used in this study and provide support for the validity of the data collected for this study.

Table 2
Correlation Analysis: ESE, EI

Sample	Number of Observations	<i>r</i>	<i>p</i>
Total	83	.58	<.0001
Female Students	32	.66	<.0001
Male Students	51	.52	<.0001

Descriptive Statistics

The primary focus of this study was to assess differences in EI and ESE for female and male students enrolled in an introductory level new venture development course after exposure to a matched gender role model, a mismatched gender role model, or no role model (control). Table 3 presents frequencies and percentages for the overall sample as well as descriptive statistics for the dependent variables, EI and ESE. Of the final sample (n=83), 32 students (38.6%) identified as female, while 51 students (61.4%) identified as male. Female students were slightly overrepresented in this sample as compared to total course enrollment, where female students represented 31.7% of students in the class. However, this sample composition mirrors that of the business college, where students identifying as female represent 38.0% of total enrollment (University Office of Institutional Research and Assessment, 2022; College of Business Undergraduate Programs Office, 2022).

Table 3
Descriptive Statistics: EI Total, ESE Total

Treatment Group	Gender	Number of Observations (%)	EI		ESE	
			\bar{x}	SD	\bar{x}	SD
Total	Female	32 (38.6)	27.03	10.98	25.31	7.08
	Male	51 (61.4)	28.41	9.52	24.51	5.98
Matched-gender	Female	13 (15.7)	27.85	13.08	24.38	7.48
	Male	11 (13.3)	26.18	12.99	23.45	6.67
Mismatched-gender	Female	11 (13.3)	23.73	10.02	24.18	7.05
	Male	22 (26.4)	30.14	8.21	25.91	7.02
No Role Model	Female	8 (9.6)	30.25	8.17	28.38	6.39
	Male	18 (21.7)	27.67	8.74	23.44	3.71

It is interesting to note the large standard deviations for reported EI and ESE. This in large part reflects the large variability associated with small sample size (Glass & Hopkins, 1996). To assess the degree to which the observed large variability in this dataset is consistent with findings from other researchers, I identified a study conducted by Solesvik et al. (2014) which utilized the same survey instrument to assess EI among post-secondary students. Results of this study, conducted among undergraduate students in Ukraine (n=321) yielded a mean EI of 29.31, with a standard deviation of 8.95 (Solesvik et al., 2014). This is consistent with both the overall level of EI as well as the variability of the data on this measure for this study.

While the focus of this study was to assess aggregated scores for ESE and EI across gender and treatment subgroups, measures for individual measures provide interesting insights as

well. As shown in Table 4 below, student self-assessments on the subscales of ESE were directionally lower than for EI subscales. That said, variability, as measured by SD, was generally higher for EI measures. The ESE subscale statement with the highest mean was reported by the female/no role model subsample: “I know the practical details of starting a firm” ($\bar{x} = 5.25$, $SD = 1.58$). The lowest mean of the ESE subscales was reported by males in the no role model subsample: “I am prepared to start a viable firm” ($\bar{x} = 3.22$, $SD = 0.81$).

Table 4
Descriptive Statistics: ESE, EI Individual Measures

Variable	Matched-Gender				Mismatched-Gender				No Role Model			
	Female		Male		Female		Male		Female		Male	
	\bar{x}	SD	\bar{x}	SD	\bar{x}	SD	\bar{x}	SD	\bar{x}	SD	\bar{x}	SD
<u>ESE</u>												
1. To start a firm would be easy for me.	3.85	1.62	3.36	1.43	3.73	1.68	4.09	1.38	4.00	1.31	3.39	0.92
2. I am prepared to start a viable firm.	3.69	1.38	3.36	1.29	3.27	1.42	4.09	1.77	3.62	1.41	3.22	0.81
3. I can control the creation process of a new firm.	4.31	1.60	4.36	1.12	4.18	1.47	4.23	1.38	5.00	0.92	3.67	1.19
4. I know the practical details to start a firm.	3.85	1.68	4.00	1.41	3.91	1.45	4.55	1.77	5.25	1.58	4.50	1.38
5. I know how to develop an entrepreneurial project.	4.85	1.52	4.91	1.64	5.18	1.54	4.86	1.42	5.00	1.51	5.06	1.05
6. If I tried to start a firm, I would have a high probability of succeeding.	3.85	1.68	3.45	1.13	3.91	1.45	4.09	1.44	5.00	1.69	3.61	1.09
<u>EI</u>												
1. I am ready to do anything to be an entrepreneur.	4.77	2.13	4.36	1.81	4.18	1.99	4.54	1.65	4.62	1.30	4.39	1.50
2. My professional goal is to become an entrepreneur	4.69	2.25	4.54	2.25	4.00	2.00	4.91	1.80	5.12	1.55	4.61	1.75
3. I will make every effort to start and run my own firm.	4.69	1.97	4.00	2.37	3.54	2.16	4.82	1.82	4.62	1.85	4.22	1.86
4. I am determined to create a firm in the future.	4.38	2.43	4.63	2.50	3.91	1.97	5.45	1.60	5.12	1.55	4.61	1.69
5. I have seriously thought of starting a firm.	4.69	2.75	4.36	2.46	4.27	1.90	5.32	1.52	5.75	1.04	5.17	1.38
6. I have the firm intention to start a firm someday.	4.62	2.47	4.27	2.41	3.82	2.09	5.09	1.57	5.00	1.61	4.67	1.91

For EI, as noted earlier, self-assessments were generally higher, with the highest mean reported by females in the no role model group: “I have seriously thought of starting a firm” ($\bar{x} = 5.75$, $SD = 1.04$). In contrast, females in the mismatched-gender role model group reported the lowest subscale rating ($\bar{x} = 3.54$, $SD = 2.16$) for the statement “I will make every effort to start and run my own firm.”

Results from Independent Samples *t*-Test Analyses

The first three research questions focused on assessing differences between female and male students in the three treatment groups for this study. Independent *t*-tests were used to assess differences in EI and ESE between female and male students in total, and within each of the three treatment groups. A *t*-test is an appropriate statistical approach for comparing means of two groups where the independent variable, in this case, gender identity, is categorical and the dependent variable, in this case, EI or ESE, is continuous (Creswell & Guetterman, 2019).

Prior to conducting the independent *t*-test analysis, data for each of the subsamples were assessed to ensure that model assumptions were met. Specifically, each subsample was assessed for normality using the Kolmogorov-Smirnov test (Gamst et al., 2008). Kolmogorov-Smirnov test statistics were non-significant for each of the subsamples, supporting a conclusion that the data were normally distributed. A Fisher’s *F*-test was conducted to affirm that the homogeneity of variance assumption was supported. This test yielded non-significant test statistics for each of the subsamples, affirming that the homogeneity of variance assumptions were supported.

As Table 5 below indicates, there was a significant difference at the 90% level between mean reported EI for female students in the gender-mismatched treatment group as compared to their male counterparts ($t(31) = -1.96$; $p = 0.06$). This finding is consistent with the *a priori* hypothesis that a mismatched gender role model is less likely to be effective in motivating EI for

female students as compared to their male counterparts. Analysis indicates no significant differences in EI between female and male students for the total sample, or for the gender-matched or no role model treatment groups.

