Modeling Intention to Pursue a High-Tech Career using Social Cognitive Career Theory

by

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Abstract

This study is the first to apply Social Cognitive Career Theory (SCCT: Lent, Brown, & Hackett, 1994, 2000) to predict engineering students' intention to pursue a high-tech career in a South Asian context. The purpose of this study was twofold. The first objective was to test SCCT's interest and choice model in a non-Western context in order to test the applicability of the theory. The second objective was to expand beyond the core of the theory to incorporate background and proximal, contextual gender related variables such as gender-role orientation, masculine image of high-tech professionals, and gendered perceptions.

The data came from undergraduate engineering students studying in different universities in Bangladesh. Data were collected through self-administered pencil and paper survey. A total of 976 valid surveys were used in the data analysis. As this study was based on a new context -Bangladesh, the construct validity of the measurement scales was assessed using exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). EFA and CFA should not be performed on the same data set; the data were randomly split into two groups for this analysis. Structural equation modeling (SEM) was used to assess model fit for the whole sample. Results indicated that social cognitive theory was a good fit for the data. The multivariate analysis indicated that all of the core SCCT predictors – occupational self-efficacy, outcome expectations, and interest – were important in explaining intentions. Gender-role orientation also played a significant role although gender related variables did not perform as expected. Also, contrasting findings regarding environmental variables of social support and barriers

offered further insight into the process of students' motivation to pursue a high-tech career.

Additionally, an alternative split-group approach was taken to test how the model predictors and relationships varied with respect to gender. Gender differences in the model predictors told a contrasting and compelling story of men's and women's career choice process in a patriarchal, traditional South-Asian society. Results suggest that women engineering students in Bangladesh are defying gendered expectations to pursue high-tech careers while men are holding to stereotypical roles and expectations.

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Chapter 1: Introduction

1.1. Overview

Researchers have generated numerous career theories and models of college students' academic and career behavior. Most of these theories and models originated in North America and highlight various intrapersonal characteristics such as interests, self-efficacy, personality traits, ability, career goals, and values (e.g., Dawis 2002, 2005; Dawis & Lofquist, 1984; Farmer, Wardrop, Anderson, & Risinger, 1995; Holland, 1985; O'Brein & Fassinger, 1993). The studies that have found that intrapersonal characteristics have a significant association with college students' academic and career behavior have mainly used samples from Western developed countries (Leong & Gupta, 2008; Swanson & Gore, 2000). The origin and subsequent testing of these theories in Western, individualistic, and developed country contexts raises serious questions about the generalizability of these models in non-Western, developing contexts (e.g., Fitzgerald & Betz, 1994; Hackett, Lent, & Greenhaus, 1991; Leong & Brown, 1995; Leung, 1995; Leung, 2008). The applicability of key career theories across culture and context is important because, in an era of greater labour mobility and more international careers (Mahroum, 2000; Stahl, Miller, & Tung, 2002), companies are constantly struggling to manage their global workforce (Roberts, Kassek, & Ozeki, 1998).

In all countries, there are some occupations that tend to be comprised disproportionately of women or of men (Blackburn & Jarman, 2005, 2006) and these occupations are commonly known as gendered occupations. In gendered occupations not only is there a significant skew to gender distribution, but also the work itself is defined in gendered terms, for example, precision for engineering and caring for nursing

(Sargent, 2005). Studies on gendered occupations commonly emphasize the barriers that men or women face in such disciplines (e.g., Cross & Linehan, 2006; Hackett, Betz, Casas, & Rocha-Singh, 1992; Sargent, 2005; Seymour & Hewitt, 1997) or focus on gender differences in choice of such occupations (e.g., Blackburn & Jarman, 2005; Cancannon & Barrow, 2010; Lent, Lopez, Sheu, & Lopez, 2011; Shashaani & Khalili, 2001; Wyer, 2003). The extant research on gendered occupations has mostly been examined from a Western lens and therefore criticized for ignoring the different dynamics of gender inequality in different cultures (Syed & Pio, 2010). In order to address these concerns the present study focused on a South Asian context namely Bangladesh.

There are two possible approaches a researcher could follow to investigate gendered occupations in a South Asian context. One approach is to develop a new career theory and model that is culturally sensitive, using exploratory research. Another approach is to extend Western-based career theory and models by incorporating relevant person and contextual variables to make these theories more applicable to gendered occupations in an international context (Leung, 1995). For the present study, the second approach was adopted and served two main purposes. First, the study findings helped to establish the applicability of Western career models in a non-Western context, South Asia. Second, it shed light on the importance and predictive validity of key background person and contextual variables that were added to an existing career choice model in order to bring local gender practices into the picture (Mellström, 2009). The next section gives a brief overview of the theoretical model used in the present study.

1.2 Theoretical Model and Predictors

Social Cognitive Career Theory (SCCT: Lent, Brown, & Hackett, 1994) is the key career theory that was applied to investigate choice of a gendered occupation in the present study. SCCT (Lent, et al., 1994, 2000) draws primarily from general social cognitive theory (Bandura, 1986,1997), social learning theory (Krumboltz, Mitchell, & Jones, 1976), and research on career and academic self-efficacy (e.g., Betz & Hackett, 1981,1983; Lent, Brown, & Larkin, 1984). According to Leong and Gupta, SCCT is the theory that "offers the most promise with regard to cultural validity with diverse populations" (2008:231). The theory has received a great deal of attention from researchers due to its constructivist approach that not only stresses the importance of social cognitive variables, but also acknowledges the role of person and contextual variables in individuals' career trajectories (Swanson & Gore, 2000). The theory also offers a comprehensive conceptual framework that is useful for understanding the issues and obstacles characterizing the career choice and development of men and women in gendered occupations. Although SCCT has been validated with international samples (e.g., deBruin, 1999; Lent, Brown, Nota, & Soresi, 2003), no studies were found that had used all of the predictors of SCCT's interest and choice framework in investigating career behaviors in South Asia, or even more broadly in an Asian context. The few studies that have used the SCCT framework internationally did so in a piecemeal manner. For example, Ku and Watt (2009) used the SCCT interest and choice model, without the environmental variable of social support and social barriers, in a sample of 109 students drawn from Hong Kong, to investigate intention to pursue a teaching career. Likewise, Saifuddin, Dyke, and Rasouli (2013) used only engineering self-efficacy, career

aspirations, support (parent, teacher, and peer), and supportive learning environment to predict students' persistence in engineering undergraduate programs in a sample of 849 engineering students in Dhaka city in 2011.

The present study investigated Bangladeshi engineering students' intentions to pursue a high-tech career using the SCCT's interest and choice model. Career intention is an important predictor of behavior. Intentions are indicators of how hard people are willing to try, and how much effort they are willing to put forward, to perform a behavior (Ajzen, 1991). Different types of behavior can be predicted by career intentions, for example, intentions can predict persistence, career choice, or turnover behavior (e.g., Mellor-Bourne, Jackson, & Hodges, 2012; Parasuraman, 1982; Wyer, 2003). According to SCCT's interest and choice model (Lent et al., 1994, 2000), intention represents goals that symbolize future outcomes. For this study, intention referred to a career choice behavior and formed the dependent variable.

SCCT (Lent et al., 1994) was created as a framework to facilitate understanding of the ways individuals form career interests and make academic or career choices. SCCT also describes the way self-efficacy beliefs and outcome expectations influence career interests, which in turn moderate choice goals and lead to performance attainment. The theory suggests that self-efficacy beliefs influence outcome expectations, particularly in situations where outcomes are closely tied to efficacy beliefs and quality performance. That is, individuals usually expect to receive favorable outcomes from performing tasks at which they feel competent. SCCT further postulates that self-efficacy beliefs give rise to interest in tasks in which they feel competent, and influence the course of action people choose to pursue which can influence their quality of performance. Applying the

interest and choice block of this theory in the present study, it was hypothesized that students with high self-efficacy would have higher interest in the technology domain, and stronger intentions to pursue high-tech careers. Further, the anticipation of positive outcomes is expected to influence both interest and the course of action people choose to pursue. Taken together, stronger self-efficacy beliefs and positive outcome expectations would give rise to interest and ultimately would lead students to choose high-tech careers. According to SCCT, self-efficacy beliefs, outcome expectations, interests, and choice goals, which are internal to one's cognitive processes, do not work in isolation, rather they interact with other contextual variables that happen outside one's cognitive processing and form one's environment.