Table 5
t-Tests: EI by Treatment Group, Gender Identification

Treatment Group	Females	Males	<i>t</i>	<i>df</i>	<i>p</i>
	<u>n=32</u>	<u>n=51</u>			
	M (SD)	M (SD)			
Total	27.03 (10.98)	28.41 (9.52)	-0.61	81	0.55
Gender-matched	27.85 (13.08)	26.18 (12.99)	0.31	22	0.76
Gender-mismatched	23.72 (10.02)	30.14 (8.21)	-1.96	31	0.06**
No role model	30.25 (8.17)	27.67 (8.78)	0.71	24	0.49

Note: ** $p < 0.10$

For ESE, *t*-test analysis indicates a result that is less consistent with the initial hypothesis, with female students in the no role model treatment group reporting significantly higher ESE as compared to their male counterparts ($t(24) = 2.49, p < .05$). There were no significant differences in mean reported EI between female and male students for either the gender-matched or gender-mismatched groups.

Table 6
t-Tests: ESE by Treatment Group, Gender Identification

Treatment Group	Females <u>n=32</u>		Males <u>n=51</u>		<i>t</i>	<i>df</i>	<i>P</i>
	M	(SD.)	M	(SD.)			
Total	25.31	(7.08)	24.51	(5.98)	0.55	81	0.58
Gender-matched	24.38	(7.48)	23.45	(6.67)	0.32	22	0.75
Gender-mismatched	24.18	(7.05)	25.91	(7.02)	-0.67	31	0.51
No role model	28.37	(6.39)	23.44	(3.71)	2.49	24	0.02*

*Note: * $p < .05$*

Results from Factorial ANOVA Analyses

Two 2 X 3 factorial ANOVA models, one for ESE and one for EI were used to analyze survey data to answer research question 4 and to assess the degree to which the impact of role model exposure on EI and ESE is mediated by gender. The ANOVA models incorporated the interaction between gender and treatment group (gender*treatment), gender, and treatment group, as well as a blocking variable to control for course section. Factorial ANOVA is an appropriate statistical analysis to assess whether the impact of three different role model exposures (treatments) is moderated by gender (Creswell & Guetterman, 2019; Gamst et al., 2008; Glass & Hopkins, 1996).

Analysis was first conducted to confirm that data met the ANOVA assumptions for normality and homogeneity of variance. The normality assumption held for all subgroups for ESE. However, for EI, the sample of female students in the gender-matched treatment group was

slightly platykurtic (kurtosis = -1.524). Because ANOVA is robust to violations of the normality assumption, I proceeded with the ANOVA analysis.

Homogeneity of variance was then assessed using Levene's test. For ESE, the Levene's test yielded a non-significant F -statistic for the interaction term, gender*treatment ($F(5,77)=0.99$, $p=0.4276$) as well as for both the gender ($F(2,80)=1.39$, $p=0.2555$) and treatment groups ($F(1,81)=1.03$, $p=.3140$) main effects. For EI, the Levene's test statistics were significant for both the interaction term ($F(5,77)=2.90$, $p=0.0189$) and the treatment group main effect ($F(2,80)=6.81$, $p=.0019$), indicating a violation of this assumption. Because the largest variances did not occur in the largest subgroup, use of the GT2 post-hoc procedure was judged to be sufficient to appropriately manage Type 1 error (Gamst et al., 2008).

The omnibus ANOVA model for ESE yielded a non-significant result ($F(10,72)=0.79$, $p=0.6419$). This finding indicates that the impact of role model exposure on students' self-assessment of ESE is not moderated by gender.

Table 7
ANOVA: Mean ESE comparison across treatment groups

Source	DF	F-value	Pr > F
Gender	1	0.76	0.3861
Group	2	0.58	0.5648
Gender*Group	2	1.67	0.1949
Section	5	0.67	0.6443
Error	72		
Total	82		

The omnibus ANOVA model for EI, incorporating gender, treatment group, the interaction between gender and treatment group (gender*treatment) and controlling for course section did yield a significant finding at the 90% level ($F(10,72)=1.73, p=0.0907$) with a large effect size ($\eta^2=0.19$). However, the interaction effect for gender*treatment was non-significant, indicating that for EI, the impact of role model exposure on EI is not moderated by gender. The main effects for both gender and group were also non-significant. The only significant main effect was for course section, which was used as a blocking variable in the analysis. This finding indicates that at least one of the course sections has a mean EI that is significantly different. Post hoc analysis indicates that course section 6 has a significantly higher level of mean reported EI as compared to course section 1. ANOVA results for EI are reviewed in Table 8 below.

Table 8
ANOVA: Mean EI Comparison Across Treatment Groups

Source	DF	F-value	Pr > F
Gender	1	0.07	0.7853
Group	2	0.07	0.9303
Gender*Group	2	0.45	0.6396
Section	5	2.64	0.0300*
Error	72		
Total	82		

Note: * $p < 0.05$

Chapter Summary

This chapter presented the results of the study, reviewing descriptive statistics as well as results from independent samples *t*-tests and ANOVA. Lower than expected completion rates on

the entrepreneurship role model assignment resulted in a relatively small sample size ($n=83$). This limited the statistical power of the analyses to detect small to medium effects. That said, independent t -test analysis indicated that female students in the gender-mismatched treatment group reported significantly lower EI as compared to their male colleagues. Additionally, t -test analysis detected a significant difference in reported ESE between female and male students in the no role model group, with female students reporting significantly higher ESE.

The omnibus ANOVA test for ESE, incorporating gender, treatment group, the interaction gender*treatment group and a control variable for course section yielded a non-significant finding. The omnibus ANOVA test for EI, incorporating the same variables, was significant with a medium effect size. However, the interaction effect, gender*role model exposure was not significant. Main effects for gender and treatment group were also non-significant. The control variable, course section was significant, indicating differences in mean EI across course sections.

CHAPTER 5

DISCUSSION AND CONCLUSIONS

Introduction

Increasingly, entrepreneurship is viewed as a solution to the “glass ceiling” issues that women experience in the corporate environment (Hisrich & Peters, 2016; Kuratko, 2017). However, rates of entrepreneurship for women continue to lag those for men, with women’s involvement in nascent (idea-stage) and early-stage entrepreneurship activity in the U.S. estimated to be 60-80% of that of their male counterparts (Elam et al., 2019; Fairlie & Desai, 2021). Entrepreneurship education, which is one of the fastest-growing subject areas in higher education (Katz, 2003, Mwasalwiba, 2010; Ratten & Usmanij, 2021), would seem to be a key strategy for balancing the entrepreneurship pipeline. However, female students remain under-represented in EE, with the gap particularly pronounced for degree programs in entrepreneurship (Choi et al., 2012; National Center for Education Statistics, 2018).

While multiple studies indicate that EE correlates to more positive attitudes towards entrepreneurship and increased levels of ESE and EI (Arranz et al., 2017; Nilsson, 2012; Rauch & Hulsink, 2015; Sanchez, 2011), there is a growing body of research that suggests that EE outcomes are less positive for students who identify as female (Chowdbury et al., 2019; Dempsey & Jennings, 2014; Joensuu et al., 2013; Salavou et al., 2021; Shinnar, 2014). Research suggests that the development of self-efficacy in women takes a different path, and is more reliant on vicarious experience, that is, the influence of role models, rather than enactive mastery (BarNir et al., 2011; Entrialgo & Eglesias, 2017; Westhead & Solesvik, 2016).