In a subsequent expansion of the SCCT interest and choice model, Lent et al. (2000) incorporated environmental variables addressing the role of social supports and social barriers in influencing career choices. Social support and social barriers are defined as "environmental factors that persons perceive as having the potential, respectively, to aid or hinder their efforts to implement a particular educational or occupational goal" (Lent et al., 2001:475). Individuals' confidence in performing a task and/or their intention to pursue some behavior is strengthened when they perceive that they have high support or encouragement. Conversely, their confidence in performing a task and/or their intention to pursue some behavior will be undermined when they perceive high barriers. In the present study, the expanded model of SCCT's interest and choice was used to predict students' intentions to pursue a high-tech career. The model predictors included self-efficacy, outcome expectations, interest, social support, and social barriers.

1.3 High-Tech: A Gendered Occupation

The outcome variable for this study was intention to pursue a high-tech career. The high-tech domain in South Asia is an interesting context in which to apply the SCCT framework. High-tech is an umbrella term that refers to the branch of advanced technology which utilizes electronics. According to Frenette (2007), the term high-tech is generally associated with the information, communication, and technology (ICT) sector where eighty-eight percent of the workforce of this sector is comprised of the computer and telecommunication sectors, including both manufacturing and service. In accordance with Frenette's definition, the high-tech domain can be said to include disciplines such as computer science, computer engineering, electrical and electronics engineering, software engineering, systems engineering, information communication technology, and information systems. High-tech jobs are considered to be one of the fastest growing, well-paid occupations (Betz, 2005; Ferguson, Hitt, & Tambe, 2013) associated with high prestige (Srinivasan, Murty, & Nakra, 2013), and also an important source of economic growth (Wright & Dwyer, 2003).

Historically, high-tech has been identified as a male-dominated profession (e.g., Griffiths, Moore, & Richardson, 2007; Michie & Nelson, 2006; Snir, Harpaz, & Ben-Baruch 2009; von Hellens, Neilson, & Beekhuyzen, 2004). Extant research has indicated women may shy away from such occupations due to environmental influences such as gendered expectations and gendered image of the profession. Prescott and Boggs suggest such influences, "impact and constrain women's choice, as well as provide barriers, in which gendered occupational segregation is maintained, reinforced, and perpetuated in society and cultural practices" (2013: xiii). Some of the gendered expectations and

behaviors include gender-role attitude (Gushue & Whitson, 2006), gender-role stereotyping (e.g., Betz, 2005; Dyke, Saifuddin, & Rasouli, 2012; Michie & Nelson, 2006; Snir et al., 2009), masculine image (e.g., Thomas & Allen, 2006; Wyer, 2003), gendered representation of high-tech in the media (Adya & Kaiser, 2005; Dyke et al., 2012), and culturally situated gendered perceptions (e.g., Küskü, Özbilgin, & Özkale, 2007; Tatli, Özbilgin, & Küskü, 2008; von Hellens et al., 2004).

The SCCT framework also acknowledges that an individual's career development process is influenced by objective and perceived aspects of the environment, and highlights the period during which such influences may occur (Lent et al., 2000). According to the SCCT framework, such influences are divided into two categories depending on their relative proximity to the career choice-making process. The first category is distal or background, and the second category is proximal. The distal (background) variables affect learning experiences through which an individual's career relevant efficacy beliefs and outcome expectations develop. On the other hand, proximal (contextual) variables play an important role during active phases of educational or career decision making. As high-tech occupations are highly gendered, this study incorporated both distal (background) and proximal (contextual) gender variables within the SCCT framework to predict engineering students' intentions to pursue high-tech careers.

1.3.1 Distal Background Variables

One of the important background variables relevant to gendered occupations is gender-role orientation. According to Hackett and Betz (1981), the development of self-efficacy beliefs for male-dominated occupations like high-tech is influenced by gender-

role orientation. Individuals who intend to pursue a non-traditional career would score higher on the masculinity dimension and lower on the femininity dimension of gender-role orientation. As self-efficacy beliefs and outcome expectations are both informed by the same background variables (Bandura, 1986); a masculine gender-role orientation would also contribute to the positive outcome expectations necessary to pursue a high-tech career. Thus masculine and feminine gender-role orientations are incorporated in the model as background person variables. These variables are expected to directly impact self-efficacy and outcome expectations, and, through self-efficacy and outcome expectations, impact interest and intention to pursue high-tech careers.

1.3.2 Proximal Contextual Variables

Proximal contextual variables related to gender such as the masculine image of the profession and gendered perceptions about high-tech, may lead women to avoid high-tech careers but may not have the same effect on men. Image about an occupation refers to the mental association an individual has in her/his mind about the profession and can play a very important role in individuals' career choices and persistence (Thomas & Allen, 2006; Wyer, 2003). The stereotypes about high-tech professionals as boring, nerdy, and geeks, coupled with media portrayal of high-tech professionals as more male-dominated (e.g., male models in technology related product advertisement or male anchors in technology shows) create a masculine image about the professionals that may demotivate women from pursuing these roles (Adya & Kaiser, 2005). The masculine image is further strengthened by the fact that in the high-tech workforce there is a

significant skew to the gender distribution, that is, many men and few women (Simard, 2007).

Another contextual variable that may influence the decision to enter a high-tech career is gendered perceptions (Küskü et al., 2007). Gendered perceptions are beliefs that men and women hold about the place of gender in engineering and technology professions. When male students display stronger beliefs about the significance of gender in professional choice than female students, it solidifies gender order which can impede women's career choices (Küskü et al., 2007). For example, according to EUROSTAT (2004) Turkey has one of the highest proportions of female engineering students (34.8%) after Bulgaria and Portugal (35.5% and 35.3%, respectively); yet women's participation in employment in the high-tech sector is the lowest in Turkey (17.6%) followed by the United Kingdom (25.3%) and the Netherlands (25.4%). The sharp contrast between the proportion of women studying engineering and technology majors and the proportion of women pursuing high-tech careers is an indicator that gender-related perceptions can discourage women from entering such careers.

1.3.3 Rationale for Integrating Gender-Related Variables in the Research Model

Research on gender-role orientation as a precursor to self-efficacy and outcome expectations is limited. No research was found that explored the relation between the masculine image of the high-tech profession and career choice goals or between gendered perceptions and choice goals. Therefore, in addition to SCCT's social cognitive constructs (self-efficacy, outcome expectations, interest, social support, and social barriers), background person variables (masculine and feminine gender-role orientation),

and proximal contextual variables (masculine image and gendered perceptions) were examined in this study to predict engineering students' intentions to pursue a high-tech career.

1.4 High-Tech Careers and Women in South Asia: Bangladesh

Despite high-tech being labelled a gendered occupation, women's enrolment in high-tech related undergraduate programs in Asian countries such as India, China, Taiwan, South Korea, (Simard, 2007) and Bangladesh is on a rise whereas, women's enrolment in high-tech related majors in North America is declining (Campbell, 2005; Prescott & Boggs, 2013; Vegso, 2008). For example, Simard (2007) reported that the percentage of female-earned degrees in natural sciences and engineering in Taiwan and South Korea was higher than Germany or the United States in 2001. India's National Association of Software and Service Companies (NASSCOM, 2007) noted an increase of women in the Indian high-tech sector. According to NASSCOM (2009), women constituted 36% of the junior level IT workforce and the numbers are steadily increasing. This trend of increasing female involvement in engineering and technology presents a contrast between Western and Eastern cultures since Western cultures are viewed as being closer to gender equality, while many Eastern cultures are viewed as less egalitarian (House, Hanges, Javidan, Dorfman, & Gupta, 2004).

Similar trends of women's increasing participation in engineering and technology were also observed in Bangladesh. There has been a steady increase in student enrollment in undergraduate programs overall in Bangladesh (323 percent increase from 2001 to 2008; BANBEIS, 2010) with a relatively constant proportion of female students across

degrees (22 to 24 percent since 1974; BANBEIS, 2010). Although women's participation in higher education overall depicts a stable trend, the same cannot be said about women's enrollment in engineering and technology majors. For example, the proportion of women in the leading engineering university, Bangladesh University of Engineering and Technology increased from 13.6% in 1999 to 19.3% in 2009. A similar trend was found in Shahjallal University of Engineering and Technology where, the percentage of women students increased from 14.1percent in 1999 to 24.1 percent in 2009 (BANBEIS, 2000; varsityadmission.com, 2010). Among top ranking engineering and technology universities in Bangladesh, the proportion of women students was approximately 20 percent overall (Saifuddin et al., 2011, 2013).

At the same time, according to the World Economic Forum's Global Gender Gap Report, in the formal labour market Bangladeshi women held only 10 percent of decision-making roles (legislators, senior officials, and managers) yet they comprised 28 percent of the technical and professional workforce (Hausmann, Tyson, & Zahidi, 2012). The proportion of women participating in the technical and professional workforce is higher than the national average of 14 percent of Bangladeshi women participating in formal employment (Rahman, Younus, & Hossain, 2008).

Women's enrollment and participation in high-tech (a male-dominated domain) is somewhat surprising because Bangladesh is a patriarchal, patrilineal, and patrilocal society. Men dominate women through private and public patriarchy. Private patriarchy is maintained through family where women are considered passive dependents of male members of the family – father, brother, or uncle if unmarried, and husbands or in-laws if married. In this patriarchal society, women derive their roles mainly from family (Chowdhury, 2009) and are expected to behave in a gender congruent manner. In the public

arena, women are often viewed as sexual objects and patriarchy is maintained either through sexual harassment (Chowdhury, 2009) or through limiting women's movement in the public space in the name of protecting women from dangerous environments (Poster, 2013). Patriarchy in Bangladesh is further legitimized through Islamic religious practices (Chowdhury, 2010a). Many Bangladeshi women have limited access to economic resources and decision-making due to patriarchal structures, lack of education, and socially prescribed roles (Cain, Khanam, & Nahar, 1979; Chowdhury, 2009; Japan Bank for International Cooperation, 2007; PRSP Bangladesh, 2013).

Within the Bangladeshi context, the increased representation of women in engineering and technology not only defies stereotypes about gendered occupations, but also represents a case where women are defying traditional social roles. One possibility is that the high prestige associated with high-tech occupations may have helped the domain to be viewed by society, as gender neutral as opposed to gendered. Alternatively, in order to gain independence from patriarchal subordination, women may be reconstructing their identity in manners that allow them to participate in gendered professions which, in return, offer them opportunities to break away from traditional social roles. This study, therefore, is expected to shed light on how social and cultural norms are influencing South Asian women to enter male-dominated occupations that may eventually help them to achieve equal representation. The theoretical constructs of SCCT (Lent et al., 1994, 2000), along with the person and culturally situated contextual variables, are used in the research model in order to broaden our understanding of gender representation in high-tech worldwide.

1.5 Purpose of the Study

In order to address gaps in the literature highlighted in the preceding sections, the present study was conducted in a South Asian context with the following goals:

1) To apply a Western career model (SCCT interest and choice model) in a non-Western context (South Asia) and to test the applicability of the theory,
2) To determine the extent to which social cognitive factors predict Bangladeshi students' intentions to pursue high-tech careers,
3) To expand the SCCT interest and choice model by incorporating gender-role orientation, and the culturally situated contextual factors of masculine image and gendered perceptions,
4) To simultaneously investigate the degree to which the model's predictors and relationships vary with respect to gender, and
5) To determine the extent to which gender-role orientation and culturally situated contextual variables can help in explaining gendered dynamics in individuals' intentions to pursue high-tech careers.

Examining the factors that predict career intentions of female and male engineering students in Bangladesh, I hope to enhance our understanding of the career choice process in a different cultural context. The study has theoretical, methodological, and practical implications, and advances research on science and engineering career choices. From a theoretical perspective, this is the first study to test the full SCCT interest and choice model in a non-Western developing context. This lends support to the generalizability of the SCCT theoretical framework and demonstrates cross-cultural

validity of the model. From a methodological perspective, this study contributes to developing and validating context sensitive measures that should work as reference points in future research using the SCCT framework in a developing country context. From a practical perspective, the current study enhances our understanding of the influence of culturally situated contextual variables on individuals' intentions to pursue careers in high-tech. The findings also help to explain likely reasons for the increased interest in and intention among, female students to pursue a high-tech career in a traditional society. The results can inform policy decisions regarding encouraging more women to pursue technology careers. The current study adds to the small body of research that has examined the predictors of career choice among science and engineering students in non-Western cultures (Adams, Baichoo, & Bauer, 2006; Dyke et al., 2012; Ecevit, Gündüz-Hoşgőr, & Tokluoğlu, 2003; Eidelman & Hazzan, 2005, 2006; Gokuladas, 2009; Küskü et al., 2007; Saifuddin et al., 2011, 2013; Trauth, Quesenberry, & Huang, 2008) and is intended to contribute to a better understanding of the practices that need to be in place to reduce the global gender gap in the high-tech sector.

1.6 Overview of the Thesis

Chapter 2 presents a detailed literature review on SCCT and studies that have incorporated relevant person or contextual variables with respect to gendered occupations. The chapter is organized in three sections. The first section presents an overview of SCCT and the rationale for choosing SCCT as the theoretical framework for this study. The second section presents empirical studies validating the applicability of

SCCT with Western and non-Western samples. And the third section presents studies that have extended SCCT or incorporated variables to investigate gender dynamics in gendered occupations. Chapter 3 features the expanded SCCT interest and choice model and twenty-two hypotheses relating to eight key predictors. The model is presented in two parts: the first part discusses SCCT's interest and choice model and the second part discusses the expanded model that includes masculine gender-role, feminine gender-role, masculine image of high-tech, and gendered perceptions about high-tech. Chapter 4 provides an overview of how the data were collected and a detailed description of each measure that was used to assess the constructs. The chapter ends with descriptive analyses for the sample data. Chapter 5 provides the results of exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) on the measures. The EFA and subsequent CFA helped in pruning the measures with respect to items and with respect to sub-dimensions. The chapter ends with a summary table on the final measures along with their reliability coefficients. Chapter 6 presents a series of correlation and regression analyses that test the hypothesized relationships in the model. This exercise helped in further pruning the measures and ensuring that the final model was tested with valid predictors. The chapter also includes a summary table that reports findings on the hypothesized paths. Chapter 7 presents the results of structural equation modeling that includes both a measurement and structural model. The Chapter ends with a summary of results for the alternate multivariate tests of the hypotheses. Chapter 8 discusses additional analyses that were run to understand gender differences in the model predictors. The last chapter, Chapter 9 discusses the findings, contributions, limitations, and future research directions.

Chapter 2: Literature Review

Individuals' career choices and development have received significant attention from scholars resulting in several theoretical frameworks. Most of these theories and models, however, have been developed from a Western perspective emphasizing individual attributes such as ability, interest, and self-efficacy. The generalizability of these theories to other contexts and cultures has received little attention, particularly with respect to gendered occupations – such as teaching or nursing which are female-dominated and engineering or computer science which are male-dominated. Most of these career theories fail to incorporate many of the background and contextual elements that might help to understand why men or women are drawn to, or avoid, certain gendered occupations (e.g., Dawis, 2002; Holland, 1985; Hackett & Betz, 1981; O'Brien & Fassinger, 1993, Hu & Watts, 2009). In order to address this gap, this research used the SCCT framework (Lent et al., 1994, 2000) in predicting engineering students' intentions to pursue high-tech careers in Bangladesh. The chapter begins with a theoretical rationale for using SCCT's framework in this study, followed by the description of the theory. Next, a summary of empirical studies that have applied SCCT in different domains with diverse samples are presented, followed by studies that have extended SCCT or have incorporated relevant person or contextual variables related to gendered occupations. Finally, a chapter summary is presented.

2.1. Career Theories

Career theories can be classified into three broad categories: trait-factor, developmental, and social cognitive (Swanson & Gore, 2000). Trait factor approaches mainly focus on individual characteristics such as interests, values, abilities, etc. and try to match these traits to job characteristics using a decision making or problem solving approach. The developmental approach, on the other hand, emphasizes that individual's development is a continuous process and as an individual gains experience and maturity, one gets a better sense of what one is capable of doing and adjusts career pursuits accordingly. Finally, the social cognitive approach highlights the importance of cognitive and emotional variables, and seeks to explain how people acquire and maintain certain behavioral patterns, while providing the basis for appropriate interventions (Bandura, 1997). Social cognitive career theory (SCCT) is derived from the social cognitive model. SCCT combines features from both trait-factor and developmental theories, yet at the same time remains distinct from other career theories (Lent et al., 1994).