This study focused on assessing the impact of role model exposure on self-assessed ESE and EI for female and male students enrolled in EE, in this case, an introductory new venture development course, at a mid-size public research institution in the mid-south. This chapter provides an overview of the research study and discusses results and conclusions from the study in the context of the research literature. Finally, this chapter provides recommendations for future research as well as implications for practice.

Overview of the Study

The goal of this study was to make meaningful contributions to the entrepreneurship literature by assessing the impact of role models, specifically matched-gender versus mismatched gender role models on ESE and EI for female and male students. The study builds on insights from the literature which suggest that self-efficacy for women develops differently than for men, with role models playing a more important role (BarNir et al., 2011; Entrialgo & Iglesias, 2017). The importance of a matched-gender role model has also been found to be particularly important for women as they develop self-efficacy and assess their potential for career success in male-dominated fields (Lockwood, 2006).

This quantitative study utilized an experimental design, with randomized assignment of research participants to treatment groups and use of a control group. This research approach is more rigorous than what is typically found in the entrepreneurship education assessment literature and allows for the application of powerful statistical analysis tools, in this case, factorial ANOVA to assess differences among subgroups (Gamst et al., 2008).

An instrument developed and validated by Linan and Chen (2009), was used to measure ESE and EI. Their validation research focused specifically on university students. The instrument is highly reliable, with Cronbach's alpha of .943 for the six-item ESE instrument and 0.885 for

the 6-item EI instrument. Validity of the instrument was assessed using factor analysis, specifically, the Kaiser-Meyer-Olkin test, which yielded a score of .912 (Linan & Chen, 2009).

A total of 92 surveys were completed. Of these, 83 surveys were used for data analysis, with 9 surveys eliminated from the dataset because of missing data. All data were exported for analysis in SAS version 9.4.

Four research questions guided this study and the statistical analysis for each question. The research questions for the study are as follows:

1. What differences in ESE and EI exist between female and male students who read about a matched-gender entrepreneur/role model?
2. What differences in ESE and EI exist between female and male students who read about a mismatched-gender entrepreneur/role model?
3. What differences in ESE and EI exist between female and male students who did not read about an entrepreneur/role model?
4. How do ESE and EI differ among the matched-gender role model group, the mismatched gender role model group, and the control group (no role model)?
 - a. Are there differences in EI and ESE across groups for the combined student sample?
 - b. Are there differences in EI and ESE across groups for female students?
 - c. Are there differences in EI and ESE across groups for male students?

Findings indicate that there was a statistically significant difference in mean EI for the gender-mismatched role model group, with mean EI for female students significantly lower than for their male counterparts. In contrast, ESE was significantly different between genders in the no role model group, with mean ESE significantly higher for female students. The omnibus ANOVA model for ESE incorporating gender, role model exposure, gender*role model

exposure, and a control variable for course section was not significant, indicating that the impact of role model exposure on students' self-assessed ESE is not moderated by gender. The omnibus ANOVA model for EI, incorporating the same variables was significant. However, the interaction effect for gender*treatment group was not significant. The only significant main effect in this model was course section, which was used as a control variable.

After discussing issues with the sample itself, each research question will be discussed in the context of the current literature.

As noted in Chapter 4, the sample size for the study was relatively small ($n=83$), reflecting lower than expected completion rates on the pre-survey reading assignment which provided an exposure to either an entrepreneurship role model or more general information regarding entrepreneurship. This pre-survey qualification step reduced the total sample available to participate in the study from 200 students to 140 students. There was no meaningful difference in assignment completion rates between female and male students, with completion rates of 66.7% and 71.5% respectively.

Survey response rates were somewhat lower than expected, at 59.3%. That said, female students had a higher survey response rate (76.2%) compared to their male counterparts (52.0%). From an overall sample perspective, this resulted in an ending sample consisting of 38.6% female students and 61.4% male students. This is roughly equivalent to business college undergraduate enrollment, where gender composition is 38.0% female and 62.0% male (College of Business Undergraduate Programs Office, 2022). However, women were overrepresented in the ending sample as compared to their enrollment in the new venture development course, where female students represent 31.7% of students.

Bandura's theory of self-efficacy (1977) and Azjen's theory of planned behavior (1991), two key foundational theories for this study assert that there is a strong connection between self-efficacy and intention. Specifically, Bandura (1977) states that perceptions of self-efficacy influence the initiation of an action and its persistence. Azjen (1991) posits that there is a strong linkage between behavioral intention and perceptions of behavioral control or self-efficacy. To assess the degree to which data from this study were consistent with these foundational theories, correlation analyses were conducted. Specifically, Pearson's r was calculated to assess the level of correlation between ESE and EI for the total sample, for female students, and for male students. These analyses yielded strong and positive correlations, for the total sample ($r(81)=0.58, p < .0001$), and for both of the gender-based subsamples ($r(30)=0.66, p < .0001$ for female students, $r(49)=0.52, p < .0001$ for male students), supporting a conclusion of face validity for the research results.

Discussion of the Findings and Conclusions

In this section I will explore the detailed findings of the study in the context of the body of research regarding gender and entrepreneurship education.

Q1: Gender differences between female and male students, matched-gender role model

The first research question was answered using t -tests to compare mean reported scores for ESE and EI for female and male students. For the matched-gender role model group, findings from the analysis indicated no significant difference between female and male students for either mean reported ESE ($t(22) = 0.32, p = 0.75$) or mean reported EI ($t(22) = 0.31, p = 0.76$).

The finding of no significant difference in ESE between male and female students is inconsistent with findings of a significant gender gap in ESE cited in the literature (BarNir et al., 2011; Dempsey & Jennings, 2014; Shinnar et al., 2012; Wilson et al., 2009). Wilson et al. (2009)

reported a significant gender gap in ESE across three age groups studied, including middle/high school, MBA students, and early career young adults. Similar findings of a gender gap in ESE were reported by researchers from studies conducted among college students in the U.S. (BarNir et al., 2011; Shinnar et al., 2012) and Canada (Dempsey & Jennings, 2014). Interestingly, Shinnar et al.'s (2012) findings indicate that participation in EE actually widens the gap in ESE between female and male students. Dempsey and Jennings (2014) reported a significant gender gap in ESE among university students across a range of degree programs at a major university in Canada. In addition to reporting significantly lower levels of both ESE, female students also reported perceptions of lower levels of enactive mastery in completing an opportunity identification task for a new venture (Dempsey & Jennings, 2014).

Findings of no significant difference in reported EI between female and male students in the matched-gender role model group is also inconsistent with findings from prior research (Nowinski et al., 2019; Shinnar et al., 2012). Shinnar et al.'s study included college students in the U.S., China, and Belgium, with female students in all three countries reporting lower levels of EI as compared to their male counterparts. Nowinski et al. (2019) reported a similar conclusion based on their study among university students in Hungary, Poland, Slovakia, and the Czech Republic.