Like trait-factor theory (e.g., Dawis 2002, 2005; Dawis & Lofquist, 1984; Holland, 1985, 1997), SCCT recognizes the importance of abilities and interests in the career development process. The difference is trait based theories treat constructs, for example, personality, interest, and ability as "relatively global, static self attributes" (Lent et al., 1994:82) whereas SCCT treats constructs as dynamic and situation specific. For example, in the theory of work adjustment (Dawis 2002, 2005; Dawis & Lofquist, 1984) varieties of person (P) and environment (E) variables are used to account for behavior. The theory seeks to explain career development and satisfaction in terms of P-E

correspondence, that is, an alignment will lead to satisfying (from P perspective) and satisfactory (from E perspective) choices, assuming that people and their environment remain the same. In contrast, SCCT highlights relatively dynamic and situation specific aspects (Lent, 2005) of both people (e.g., self-efficacy, outcome expectations, future behavior) and their environments (e.g., social support, barriers). By offering a dynamic perspective SCCT helps to explain how people change, develop, and control their behavior over time and in different situations i.e., how individual exercise personal agency (Lent & Brown, 2006). Likewise, developmental theories (Gottfredson, 1981, 2002, 2005; Savikas, 2002) focus on the experiences and challenges people face as they progress through life stages, these experiences and challenges help them to understand their career interest and career choices. SCCT, like developmental theories, also focuses on the process by which individuals' interests and academic and career choice decisions evolve. In contrast to the developmental theories, SCCT is less concerned with the specific ages and stages of career developmental tasks and is more concerned with theoretically derived constructs (e.g., self-efficacy, goal formation) that promote or stall effective career behaviors across the developmental tasks (Lent, 2005). By incorporating elements from other branches of career theories, SCCT is able to offer a comprehensive framework to study career goals. A brief review of some of the key career theories further highlights the value of SCCT for this study.

One of the prominent trait-based theory is the theory of work adjustment (TWA: Dawis 2002, 2005; Dawis & Lofquist, 1984). TWA is grounded in an individualistic orientation and is concerned with fit between the person and environment in predicting career behavior (Leung, 2008). The theory focuses on individual differences and is

applicable in measuring the linkage between needs or abilities and satisfaction or work adjustment (Dawis, 2005). The present study, however, is concerned with predicting students' intentions to pursue high-tech career which is a career entry decision, rather than an issue of satisfaction or adjustment to the career. Moreover the sample population for this study are Bangladeshi engineering students who are likely to favor a more collectivist orientation (Leong & Leung, 1994); hence TWA was not used for this study.

Another theory that focuses on person-environment fit based on individual differences in vocational interests is Holland's (1985) theory. This theory tends to view people and their work environment in trait-oriented terms, assuming that a person's vocational interest type remains stable over time and over situations (Lent, 2005) and that people usually select occupations congruent with their interest(s). Holland's theory can be applied to predict career intentions, however, its cross-cultural validity comes into question as the theory has been tested and validated mainly among Western and European participants (e.g., Hansen & Sackett, 1993). Moreover, the focal concept of this theory is vocational interest and interest was not found to be an important predictor of career behavior in other ethnic samples having collectivist cultural orientation. For example, interest was not a significant predictor of career choice in studies with Asian Americans (Tang, Fouad, & Smith, 1999) and with Mexican Americans (Flores & O'Brien, 2002). This raised questions about the cross-cultural validity of Holland's theory (Leong & Gupta, 2008). As the present study uses a sample from Bangladesh, which has a collectivist cultural orientation, Holland's theory may not have served the purpose.

Turning attention from trait-based theories to developmental career theories, culture is an important component of developmental career theories. For example, Gottfredson's (1981, 2002) theory of circumscription and compromise takes into account cultural differences and can be applied to diverse populations (Arbona, 1995). The theory proposes that individuals, as they grow and pass through different life stages, develop self-concepts and these self-concepts are influenced by the environment(s) individuals are exposed to. In the process, individuals identify the preferred career alternatives that are congruent with their self-concepts and make occupational decisions accordingly. In the absence of preferred alternatives, individuals compromise and settle for less attractive alternatives. A major criticism of Gottfredson's theory is limited empirical testing (Swanson & Gore, 2000) due to the difficulty of operationalizing and measuring constructs such as circumscription and compromise, which can assume different meanings and values in different contexts (Leung, 2008). Also most of the studies examining Gottfredson's theory have used samples from Western countries with individualistic cultures such as the USA (Helwig, 2001) and New Zealand (Henderson, Hesketh, & Tuffin, 1988). The applicability of this theory in non-Western, collectivist cultures remains to be seen. The difficulty in operationalizing the model's constructs coupled with a lack of cross-cultural studies in non-Western contexts made it less appealing for use.

Compared to the other theoretical frameworks discussed above, SCCT was found to be a suitable framework in a South Asian context for the following reasons: First, SCCT draws from social cognitive, trait-based, and developmental theories and offered a comprehensive conceptual framework to understand academic and career behavior (e.g.,

Flores & O'Brien, 2002). Second, it bought together conceptually related constructs (e.g., self-efficacy, self-concept) and outcomes, and linked seemingly diverse constructs (e.g., self-efficacy, interest, abilities) from major career theories in one unifying conceptual framework (Lent et al., 1994). Third, according to Leong & Gupta, SCCT offered "the most promise with regard to cultural validity with diverse populations" (2008: 231) in that it has used the theoretical constructs such as self-efficacy, outcome expectations, and interest in diverse groups (Leong & Brown, 2005). And finally, it was possible to incorporate background person (gender-role orientation) and proximal contextual variables (masculine image of the high-tech professionals and gendered perceptions) along with SCCT's model predictors. Together it helped in understanding the impact of these variables in the career intentions of individuals, particularly women's intentions in pursuing a gendered occupation of high-tech.

SCCT has been regarded by several career scholars as one of the most sophisticated and influential theoretical perspectives in career choice and development (e.g., Blustein, 1999; Fitzgerald, Fassinger, & Betz, 1995). To demonstrate the richness of the theory and its appropriateness for use, the next section presents a brief overview of the SCCT theoretical framework, followed by studies in which SCCT's interest and choice model was tested with diverse populations in diverse contexts.

2.2 Social Cognitive Career Theory

Bandura (1986) developed a general social cognitive theory to explain human behavior in terms of 'triadic reciprocation'. In this model of reciprocal determinism, personal factors, behavioral patterns, and environmental events interact and influence

each other bi-directionally. A key mechanism through which an individual contributes to this triadic relationship is the concept of personal agency. Three main social cognitive mechanisms of personal agency within this model are self-efficacy beliefs, outcome expectations, and goal representations. The influence of these factors on each other is cyclical. That is, self-efficacy will Lent et al. (1994) included these mechanisms of triadic reciprocity from Bandura's (1986) social cognitive theory and applied and extended it in the domain of academic and career development to propose SCCT (Figure 2.1). The theory is divided into two complementary frameworks: (1) the core framework highlights the social cognitive mechanisms of personal agency and how they exert influences on career and academic development. And (2) the extended framework incorporates contextual variables (e.g., social support and barriers) and how they interrelate with the social cognitive factors to influence career related behaviors (Lent et al. 2000).

The central tenet of the theory is that career related interests, choices, and performances develop in part from self-efficacy beliefs and outcome expectations. According to Bandura, self-efficacy refers to "people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances" (1986:391). Simply stated, self-efficacy is the degree to which an individual feels confident about his or her skills in successfully performing a task and/or in coping with difficult tasks or problems. For example, a person with high self-efficacy in computer related tasks may develop an interest in and set a goal to work in the computer industry, whereas a person with low self-efficacy in computer related tasks despite having an interest in the domain, may feel she/he lacks the necessary skills to pursue a career in a computer related industry. Self-efficacy is seen as "a dynamic set of

self-beliefs that are specific to particular performance domains and that interact complexly with other person, behavior, and contextual factors" (Lent et al., 1994:83). These beliefs represent the most influential mechanism of personal agency (Bandura, 1986) and are acquired and modified by four primary types of learning experiences: performance accomplishments, vicarious learning, social persuasion, and psychological and affective states (Bandura, 1997).