While the results for this study appear to be inconsistent with the literature cited above, it is important to note that data for this study were collected in the 12th week of a 16-week semester. Given findings in the literature indicating that for female students, participation in academic EE results in significant reductions in both ESE (Shinnar et al., 2014) and EI (Salavou et al., 2021; Shinnar et al., 2014) as compared to pre-EE levels, it is possible that matched-

gender role model exposure acted as a positive offset for female students, boosting their level of EI and ESE to levels comparable to that of their male counterparts.

It should also be noted that for this treatment group, survey response rates for male students were very low, at just 32.4%. This resulted in a subgroup that was not representative of the sample population, with female students (54.2%) constituting the majority of this treatment group.

Q2: Gender differences between female and male students, mismatched-gender role model

This question was answered using *t*-tests to compare mean reported scores for ESE and EI for female and male students who read about a mismatched-gender role model. Findings for ESE indicate no significant gender difference in this treatment group ($t(31) = -0.67, p = 0.51$). As with research question one, this finding of no significant difference in ESE between male and female students is not consistent with previously cited research, which found a significant gender gap in ESE (BarNir et al., 2011; Dempsey & Jennings, 2014; Shinnar et al., 2012; Wilson et al., 2009).

However, mean reported EI was significantly different between female and male students at the 90% level ($t(31) = -1.96, p = 0.06$), with mean EI for female students significantly lower as compared to their male counterparts. This finding is consistent with a range of research studies that identified gender gaps in EI (Wilson et al., 2009; Salavou et al., 2021; Shinnar, 2014; Shinnar et al., 2012; Westhead & Solesvik, 2016). This finding also fits the model of stereotype threat theory (Steele & Aronson, 1995), and specifically domain avoidance, where individuals avoid activities, courses, or career paths where they perceive acceptance and value of diversity in the domain to be low. As noted earlier, female students in EE in the U.S. (Choi et al., 2012) and at the university where this study was conducted are a distinct minority of students. In addition,

faculty for all sections of the new venture course studied here were male, which likely amplified the impact of the mismatched-gender role model.

It is interesting to note that while ESE was statistically equivalent between female and male students in this treatment group, this did not translate into equivalent levels of EI, as would be predicted by Azjen's (1991) theory of planned behavior. A research study by Hsu et al. (2019) provides insights into this finding. Specifically, this study found that EI is significantly influenced by perceptions of person-career fit, that is, the degree to which an individual perceives that an entrepreneurial career path is consistent with personal goals and is appropriate for "people like me." Findings from this study indicate that for students who perceived low personal-entrepreneurial fit, positive feedback and increased ESE did not translate into higher reported EI (Hsu et al., 2019).

Finally, the finding of significantly lower EI for female students also mirrors Lockwood's (2006) study on the impact of role models on career confidence. Specifically, findings from this study indicate that for female students, exposure to a mismatched gender role model is ineffective in impacting career confidence and is statistically equivalent to having no role model exposure (Lockwood, 2006).

Q3: Gender differences between female and male students, no role model (control)

Again, this research question was answered using *t*-test to compare mean reported scores for ESE and EI between female and male participants. For this group, there was no significant difference in mean reported EI between female and male students ($t(24) = 0.71, p = 0.49$). In contrast to the other two treatment groups, there was a significant difference between the gender subgroups in mean reported ESE, with female students reporting significantly higher levels of ESE ($t(24) = 2.49, p = 0.02$).

This finding is generally at odds with the research literature, where almost all studies reviewed here cite self-reported levels of ESE for female students at significantly lower levels than for their male counterparts (Chowdbury et al., 2019; Dempsey & Jennings, 2014; Kickul et al., 2008; Shinnar, 2014; Wilson et al., 2009). That said, research by Nowinski et al. (2019) provides some context for this finding. Specifically, while Nowinski et al. (2019) reported a significant gap in ESE between female and male students at the beginning of EE, their findings indicated that EE had a disproportionately positive impact on ESE for female students. Since data for my study were collected near the end of a semester-long EE course, it is possible that the finding of significantly higher ESE for the female subgroup reflects a similar, disproportionate impact of EE on self-reported ESE for female students, consistent with findings by Nowinski et al. (2019).

Another explanation for these findings is based in stereotype threat theory. Steele et al.'s (2002) model posits that stereotype threat strength, in terms of its impact on the individual, is impacted by features of both the situation and of the individual. Specifically, characteristics of individuals, including domain identification (entrepreneurship), group identification (gender), and stigma consciousness impact strength of stereotype threat (Steele et al., 2002). Because students self-select into the new venture development course, it is plausible that female students who did enroll had a low level of group identification, and therefore were less susceptible to the negative impact of stereotype threat on self-evaluation of their entrepreneurship capabilities and potential for career success (Steele & Aronson, 1995).

That said, there is a more likely explanations for this finding, relates to the very small sample size for the total treatment group ($n=26$) and specifically, the female subsample in this treatment group ($n=8$). Making statistical inferences from a sample this small is problematic

because of the risk of meaningful sampling error, which decreases as sample size increases (Glass & Hopkins, 1996).

Q4: Differences across treatment groups by gender

To assess gender differences across treatment groups, and specifically, to understand the degree to which the impact of role model exposure (matched-gender, mismatched-gender, or none) on self-reported EI and ESE is mediated by gender, factorial ANOVA was utilized. In addition to independent variables for gender, treatment group, and the interaction of gender*treatment group, a control variable for course section was included in the ANOVA models.

The omnibus ANOVA model for ESE yielded a non-significant result ($F(10,72) = 0.79, p = 0.6419$). The omnibus ANOVA model for EI yielded a significant finding at the 90% level ($F(10,72) = 1.73, p = 0.0907$) with a large effect size ($\eta^2 = 0.19$). The interaction effect for gender*treatment was non-significant, as were the main effects for both gender and treatment group. These findings support a finding of no significant gender difference across treatment groups, or more specifically, that the impact of role model exposure (matched-gender, mismatched-gender, or none) is not mediated by gender.

Interestingly, a meta-analysis conducted by Haus et al. (2013) provides some support for the finding of no significant gender differences in ESE or EI. Specifically, this analysis, based on an aggregation of 30 research studies ($n = 52,367$), concluded that while average EI for females was significantly lower, the effect size was very small (Haus et al., 2013). Similarly, a small but significant gender difference in perceived behavioral control (a surrogate measure for ESE) was also detected. While these gender differences in ESE and EI were detectable and significant

given the very large sample size inherent in Haus et al.'s 2013 meta-analysis, they would not be detectable given the small sample size of this study ($n=83$).

It is likely that the non-significant ANOVA model for ESE was the result of insufficient sample size. As noted earlier, the overall sample size ($n=83$), and the resulting very small subsample sizes resulted in too little statistical power to detect a small effect size (Glass & Hopkins, 1996).

The fact that the impact of role-model on self-reported ESE and EI was not moderated by gender might also be explained by execution issues in the fielding of the research protocol. Specifically, while my research protocol called for student to receive and respond to the survey instrument within 24 hours of completing the role model reading and reflection assignment, initial response rates to the survey were very low. I visited each of the course sections one week later to encourage students to complete the survey questionnaire. In contrast to this delayed response in my research protocol, Lockwood's 2009 study of the gendered impact of role models on career confidence was conducted in a computer lab setting in which students read about a gender-matched or gender-mismatched role model and immediately completed the study instrument. The delay between reading about the role model and completing the survey in my study likely resulted in a meaningful level of dissipation of the impact of the intervention, leading to a finding of a non-significant main effect of role model exposure.

The non-significant result might also reflect the impact of a priming effect on students' self-assessments. Priming refers to changes in attitudes or assessments resulting from the impact of the pre-assessment stimulus or prime (Minton et al., 2017). In this study, the gender role model intervention occurred in the 12th week of the 16-week semester. Because of this timing, it

is possible that student response to the research stimulus was primed by their course material exposure, and that this priming effect overwhelmed the impact of the role model intervention.

It is also plausible that the findings for my study were shaped by self-selection bias, specifically for women in the sample. That is, given the overall low enrollment rate of female students in the business college as compared to the university as a whole, and the even lower rates of enrollment of female students in EE (and specifically, the new venture development course), it is likely that these students bring a higher level of confidence in their own abilities to the new venture development course as compared to a sample of female university students, or even a sample of female business students.

Interestingly, the only significant main effect in the ANOVA model for EI was for the blocking variable, course section ($F(5,72) = 2.64, p = 0.0300$). Application of the GT2 post-hoc test, which controls Type 1 error with unequal group sizes (Gamst et al., 2008), yielded a finding that mean EI was significantly different in at least one course section. In this case, EI was significantly higher for students in course section 6 as compared to course section 1. There are two possible explanations for this finding. The first is that this finding reflects self-selection bias. Course section 6 is an evening class that meets once per week. The section is taught by an instructor who recently was awarded his Ph.D. and has been recognized with an outstanding teaching award by the College of Business. The combination of the course schedule and instructor might attract students who were more motivated to start a business, and thereby likely to self-report higher levels of EI. The second explanation is that the combination of curriculum and teaching approach in this course resulted in higher levels of EI for students in this course section.

While it was disappointing to find a non-significant outcome of the role-model intervention, this result was not altogether surprising. Research by Wilson et al. (2007) indicates that the gap in EI and ESE in women is formed in adolescence and persists into early adulthood. Therefore, in retrospect, it is not surprising that a single role model exposure activity did not significantly impact these student self-assessments.

Limitations

This study focused on students who were enrolled in a new venture development course in the business college at a single mid-size university in the Mid-South. This single-site research approach limits the projectability of findings to the total population of U.S. university students or university business students.

The study analyzed data from students enrolled in a new venture development class. While students in all course sections had the opportunity to participate, the design of this study required that students complete a reading assignment in order to be eligible to participate in the study. It is unclear the degree to which the data reflects bias related to non-completion of the assignment. In addition, survey non-response represents an additional source of potential bias to the data.

While overall response rates for the survey were relatively low, female students had a higher survey response rate (76.2%) as compared to their male counterparts (52.0%). From an overall sample perspective, this resulted in a final sample that was 38.6% female (n=32) and 61.4% male (n=51). This is roughly equivalent to business college undergraduate enrollment, where gender composition is 38.0% female and 62.0% male (College of Business Undergraduate Programs Office, 2022). However, female students were overrepresented in the final sample as compared to their enrollment in the new venture development course, where the representation of

female students is just 31.7% of students. This overrepresentation of female students in the sample raises the issue of sampling error, limiting the projectability of findings.

The small total sample size ($n=83$) resulted in very small subsamples. Because sample size was much lower than originally planned, this study lacked sufficient statistical power to detect small-to-medium effect sizes. Meta-analyses of research studies measuring the impact of EE on student outcomes have found that effect sizes are small (Bae et al., 2014; Haus et al., 2013; Martin et al., 2013).

Recommendations for Future Research

This study represents a first step in assessing the impact of a simple instructional element in influencing EI and ESE for female and male students. Results of this study were far from conclusive. However, the finding of a significant difference between female and male students' response to exposure to a mismatched-gender role model provides encouragement for continued research to assess specific and actionable recommendations on curricular changes to improve outcomes for female students in EE.

The ability of this study to detect effects that, based on previous research, are likely to be small to medium in size (Bae et al., 2014; Haus et al., 2013; Martin et al., 2013), was limited by sample size, particularly very small subsample sizes within the treatment groups. Increasing sample size will increase statistical power thereby enhancing the ability to detect small to medium effect sizes. For example, increasing sample size of female students in treatment group 1 (matched gender role model) from $n=13$ to $n=25$ would more than double the statistical power of the study, significantly increasing the probability of detecting a medium-size effect as compared to the current study (Glass & Hopkins, 1996). This study could easily be replicated in fall 2022

sections of the new venture development course, and the additional data would meaningfully increase statistical power, potentially leading to more significant and actionable conclusions.

Replication of the study should build on findings from this study relating to execution of the role model intervention. As noted earlier, the timing of this study occurred late in the semester, raising questions regarding the impact of priming in impacting research results. Fielding the research earlier in the semester, ideally during the first week of the course, will resolve the priming issue. In addition, adjusting the research design to capture students' self-assessment of ESE and EI immediately following exposure to the role model intervention will likely increase both survey response rate and overcome issues associated with the dissipation of impact of the gender role model intervention.

Because gender gaps in ESE and EI are evident in adolescents (Wilson et al., 2004), and appear to persist into young adulthood (Duval-Couetil et al., 2014; Sullivan & Meek, 2012; Yi & Duval-Couetil, 2021), it is likely that a more substantial curricular intervention is necessary to have a meaningful and measurable impact on ESE and EI for female students. Development and assessment of stronger curricular interventions represent a needed and likely productive area for further research. This intervention could be in the form of an engaging multi-media online course module incorporating several role model examples to strengthen student engagement and response.

This study, in general, failed to identify gaps in self-reported ESE and EI between female and male students. A plausible explanation for this is self-selection bias. That is, female students in the mid-south who choose to enroll in EE likely to do so because they are confident in their abilities to succeed in a field that is male-dominated and have a high level of commitment to entrepreneurship as a career. Conducting research more broadly across the business college to

assess levels of ESE and EI among female and male students would provide a true control group against which to compare findings from students enrolled in EE.

Finally, the finding of a significant difference across course sections, while unexpected, warrants additional research. Curriculum and instruction matter. This study was conducted late in the semester among students enrolled in six different sections of a course taught by four different instructors, each teaching against a curriculum of their own design. In order to elevate the impact of EE on outcomes for both female and male students, it will be important to research and assess the impact of key elements of the curriculum and teaching strategies.

Recommendations for Practice

While the results of this study were largely inconclusive, it is important to assess these findings in the context of the large and growing body of literature which supports the need for a more robust and diverse pipeline of entrepreneurship talent and strengthened EE curriculum to enhance self-efficacy and intention for all students in the classroom. To deliver on the promise of EE to fuel the talent pipeline, focus is needed at the institutional level as well as in the classroom.