Another key predictor of career choice is outcome expectations. Outcome expectations refer to "a judgment of the likely consequence a behavior will produce" (Bandura, 1986:391). Self-efficacy beliefs are concerned with a person's capabilities in performing a particular task, whereas outcome expectations are concerned with imagined consequences of performing the tasks. According to Lent et al., self-efficacy is, "can I do this?" and outcome expectations are, "If I do this, what will happen?" (1994:83). Among the social cognitive mechanisms of personal agency, Bandura posits that self-efficacy is more influential than outcome expectations and self-efficacy can influence outcome expectations, especially where outcomes are tied to the quality of performance. People expect to achieve better results in activities in which they view themselves to be competent. For example, a student with high math self-efficacy will expect to get a higher grade in a math course. But in instances where outcome expectations are loosely tied to the quality of performance, outcome expectations may outweigh the influence of high self-efficacy and make an independent contribution in predicting career behavior (Diegelman & Subich, 2001; Lent et al., 1994). For example, a woman with high computer self-efficacy may not pursue a computer engineering major in anticipation that she will not receive equal pay in a male-dominated work environment. Both self-efficacy

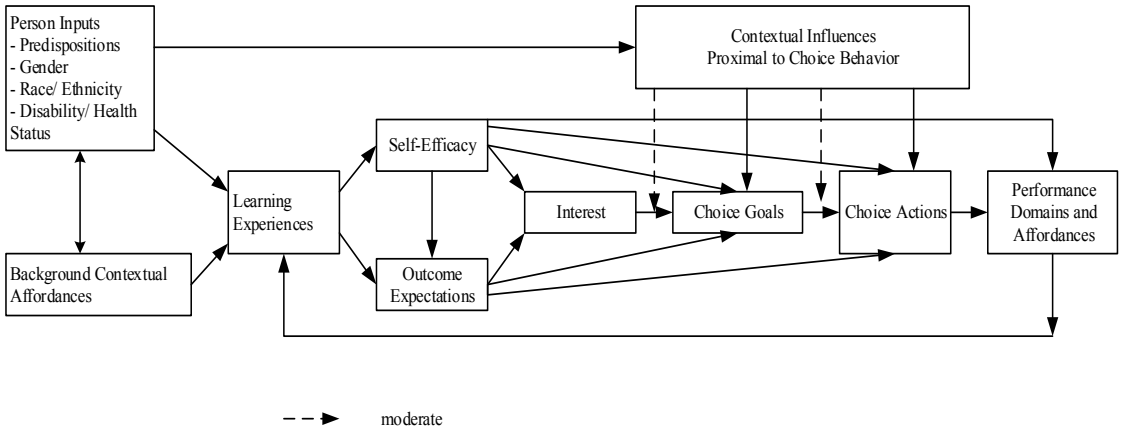
and outcome expectations have been found to influence career and academic intentions (e.g., Diegelman & Subich, 2001; Lindley, 2005) but their relative effects on career decisions may depend on the person and the situation (Lent, 2005). The same experiences (performance accomplishments, vicarious learning, social persuasion, and psychological and affective states) that inform self-efficacy beliefs are also expected to influence outcome expectations in an individual (Bandura, 1986).

The third core social cognitive variable in SCCT is goal representation. Goals are future outcome that one hopes to achieve. Goal representation may be defined as the determination to engage in a particular activity to achieve some desirable outcome (Bandura, 1986). Goals are very much part of all career choice and decision making theories, but depending on their level of specificity and proximity to choice implementation, they are conceptualized differently (Lent et al., 1994). For example, goals are expressed as aspirations when measured in adolescents and youths because they are not yet in a stage to consider real consequences and in the absence of immediate reinforcement, they use aspirations to organize and sustain career-related behaviors (Ali & Saunders, 2009). Goals are likely to be conceptualized as choice goals, in a sample of undergraduate students, who are at a stage of actively considering their academic majors (e.g., Lent et al., 2005) or as plans or decisions when they involve specific intentions and commitment to pursue a career in a particular field (e.g., Chuang & Dellmann-Jenkins, 2010). According to social cognitive theory, self-efficacy and outcome expectations have an impact on choice goals, which in turn stimulate goal setting and behavior. For example, a person with high computer self-efficacy and positive outcome expectations is likely to choose an academic major related to computer disciplines. In continuing with

the computer related discipline, progress made in attaining goals in turn has a reciprocal influence on self-efficacy and outcome expectations. Successful progress may further strengthen self-efficacy and outcome expectations, whereas lack of progress may weaken self-efficacy and outcome expectations.

Figure 2.1

Model of Social Cognitive Influences on Career-Related Choice Behavior



Note. Adopted from Lent et al. (1994).

Using social cognitive mechanisms of self-efficacy, outcome expectations, and goal representation, Lent et al. (1994) outlined a conceptual framework of academic and career development (Figure 2.1) with three interlocking outcomes – interest development (how basic academic and career interest develop over time), choice (how interest and other factors determine academic and career related choice behavior), and performance (why people persist and achieve different levels of success). The theory depicts interaction between self-efficacy, outcome expectations, interest, goals, and other

important aspects of persons (e.g., gender, race, ethnicity), background (e.g., socio-economic status), learning experiences, and their environment (e.g., social support, social barriers) to predict individuals' academic and career-related choices. More recently, Lent and Brown (2006) expanded the scope of SCCT, by offering a fourth social cognitive model designed to explain satisfaction in academic and professional pursuit. Description of the various models is presented next.

2.2.1 Model of Interest

According to SCCT's interest model, children and adolescents are exposed to a variety of activities relevant to career development such as sports, math, computers, etc. They are encouraged by parents, peers, teachers, and others to pursue various activities and to try to perform these activities well. As they practice these activities and receive ongoing feedback (positive and negative) they develop a sense of competence and expectations in that domain. When individuals view themselves competent in performing the tasks and assume that performing the tasks will bring positive outcomes, interest in the task is likely to develop. Conversely, interest may diminish if they doubt their self-efficacy or expect to receive negative outcomes. It needs to be emphasized that other person and background variables (e.g., gender, socio-economic status) may influence the development of self-efficacy and outcome expectations in a person through learning experiences too.

2.2.2 Model of Career Choice

The SCCT model of career choice is an extension of the interest model. Here the model posits that self-efficacy and outcome expectations jointly give rise to interest. As interest develops, along with self-efficacy and outcome expectations, it gives rise to intentions or choice goals that are congruent with those interests. The linkage between interest and intentions or choice goals is not linear or static, rather is subject to further revision because individuals interact with their environment and both individuals and their environments are dynamic entities.

The environmental factors are divided into two categories depending on when they occur within the choice process (Lent et al., 2000). The first type includes more distal background variables (such as, gender-role socialization) that affect the learning experiences through which career relevant self-efficacy and outcome expectations develop. For example, a young girl and a young boy may be socialized in a manner such that the young girl receives encouragement in trying out activities that are more female-typed whereas the young boy gets encouragement in trying out activities that are more male-typed. Due to their different socialization and exposure, girls and boys are likely to develop self-efficacy, outcome expectations, and in turn interest in tasks that are culturally defined as gender appropriate (Hackett & Betz, 1981). The second types of environmental factors are proximal contextual variables that are important during the active phases of career decision making. Proximal contextual variables may affect people's choices or implementation possibilities in two ways. First, SCCT posits that certain proximal contextual variables may affect people's career behavior directly. For example, an undergraduate engineering student may want to pursue a career in the high-

tech because the society views these occupations as prestigious. Second, proximal contextual variables may moderate the processes through which people make and implement career relevant choices. For example, despite knowing that the high-tech jobs are prestigious, a female engineering student may not want to pursue a high-tech career if she anticipates unequal treatment due to the male-dominated nature of the high-tech sector.

Likewise, environmental variables of social support and barriers can influence individuals' career choice goals and actions. According to SCCT, high support and low barriers increase the likelihood of converting interest into goal and goal into action, whereas non-support or a hostile environment can stall the process of transforming interest to goal and goal to action. For example, a female undergraduate student may continue or discontinue her computer science degree depending on her experience of a supportive learning environment or a chilly environment (Brainard & Carlin, 1998). The choice model also depicts a feedback loop, in which performance attainments inform learning experiences, which then influence self-efficacy and outcome expectations. The present study is concerned with the Bangladeshi undergraduate engineering students' intentions to pursue or not to pursue a high-tech career upon graduation. Hence, this study used the model that combined the interest model and choice model, known as SCCT's interest and choice model (Lent et al., 2005, 2011; Lent, Lopez, Lopez, & Sheu, 2008).