From an institutional perspective, it is important to amplify and target messaging about entrepreneurship and EE to attract more female students. Stereotype threat theory posits that members of an underrepresented population group, in this case, students identifying as female, will avoid activities, courses, or career paths where they perceive negative performance stereotypes exist. This avoidance is heightened when there are cues as to a predominate culture, in this case, one that is gendered and male, and where there is a perception of low value placed on diversity (Steele et al., 2002). Overcoming this issue will require greater representation of female students in EE. Attracting greater representation, in turn, will require strong and

consistent messaging at the institutional level to encourage and support interest in entrepreneurship careers and EE among female students.

In order to attract greater numbers of female students to EE, messaging should integrate themes that are resonant to students who identify as female. Multiple studies have identified that while male students are attracted to entrepreneurship because of their perceptions that this career path will be financially rewarding and will afford them high levels of autonomy (Sullivan & Meek, 2012; Wilson et al., 2004), female students bring different interests and motivations. Specifically, female students are attracted to entrepreneurship because of their perceptions of the flexibility this career path provides, the degree to which it allows them to create a supportive work environment, and the opportunity it represents for them to bring their values to a new venture, enabling them to make a positive impact in the community (Riebe, 2012; Sullivan & Meek, 2012; Wilson et al., 2004). Therefore, communication about entrepreneurship must incorporate these relational factors in order to attract a broader, more representative group of students to EE.

It is also important to recognize and counteract the gendered imagery of entrepreneurship that has been widely communicated in the business press, in popular culture, and in entrepreneurship textbooks. This gendered imagery, which focuses on the entrepreneur as a strong, competitive risk-taker whose motives are largely financial (Gupta et al., 2009; Jones, 2014; Kuratko, 2017; Spinelli & Adams, 2016) serves to marginalize students who identify as female, and act as a barrier to enrollment in EE and to the development of confidence and intention towards entrepreneurship. In addition to incorporating the values and motivations that female students bring to entrepreneurship, communication at the institutional level must present images of entrepreneurship that are broader and more inclusive. If done effectively, messaging

about entrepreneurship and EE will enable a more diverse group of students to picture themselves as successful entrepreneurs, and to perceive a strong fit between the career path and their own talents, interests, ambitions, beliefs, and values.

As more female students enter EE, a comprehensive evaluation of EE course curricula, with a focus on providing a more inclusive educational experience in the classroom, is needed. From a strategic perspective, this will entail an evaluation of some foundational elements in the teaching of entrepreneurship. Bandura's theory of self-efficacy (1977) recognized four factors impacting perceived self-efficacy: enactive mastery, vicarious experience, verbal persuasion, and emotional arousal. Of these four factors, Bandura posited that enactive mastery was most impactful in building perceptions of self-efficacy. Based on this insight, curricula in EE are increasingly focused on experiential learning, usually in the form of development of a new business pitch or business plan (Mandel & Noyes, 2014). While experiential learning opportunities should continue to be a part of the curriculum, additional curricular elements should be included to meet the needs of a more diverse group of students.

A growing body of research affirms the importance of vicarious experience, or role models in the development of self-efficacy for female students (BarNir et al., 2011; Entrialgo & Iglesias, 2017; Sweida & Woods, 2015). Inclusion of case studies, podcasts, articles from the popular press, and in-class speakers would strengthen the effectiveness of EE for students who identify as female. Importantly, these curricular elements must be selected carefully to ensure that they include a mix of voices and messages that provide examples of success in entrepreneurship careers and represent a broad representation of relatable role models.

Course offerings in EE should be evaluated holistically in recognition of gender differences in motivations, values, and interests as it relates to careers in entrepreneurship. As

noted earlier, while male students' motivations are more likely to be focused on financial rewards and a desire for autonomy (Wilson et al., 2004), female students are more likely to cite considerations of career flexibility, a supportive work environment, and a desire to positively impact their community as motivations to pursue entrepreneurial ventures (Riebe, 2012; Sullivan & Meek, 2012; Wilson et al., 2007). And, while male students are likely to express higher levels of interest in exploring topics specific to entrepreneurship, like product development, risk management, and venture financing, female students are significantly more interested in topics related to leadership and team management (Duval-Couetil et al., 2014). Addressing these disparate motivations and interests will likely require the integration of new modules into current courses, or the development of new courses tailored to meet the motivations and interests of female students.

Finally, in order to achieve and maintain strong female representation in EE, building a sense of community and inclusion is of critical importance. There is a broad body of research supporting the success of inclusion strategies to build and retain more gender-diverse student groups for STEM (Science, Technology, Engineering, and Math) in higher education. Specific strategies to attract and retain more female students include creation and support of single-sex student organizations to create a sense of community (Dell et al., 2018; Hernandez et al., 2018; Schilling & Pinnell, 2019), shifting emphasis from competition to cooperation within STEM classrooms (Aelenei et al., 2019; Stump et al., 2011), and connecting students with matched-gender role models (Dell et al., 2018; Hernandez et al., 2018). Given the similarities in both level of gender representation, as well as social support for career path choices between entrepreneurship and STEM, these strategies represent promising approaches to attract and retain more female students to EE and, more importantly, to career paths in entrepreneurship.

At a more granular level, it will be important to assess the degree to which we are delivering EE in a manner that is inclusive and non-gendered. This will involve a review of the language used to describe the entrepreneurship process and successful entrepreneurs, to ensure that the presentation of entrepreneurship as a career is not implicitly gendered and male (Gupta et al., 2009; Jones, 2014). The presentation of case studies, role models, and in-class speakers should be evaluated to ensure that a balance of voices are heard. In-class exercises should be examined to ensure that they do not reflect implicit gender bias. And, importantly, increasing representation of female voices at the instructor-level, will be important to message inclusiveness in the EE classroom and in the entrepreneurship profession.

Chapter Summary

Entrepreneurship continues to be a vibrant force driving growth in the global economy and has been widely cited as the solution to corporate glass ceiling issues for women (Fisher, 2004; Hisrich & Peters, 2016; Kuratko, 2017). That said, women's participation in entrepreneurship continues to lag that of men (Head, 2021; Elam et al., 2019). Female students' participation in EE at the post-secondary level lags far behind that of male students (Choi et al., 2012; National Center for Education Statistics, 2018). And, for the female students who do enroll in EE, their outcomes as measured by their confidence in their ability to start and run a new business (ESE) and their intention to do so (EI), are less positive than for their male counterparts.

Entrepreneurship Education (EE) is a dynamic and fast-growing subject area in higher education (Mwasalwiba, 2010; Ratten & Usmanij, 2021), and is increasingly viewed as critical for colleges and universities to remain competitive in attracting both students and donors (Katz, 2008; McClure, 2015). However, this dynamic and ever-evolving subject area has not yet

delivered on the promise of effectively building the skills and confidence needed to translate into entrepreneurial intentions among a diverse student population.

Entrepreneurship is, at its core, driven by innovation (Hisrich & Peters, 2020; Kuratko, 2017). This foundation of innovation challenges educators in EE to keep pace, and energizes the development of creative approaches to programs, curriculum, and teaching strategies. Bringing together research insights with the energy and innovation of entrepreneurship will result in the development of curricular innovations in EE that will better meet the needs of the diverse group of students who aspire to entrepreneurship careers.

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APPENDIX A

Articles for Treatment, Control groups

Article 1: Katrina Lake, Stitch Fix

How This Young Founder Created a Successful On-line Fashion Startup



Stitch Fix CEO Katrina Lake photographed at company headquarters in San Francisco, CA

When Katrina Lake started her fashion company Stitch Fix, an e-commerce company that pairs an army of stylists with an arsenal of data to deliver clothing, she had an innovative idea, but little funding. Like many founders, she started her company because the one she was looking for did not exist. "I wanted to work at whatever company was going to be the future of retail," says Lake, who was a consultant and worked in venture capital before she realized no one had successfully merged fashion with data to provide consumers with customized fashion recommendations.

In 2011, drawing on her own experiences with her sister--a clothing buyer who often sent Lake style suggestions--the then-27-year-old created a personal shopping website. It hardly had algorithmic sophistication: Lake used SurveyMonkey to track customers' preferences, and then toted armloads of garments to their homes, accepting checks to cover the \$20 styling fee.

In February 2012, Lake was introduced to Eric Colson, then Netflix's VP of data science and engineering. Lake asked Colson if he would consider becoming an adviser to her one-year-old company. Colson initially declined. But a few weeks later, the concept was still tugging at him.

After a second conversation with the founder, during which she detailed her vision for Stitch Fix, Colson concluded that Katrina Lake's start-up had the potential to transform fashion in the way Netflix had transformed in-home entertainment. Within a few months, he had left Netflix to become Stitch Fix's chief algorithms officer.

Katrina Lake has proven to be one of the smartest founders to emerge in e-commerce. As traditional retail crumbles, last year her San Francisco-based online styling company earned \$730 million in revenue, and it reported filed confidential plans to go public this fall with an estimated market capitalization of \$3 billion or more. Stitch Fix has raised a relatively small \$42 million yet is one of the few upstarts that is already profitable--and it has been since 2015.

By 2013, the business was taking shape. With a strong data science team on board, the company collected vast amounts of data on Stitch Fix customers--body dimensions, pattern preferences, what clothes they had kept, what clothes other people who had kept those clothes had also kept - to arrive at astonishingly accurate predictions. A Stitch Fix stylist would then take a prediction and determine whether it seemed right for particular shoppers--today resulting in 24 percent of customers sticking with the subscription service for at least nine months, according to one analysis of sales data.

Lake says her company's human-filtered precision--in which 3,300 stylists work with 600 clothing brands, including its own private label--will keep aggressive competitors like Amazon at bay. "Consumers don't want thousands of jeans they can read all these reviews of," she says. "They want to put on the one pair of jeans they look awesome in."

Lake is currently working on a plan to take Stitch Fix public. She hopes that the success of Stitch Fix will give other young aspiring entrepreneurs the confidence to launch and scale their new ventures.

Article 2: Mark Dubin

How This Young Founder Created a Successful on-line Personal Grooming Startup



Dollar Shave club CEO Michael Dubin, photographed at company headquarters in Venice Beach, CA *Sean Fujiwara*

When Mark Dubin co-founded his scrappy Dollar Shave Club in 2012, he had little money to finance a marketing campaign, so he had a friend film him for a tongue in cheek online promotional video, the only resource he had. He poured on the sarcasm and humor to find an audience.

It went viral with nearly 15 million folks watching the video. It made fun of competitors and encouraged folks to ditch their high-priced razor blades from Gillette and Schick and give his economical monthly offering a try.

After starting his company in his apartment with just \$35,000, Dubin, 35, has graduated to a former firehouse in this trendy Silicon Beach district. Visitors see a mix of traditional startup gear — rows of iMac computers and whiteboards — alongside nostalgic doo-dads. Dubin has a miniature red and white barber pole, full-size bright red barber chair, and a silly painting on the wall of the normally clean-shaven founder with a full beard — one that begs to be trimmed.

Dubin came up with the concept for the company when discussing the high price of razor blades at a party one night. His bright idea — that most blades cost too much and should be more accessible to guys — has found great success. Dubin will not discuss whether the company is profitable, but he says he has 650,000 customers who pay from \$1 to \$9 monthly for a selection of razors.

In taking on the leaders of the \$14 billion razor category, Dubin does not have to shell out huge promotional fees to sports stars to hawk his products, nor turn to drugstore chains and supermarkets to re-sell his blades. Dubin has no middleman.

What he does have now is competition from the legacy shaving companies, which now also offer lower-priced subscriptions and blades. A pack of Gillette Fusion ProGlide blades, for instance, is just \$30.87 at Target.com via a monthly subscription, and works out to around \$3.75 a blade. And the package would last two months.

Dubin says he is not concerned. Their subscription program "hasn't made a difference...I'm not worried."

In 2013 Dubin expanded beyond blades to a new line of shave supplies including shaving "butter" (alternative to shaving cream) and moisturizer to apply on afterwards. He says several more new products for guys will be released this year. His target market insight is simple — guys want to be talked to with sass and wit. Dollar's motto: "Shave time. Save Money."

"Our goal is to make our mark in the burgeoning men's skin care and grooming skin care marketplace," he says. "It's a \$6 billion industry growing more than 5% every year."

The clean shaven, well-groomed, dapper looking and witty CEO says watching the company grow has been a big shift for him, from doing everything himself to bringing in experts who can help take the business to the next level.

Dubin hopes that the success of Dollar Shave Club will give other young aspiring entrepreneurs the confidence to launch and scale their new ventures.

Article 3: Control (no role model)

Seven Tips for Young Entrepreneurs



In the digital age, becoming a successful entrepreneur is more accessible than ever before. That does not mean it is easy. Building a successful business requires patience, perseverance, passion – and a willingness to do what it takes to get a new venture off the ground.

Here are seven tips for success to get you started.

1. Start with a solid business plan

Anchor your plan in analysis of your target demographic and competitors. Analyze what can go wrong with your game plan and be ready to respond. Keep track of your skills and weaknesses, what you offer, how your product or service is unique, and how you plan to grow your business once you have entered the market.

2. Find a Mentor

Whether it is a community of like-minded investors and entrepreneurs or a close friend or business associate who is more experienced in the market, having someone to learn from and bounce ideas off of is paramount to success. Learn from their mistakes and successes, so you can minimize the former and maximize the latter in your own endeavors.

3. Build a Strong Team

Don't get the wrong idea, we don't mean hiring a bunch of overpaid "experts." Just surround yourself with people who share your vision. While it is not a great idea to start a business with your friends, you do want to have things in common with the team you work with. Be open to new opinions and suggestions. You do not want a bunch of mindless drones, you want a team of individual, critical thinkers.

4. Network

There is no such thing as too much networking. Never stop networking, even during your free time. You never know where your next lead will come from. This does not mean being annoying and constantly pitching your ideas to everyone. It does mean being open to opportunities to connect to people who might turn out to be important resources for your business.

5. Be Ready for Financial Challenges

Running a business is expensive. Be ready to operate on the cheap, at least in the beginning. Deal with cash flow hits by saving a month's worth of expenses ahead of time, or by getting creative with how you lower your overheads. As part of your business plan, be sure to give yourself adequate runway for success, and know that achieving profitability may take longer than you expect.

6. Take Care of Yourself

Entrepreneurship is a lifestyle. When you are running your own business, it is easy to forget to clock out. The days of 9-to-5 are over for you but remember to separate work and play. Don't let your business take over your life. Focus on good time management to allow time for self-care.