2.2.3 Model of Performance

The third model of SCCT is the model of performance. In this model, self-efficacy and outcome expectations are informed by abilities and past performance as opposed to learning experiences. Self-efficacy and outcome expectations are linked to formation of performance goals, which then lead to performance attainments. The key to this model is that the quality of performance attained depends in part on the type of performance goal. For example, a student pursuing an engineering degree also decides on a grade performance he or she wants to receive in his or her courses. A person wanting to achieve an 'A' grade in a course then naturally devotes a substantial amount of time to study; hence setting a performance goal regulates one's behavior. This model depicts a feedback loop where performance attainment level influences self-efficacy and outcome expectations through ability and past performance.

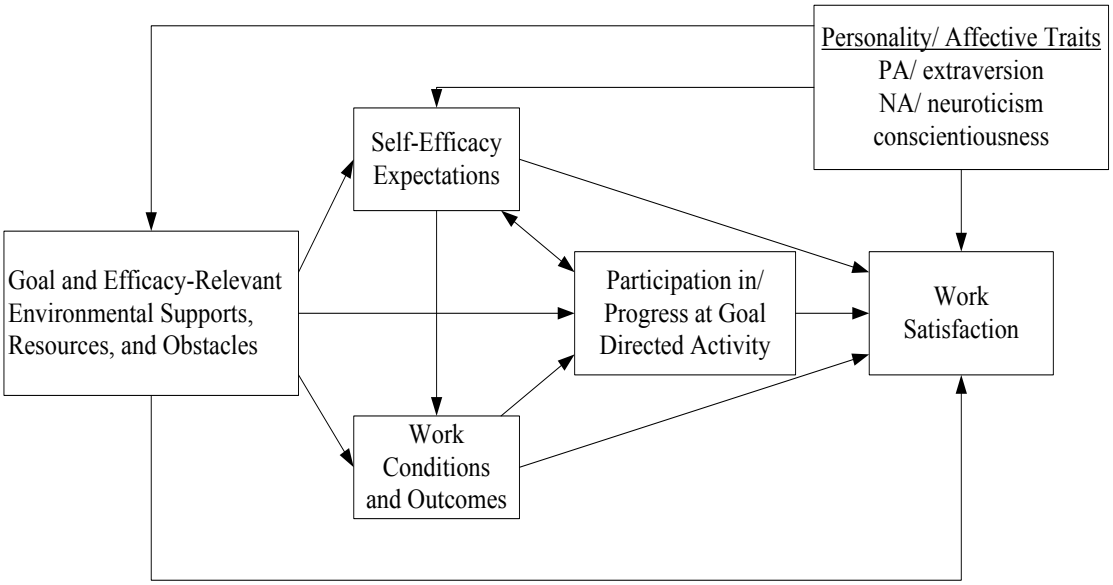
2.2.4 Model of Satisfaction

In addition to the three basic models, Lent and Brown (2006) recently expanded the SCCT base by proposing a fourth model (Figure 2.2) that explains the relationships between personality or affective traits, environmental support and barriers, self-efficacy beliefs, work conditions and outcomes, participation in or progress toward goal-directed activity, and the outcome variable of work satisfaction. According to this model, personality and affective traits directly, and indirectly via self-efficacy and environmental variables, impact job satisfaction. People who experience a high level of negative trait affect are likely to cast doubt on their personal efficacy and view environmental support in less favorable terms than those with lower negative affect. Goal mechanisms are also

related to satisfaction. Those who set goals and make progress are likely to feel more satisfied than those who do not set goals. Previously identified core constructs of self-efficacy and outcome expectations directly, and indirectly via the goal mechanism, influence job satisfaction because people who feel efficacious and get what they want are more satisfied. Also, people with high self-efficacy and outcome expectations are likely

Figure 2.2

Model of Work Satisfaction



Note. Adopted from Lent & Brown (2006)

to make progress toward their goal, resulting in satisfaction. Finally in this model environmental supports and barriers are also hypothesized to affect satisfaction directly and indirectly via their impact on goal progress and by informing self-efficacy and outcome expectations.

2.2.5 Summary

Lent and his colleagues have constructed one of the most comprehensive career theories. SCCT accounts for factors that are both internal and external to the person in the domain of academic and career development, performance, and satisfaction. Furthermore, Lent et al. (1994) have attempted to build conceptual linkages to and bridge the gaps between other career theories such as social learning theory (Krumboltz et al., 1976), self-efficacy theory (Hackett & Betz, 1981), theory of work adjustment (Dawis & Lofquist, 1984) and the vocational interest theory (Holland, 1985). SCCT is also informed by theories in organizational and social psychology such as goal-setting theory (Locke & Latham, 1990) and the theory of planned behavior (TBP: Ajzen, 1991). Its integration of several key concepts and pathways makes SCCT one of the most useful theories for empirical research on career decision-making and appropriate for the present study.

2.2.6 Rationale for Using SCCT versus TPB

Although SCCT offers a comprehensive framework, it is important to note that the outcome variable in this study is "intentions." One of the popular theories that attempts to predict behavioral intentions and actual or self-reported behavior is the theory of planned behavior (TPB: Ajzen, 1991). According to the TBP framework, planning plays a key role in forming intentions and subsequent behaviors. People plan courses of action and choose behavior by considering the consequences of their actions. The central tenet of the theory is that behavior is directly influenced by behavioral intentions, which in turn are influenced by personal attitudes, subjective norms, and perceived behavioral

control. The theory includes two person (attitudes and perceived behavioral control) and one environmental (subjective norms) variable. The attitude toward behavior is governed by expected consequences (What will happen if I do this?); subjective norms are the social pressures an individual perceives regarding the decision to perform or not to perform the behavior (Will significant others approve or disapprove of my behavior?). Perceived behavioral control is governed by an individual's perception of the difficulty of the behavior (Can I do this?). Behavioral intention refers to an individual's readiness to perform a given behavior. TBP has been used frequently in the technology and career choice literature. Despite its relevance to career decisions, this study used SCCT instead of TPB for the following reasons:

- Both the TPB and the SCCT are rooted in social cognitive theory (Bandura, 1986) and they both share similar theoretical constructs. For example, studies have shown self-efficacy and perceived behavioral control to measure the same construct – confidence in one's ability (Azjen 1991; Taylor & Todd, 1995). Likewise, TBP's attitude toward behavior and SCCT's outcome expectations, and TBP's social norms and SCCT's social support and barriers are comparable.
- The TPB predates the SCCT, and Lent et al. (1994) have acknowledged that their theory building efforts have been informed by TBP.
- Finally, although the final choice to pursue a particular career lies with the person, extant research has demonstrated the importance of contextual influences in choice behavior (e.g., Kenny et al., 2007; Tang et al., 1999; Lent et al., 2003a). Contextual influences form an important basis of SCCT's interest and choice model however,

this phenomena is not explored under TPB and therefore, SCCT offered a more comprehensive conceptual framework to investigate intention behavior.

2.3 Empirical Studies

SCCT's interest and choice model generated a large number of empirical studies that validate the use of this model in diverse contexts with diverse populations. This study had five main agendas, to apply SCCT interest and choice model in a South Asian context, to determine how social cognitive factors affect the career intentions of Bangladeshi engineering students in their pursuit of high-tech careers, to expand SCCT's interest and choice model by incorporating gender-role orientation and other contextual factors, to explore and investigate the influence of multiple factors on intentions, and to determine the extent to which gender-role orientation and contextual variables can help in explaining gender dynamics in different cultures. A literature review relevant to these aims is presented in two parts. The first part discusses the studies using SCCT in different domains with diverse samples. The second part of the review focuses on studies that examine the role of contextual variables in gendered occupations to examine career outcomes.