7. Never Stop Learning

This is critical to success. The market is constantly changing. You should be, too. Starting your own business is a constant process of growth and learning. The more you know, the less you will have to pay others to do things for you, and the more you can understand the inner workings of the market and your business. If you want to be a successful entrepreneur, it means for a never-ending learning process.

APPENDIX B

Recruiting Email for Research Participants

Initial invitation to participate

Subject Line: Invitation to participate in a research study to understand student perceptions of entrepreneurship

Hello X,

You have been invited to participate in a research study. The goals of this study are to understand attitudes and perceptions of entrepreneurship and to identify opportunities to strengthen the entrepreneurship curriculum and better meet the needs and interests of our students.

You were selected because you are enrolled in SEVI 3933 – New Venture Creation.

Your participation in this study is completely voluntary. All information you provide in the survey is completely anonymous. The survey consists of only 12 questions and should take approximately 5 minutes. After completing the survey, you will be redirected to a separate link and will have the opportunity to provide your name and email address to be entered into a drawing to win one of five \$20 gift cards for Torchy's Tacos.

The link to the survey is here: **[link]**

I am the principal researcher in this study. I spent many years as a business executive before joining the faculty at the University of Arkansas, Fayetteville where I serve as an instructor and entrepreneur in residence. This research is part of my dissertation work toward a Ph.D. in higher education. My faculty advisor on this project is Dr. Ketevan Mamiseishvili (kmamisei@uark.edu), Professor of Higher Education and interim Vice Provost for Academic Affairs at the University of Arkansas. If you have any questions regarding this study, you may contact me anytime at cjrodeff@uark.edu.

You may also contact the University of Arkansas Research Integrity & Compliance office listed below if you have questions about your rights as a participant, or to discuss any concerns about, or problems with the research.

Ro Windwalker, CIP
Institutional Review Board Coordinator
Research Integrity & Compliance
University of Arkansas
479-575-2208
irb@uark.edu

Thank you so much for your time,

Regards,
Carolyn J. Rodeffer

APPENDIX C

Reminder Email for Research Participants

Reminder email

Subject Line: Just a reminder – please provide your input in the research study to understand student perceptions of entrepreneurship

Hello X,

A few days ago, I sent you an invitation to participate in a research study to measure student attitudes and perceptions of entrepreneurship. This is an important study to help identify opportunities to strengthen the entrepreneurship curriculum to meet student needs and interests.

Participating in this study is easy: simply click on the link below and complete the online survey. This will take you 10-15 minutes. Participating in this study is completely voluntary, and your responses will be kept anonymous. After completing the questionnaire, you will have the opportunity to provide your name and email address to be entered into a drawing to win one of five \$20 gift cards for Torchy's Tacos.

The link to the survey is here: **[link]**

If you have any questions about this research, please don't hesitate to contact me at cjrodeff@uark.edu. Thank you so much for your time.

Regards,
Carolyn J. Rodeffer

APPENDIX D

Permission to use EI, ESE Instrument

Francisco Liñán <flinan@us.es>

Thu 12/23/2021 4:01 AM

Dear Carolyn,

Thank you for your message and interest in our work.

You are completely free to use EIQ scales as you see is best. Please, do acknowledge your source.

If you want the full scales, I can provide them next week (off office now).

Best regards, and best wishes for Christmas and the new year.

Paco Liñán

Francisco Liñán

Full Professor in Entrepreneurship, Universidad de Sevilla.

Vice-Dean for Research and Entrepreneurship. Facultad de CC. Económicas y Empresariales.

flinan@us.es

https://www.researchgate.net/profile/Francisco_Linan

<https://es.linkedin.com/in/franciscolinan>

<https://scholar.google.es/citations?user=oNUXi0UAAAAJ&hl=es&oi=ao>

Research ID: [E-9576-2010](#)

ORCID: [0000-0001-6212-1375](#)

APPENDIX E

Research Questionnaire

Are you a student at the University of Arkansas?

☐ Yes (1)

☐ No (2)

Skip To: End of Survey If Are you a student at the University of Arkansas? = No

What section of SEVI 3933 (Entrepreneurship and New Venture Development) are you enrolled in this semester?

☐ SEVI 3933-01 - Meets on Tuesdays and Thursdays at 9:30 a.m. (1)

☐ SEVI 3933-02 - Meets on Tuesdays and Thursdays at 11:00 a.m. (2)

☐ SEVI 3933-03 - Meets on Tuesdays and Thursdays at 12:30 a.m. (3)

☐ SEVI 3933-04 - Meets on Tuesdays at 6:00 p.m. (4)

☐ SEVI 3933-05 - Meets on Mondays, Wednesdays, and Fridays at 10:45 a.m. (5)

☐ SEVI 3933-06 - Meets on Thursdays at 6:00 p.m. (6)

In what college are you currently enrolled?

☐ J. William Fulbright College of Arts and Sciences (1)

☐ Dale Bumpers College of Agricultural, Food, and Life Sciences (2)

☐ Fay Jones School of Architecture and Design (3)

☐ Sam M. Walton College of Business (4)

☐ College of Education and Health Professions (5)







☐ College of Engineering (6)

☐ Other (please specify) (7) _____







How would you describe your gender identity?

- ☐ Identify as female (1)
- ☐ Identify as male (2)
- ☐ Identify as neither female nor male (3)
- ☐ Prefer not to respond (4)

Indicate your level of agreement with the following statements from 1 (totally disagree) to 7 (totally agree).

	1	2	3	4	5	6	7
To start a firm and keep it working would be easy for me. ()							
I am prepared to start a viable firm. ()							
I can control the creation process of a new firm ()							
I know the necessary practical details to start a firm. ()							
I know how to develop and entrepreneurial project. ()							
If I tried to start a firm, I would have a high probability of succeeding. ()							

Indicate your level of agreement with the following statements from 1 (totally disagree) to 7 (totally agree).

	1	2	3	4	5	6	7
I am ready to do anything to be an entrepreneur. ()							
My professional goal is to become an entrepreneur. ()							
I will make every effort to start and run my own firm. ()							
I am determined to create a firm in the future. ()							
I have seriously thought of starting a firm. ()							
I have the firm intention to start a firm someday. ()							

Thank you for completing the survey. If you would like to enter to win one of five \$20 gift cards, please copy and paste the following link to provide your name and email address:

<https://forms.gle/fzPXhtKfFb7jTMw5>

APPENDIX F

IRB Approval



To: Carolyn J Rodeffer
From: Douglas J AdamsJustin R Chimka, Chair
IRB Expedited Review
Date: 03/28/2022
Action: **Exemption Granted**
Action Date: 03/28/2022
Protocol #: 2202384424
Study Title: Closing the Gender Gap in Entrepreneurship Education

The above-referenced protocol has been determined to be exempt.

If you wish to make any modifications in the approved protocol that may affect the level of risk to your participants, you must seek approval prior to implementing those changes. All modifications must provide sufficient detail to assess the impact of the change.

If you have any questions or need any assistance from the IRB, please contact the IRB Coordinator at 109 MLKG Building, 5-2208, or irb@uark.edu.

cc: Ketevan Mamiseishvili, Investigator