2.3.1 Empirical Studies Related to SCCT Interest and Choice Model

SCCT offers a comprehensive framework to understand the development of career interest, career choice, performance, and work satisfaction. As a result, it has generated a large number of studies in diverse contexts with diverse populations. SCCT has been applied to academic domains such as math, science, and arts (Fouad & Smith,

1996; Fouad, Smith, & Zao, 2002; Smith & Fouad, 1999), engineering (e.g., Lent et al., 2005; Lent et al., 2008; Lent et al., 2011), information technology (Smith, 2002), computing disciplines (Lent et al., 2008, Lent et al., 2011), hospitality and tourism (Song & Chathoth, 2008), sports and leisure (Cunnigham, Bruening, Sartore, & Fink, 2005), and statistics (Blanco, 2010) to name a few. SCCT has been found useful in understanding the career development of special groups such as Asian Americans (Tang et al., 1999), Mexican American women (Flores & O'Brien, 2002), Mexican American adolescent men (Flores, Navarro, Smith, & Ploszai, 2006), African American women (Hackett & Byars, 1996), Latino, South-East Asian, African-American, and Native Americans (Byars-Winston, Estrada, Howard, Davis, & Zalapa, 2010), gays and lesbians (Morrow, Gore, & Campbell, 1996), incarcerated women (Chartrand & Rose, 1996) and battered women (Chronister & McWhirter, 2003). Additionally, SCCT has been found instrumental in predicting non-traditional interests and choice goals among women (e.g., Hackett et al., 1992; Nauta & Epperson, 2003; Shaefers, Epperson, & Nauta, 1997). Furthermore SCCT research has also been conducted with international samples such as Italian youths (Lent et al., 2003; Nota, Ferrari, Solberg, & Soresi, 2007), Chinese undergraduates (Song & Chathoth, 2008), Indian high school students (Arulmani, Van Laar, & Easton, 2003), Nigerian women (Osiruemu, 2007), Bangladeshi engineering undergraduates (Saifuddin et al., 2013), and Spanish college students (Blanco, 2010). The following section elaborates on empirical support of SCCT's interest and choice model within various academic domains, diverse groups, and international samples. The importance of each SCCT construct and the relationships between the constructs in

predicting career intentions are discussed in more detail in Chapter 3 on model development and hypotheses.

Lent et al. (2005) examined the utility of SCCT in predicting engineering interest and intention to pursue an engineering major among 487 students at historically Black and predominantly White universities. The study found general support for the social cognitive predictors of self-efficacy and outcome expectations, which jointly accounted for 37% of the variation in interest. Self-efficacy was the primary predictor of choice goals. Interest and barriers also contributed significantly to the prediction of goals but their contribution was modest. Neither support nor outcome expectations contributed significantly to the prediction of goals. Both support and barriers were interrelated and found to be predictive of self-efficacy. In terms of social cognitive variables, women did not differ significantly from men; however, women did report stronger support and fewer social barriers. With regard to the university types, students at Black universities reported significantly higher self-efficacy, outcome expectations, interest, social support, and goals. Both women and Blacks are underrepresented in the engineering domain yet both groups reported stronger support. The authors suggested that in order to encourage minority students, universities are trying to create an environment that offers strong support and that the support mechanisms are offsetting social barriers. Another possible explanation for these findings was, women and Blacks anticipate more barriers and so to pursue engineering they either have substantial support from family or seek out more support from others such as university counselling services and student advisors. The results suggested that contextual variables in predicting intention behavior needs to be further investigated as it may play an important role in attracting and retaining students

too. Overall the study found support for SCCT interest and choice model and the model was invariant across male and female students.

Lent et al. (2011) examined the SCCT interest and choice model in a sample of 1404 students majoring in a variety of computing disciplines. The model overall was a good fit to the data. In particular, interest was well predicted by self-efficacy, and persistence in computing majors was directly predicted by self-efficacy, interest, supports, and barriers. Support and barriers also indirectly influenced persistence via self-efficacy. This is consistent with earlier findings with students in science (Byars-Winston et al., 2010) and engineering (Lent et al., 2005). Consistent with the earlier findings (Lent et al., 2005), outcome expectations produced a non-significant path to choice goals as well as to interest. Authors indicated that outcome expectation measures only reflected positive outcomes and inclusion of negative outcomes (e.g., anticipated work-family conflict) or outcomes related to intrinsic values may increase the explanatory power of the construct. The study tested the model across male and female sample and found the results to be consistent between the two groups except that the path from self-efficacy to outcome expectations was larger for male sample compared to female sample, and social support and barriers covaried to a greater extent in female group than in male student group. The authors suggested women's expectations may get swayed by perceptions of a chilly engineering environment, the gendered domain of engineering, or work-family conflict, which would result in a smaller path from self-efficacy to outcome expectations. Greater covariance between support and barriers for a female sample can be due to the presence of high-support for women to make them feel more welcome and comfortable in the program which neutralized the effect of barriers and helped women to stay in the

domain. The authors also tested the model across two racial and ethnic groups: African Americans and European Americans. The two models were roughly same; however the path between self-efficacy and outcome expectations was larger among the European Americans compared to African Americans. This could reflect that the outcome expectations of African American students are informed by perceptions of other environmental variables (e.g., a chilly environment) rather than self-efficacy. Nevertheless, self-efficacy and outcome expectations were highly related. Overall the result supported SCCT's interest and choice model propositions.

Fouad et al. (2002) tested SCCT's interest and choice model across four academic domains: Art, Social-Science, Math/Science, and English in a sample of 952 predominantly White college students to investigate academic domain specificity. The study used four background variables: gender, parental education, high school grade point average (GPA) and the subject matter GPA, in addition to social cognitive predictors. They examined the influence of gender and parental education on high-school GPA and subject matter GPA. GPAs were then treated as indicators of learning experiences, which in turn were hypothesized to influence self-efficacy and outcome expectations. The overall model demonstrated a good fit across the four subject domains and the results were consistent with the SCCT's interest and choice model i.e., across the four domains, results indicated that outcome expectations were partly predicted by self-efficacy. Self-efficacy and outcome expectations jointly predicted interest, and interest influenced choice goals. Self-efficacy was informed by both high-school GPA and subject matter GPA, but outcome expectations were informed by subject matter GPA only. Parental education did contribute to self-efficacy through high-school GPA but not

through subject matter GPA. A plausible explanation offered by authors was parental education worked as a proximal influence during the adolescent years but became distal as children grew and moved to college education. Although, the model fit across the four academic domains was quite similar, some results varied across the four domains suggesting that different constructs may have different effects depending on the subject domain. The results further suggested that different intervention strategies are required in order to encourage students to enter different domains. For example, the path from subject matter GPA to math and science self-efficacy was strong compared to other subjects, suggesting that other sources of self-efficacy such as vicarious learning, social persuasion, and psychological and affective states, may prove to be less powerful than performance accomplishment for math and science compared to other domains. On the other hand, the path between outcome expectations to goals was less strong in math and science prompting the authors to suggest that doing well in math and science subjects fosters a general sense of achievement and may not be instrumental in influencing choice goals unlike performance in other domains. In the case of arts, the path between self-efficacy and outcome expectations was very strong reflecting the creative nature of the subject domain, where individuals aspire toward positive expectations only when they are confident in their skills. Overall the study found the core model held well across the four academic domains. The study validated that SCCT's interest and choice model is appropriate to investigate career behavior across different academic domains.

SCCT's interest and choice model has been applied across different academic majors as well as with diverse ethnic population. For example, Tang et al. (1999) used the theoretical approach to investigate the relationships among core social cognitive variables

and the contextual factors of acculturation, family socioeconomic background, and family involvement in predicting career choice behavior in a sample of 187 Asian American college students. The study demonstrated SCCT's utility in explaining the career behavior of Asian Americans. Consistent with other studies, self-efficacy was found to be an important determinant of career interest and choice. Acculturation was negatively related to self-efficacy and career choice; and family involvement was only found to be related to career choice. Also, the path between interest and career choice was found to be non-significant. Authors suggested that less acculturated Asian Americans develop self-efficacy for occupations popular among Asian Americans and may choose occupations based on family influences rather than their own interest (Leong & Chou, 1994). The results overall supported SCCT interest and choice model's assertions and validated importance of contextual variables in one's academic and career development.

In a study with female Mexican American high school students, Flores and O'Brien (2002) assessed self-efficacy, interest, choice goals, support and barriers along with other background variables in relation to non-traditional career development beliefs. Consistent with SCCT, self-efficacy predicted interest and career goals. The proximal contextual variable of parental support predicted both career aspirations and choice goals for non-traditional careers. Barriers, however, did not affect aspirations in this study. In this study, authors only used a direct path analysis from supports and barriers to aspirations and goals and did not incorporate the indirect path as suggested by Bandura (1999). The indirect path model suggests that the path from supports and barriers to aspirations and goals is mediated by efficacy beliefs. It is possible that the results would have been different using a more recent version of SCCT interest and choice model that

has incorporated Bandura's mediated path hypothesis (Lent et al., 2005). Moreover, interest did not influence any of the outcome variables in this study. The authors hinted that the results may have been influenced by the collective cultural orientation of Mexican American girls, where social factors like parental influence rather than their own interest may have driven career pursuits. Overall the findings supported the SCCT propositions that people develop interest in areas in which they have a strong sense of personal agency.

In another study with a diverse ethnic population, Byars-Winston et al. (2010) investigated the academic interest and goals in 223 African American, Latino, Southeast Asian, and Native American students across two academic majors – biological sciences and engineering. In addition to social cognitive variables, the study incorporated ethnic identity and other-group orientation as person factors and perceived campus climate as a proximal contextual factor in predicting minority students' persistence in undergraduate programs. Results of the study were largely consistent with the propositions of SCCT's interest and choice model. The study found that the individuals who perceived themselves as efficacious and anticipated positive rewards from the chosen major expressed interest and intentions related to completing the degree. Other-group orientation was also found to be predictive of self-efficacy suggesting that in the case of minority students, students feel more confident when they are comfortable interacting with students outside their ethnic group. The study also supported the indirect effects of perceived campus climate on academic goals via self-efficacy. This finding suggested that for minority students to continue with their science and engineering majors, a strong sense of efficacy and positive interethnic interactions are important to help them perceive

the campus climate as comfortable. In terms of academic domains, the path coefficient from academic self-efficacy to choice goals was significant only for biological science students. For engineering students, the contribution of academic self-efficacy to choice goals was only indirect, mediated through outcome expectations and interest. It is possible, that the students enrolled in engineering programs in general enjoy higher confidence and therefore in order to continue with the program, the perceived rewards (e.g., prestige, pay) and opportunities (e.g., job prospects) along with a favorable climate are more important in translating their interest into goals. In contrast, biological science students aspire toward positive expectations only when they have confidence in their ability. Their confidence and positive expectations subsequently influences their interest and intentions. Overall the study results found support for SCCT's model.

Taken together, these research findings suggest that, in general, SCCT interest and choice model has demonstrated predictive utility across different academic domains and across different ethnic groups. Although general support was found for SCCT's central tenet that self-efficacy directly and indirectly, through outcome expectations, will influence interest and choice goals, mixed results have been found on the utility of outcome expectations to predict choice goals (Lent et al., 2003a, 2011). Furthermore some study results indicated that interest may not be predictive of career choice goals especially for people with a collectivist orientation (Flores & O'Brien, 2002; Tang et al., 1999). Also not all studies were consistent in their support of SCCT's propositions regarding contextual variables and as Lent et al. argued, "Supports, opportunities, and barriers – like beauty - lie at least partly in the eye of the beholder" (1994:106). Nonetheless, such a view does not minimize the significance of environmental variables

and they need to be further explored in conjunction with social cognitive variables to better understand the academic and career routes of individuals, especially in minority groups and in non-Western contexts. Although the SCCT interest and choice model has been tested with diverse ethnic samples, the sample populations were mainly drawn from North American universities. An extensive literature search in different academic journals such as Journal of Vocational Behavior, Journal of Career Development, Career Development Quarterly, Journal of Career Assessment, and Journal of Counselling Psychology, and in search engines such as Web of Science and EBSCO Host, returned very few relevant studies that used the SCCT model in samples from non-Western, specifically from Asian, developing countries. With an exception of one study by Lent et al. (2003), the following section discusses few studies that have used international samples mainly from non-Western contexts with emphasize on Asian and developing countries.

Lent et al. (2003) examined 796 Italian high school students to test SCCT's interest and choice model in relation to Holland's (1997) six interest types (RIASEC: Realistic, Investigative, Artistic, Social, Enterprising, Conventional). The study found support for the basic hypotheses. Self-efficacy was related to interest both directly and indirectly through outcome expectations; and interest, in turn, predicted choice of occupation for all six types. Contrary to SCCT's (Lent et al., 2000) prediction, neither social support nor barriers had any direct effect on choice goals. The authors suggested that because respondents were high school students and not actively involved in career decision making, they may have been unable to comprehend the significance of proximal support and barriers. One other explanation can be that individuals living in societies with

individualistic orientations like to pursue occupations that interest them rather than seeking or avoiding occupations that have the approval or disapproval of significant others. This aspect of culture is somewhat invisible in the SCCT literature and warrants further attention. Although there were no direct effects, the relationships between social support and choice goals for all themes were mediated through self-efficacy; and the relationships between social barriers and choice goals for two themes were mediated through self-efficacy. This pattern of findings suggested that the primary purpose of support is likely to inform self-efficacy beliefs rather than to promote or avoid a particular choice option. As the relationship between barriers and self-efficacy was not significant, the authors suggested that the perception of support may have neutralized the effect of barriers. This study validated the predictive utility of the core hypotheses of the interest and choice model, however, findings related to supports and barriers suggested that proximal support and barriers may play differing roles in the choice formation process depending on the context and career development stages of the respondents. These findings warrant further research on how environmental factors promote or lower career choice intentions and pursuit.

In another study, Song and Chathoth (2008) tested a partial SCCT model of interest and choice in 660 fourth year Chinese undergraduate students to predict intentions to pursue a career in the tourism and hospitality industry. The study explored the influence of interest, contextual support, and contextual barriers on choice goals and was supportive of SCCT's hypothesis that people will aspire to enter careers that are consistent with their occupational interests. Contrary to the findings of Lent et al. (2003) with Italian students, this study found direct effects of family and social support on

choice goals suggesting that environmental support played an important role especially for people in collectivist cultures who value personal relationships. The study also found particular types of barriers, such as a lack of English language and computer skills, and discrimination, to have a direct influence on intention. This validated SCCT's hypothesis (Lent et al., 2000) that proximal barriers become more influential in active decision making phases.

In a Bangladeshi study, Saifuddin et al. (2013) used a SCCT choice model to investigate persistence in engineering programs in a sample of 849 undergraduate engineering students. The study found general support for SCCT's core constructs of engineering self-efficacy and career aspirations in predicting persistence. Despite being tested in the collectivist culture of Bangladesh, social support (parent, teacher, and family) and contextual support (supportive learning environment) variables did not have any direct effects on persistence. However, supportive learning environment did have an indirect effect on persistence mediated through self-efficacy. One explanation offered by the authors was, in Bangladesh, engineering majors are viewed as extremely prestigious and admission is highly competitive, thus students who get admission in such majors continue with the program regardless of the supports they receive from family and friends. The presence of a supportive learning environment did help the students to become more confident in their abilities which, in turn, had an impact on persistence. The study did not measure contextual barriers and hence it is difficult to comprehend how the influence of support could have been different in the presence of barriers. The study also looked at gender differences and found that some SCCT predictors have differential validity for women and men. Specifically, personal aspirations and engineering self-

efficacy were more strongly related to persistence for men than for women. The model only explained 12% of the variance for female persistence compared to 19% for male persistence. It is likely that persistence in the program is influenced by other contextual variables not considered in this study, particularly for women. Overall, consistent with social cognitive framework, engineering self-efficacy was found to be the most important predictor of persistence in this study.

Arulmani et al. (2003), in an Indian sample of high school students, tested the influence of socio-economic status on student's self-efficacy and subsequent career beliefs. Their finding was consistent with SCCT's hypothesis that background individual difference variables (e.g., socio-economic status) influence the learning experiences and impact the development of efficacy beliefs in adolescents and youths. Students with lower socio-economic status are more likely to be exposed to learning experiences that may reflect failure and create bitter attitudes. These disadvantaged youths then place a low value on obtaining skills and education, and enter the labour market as unskilled workers. The study lent support to SCCT's interplay between distal background influences and development of the self-efficacy beliefs and outcome expectations which shape individuals' careers.

Summing up the results, it is evident that SCCT offered a comprehensive framework to understand the development of career interest, choice, and performance that is grounded in the self-efficacy theory and is very much applicable in international contexts. Therefore, the decision to apply SCCT interest and choice model in the high-tech context in South Asia was appropriate. South Asia offered a promising platform as enrollment and participation in high-tech related domains is on the rise not only for men

but also for women. In a male-dominated occupation - high-tech - it is assumed that individuals, particularly women, who intend to pursue careers must first develop strong beliefs about their ability to perform (self-efficacy) and strong beliefs that their efforts will be successful (positive outcome expectations). Several person and background contextual variables may influence these beliefs. One such person variable is gender-role orientation (e.g., Fitzgerald et al., 1995; Gushue & Whitson, 2006; Ku & Watt, 2009). This person variable indirectly influences career outcome and is considered as a background distal influence, given its relative distance from actual career outcome (Lent et al., 1994). In addition to background influences, contextual variables such as gendered beliefs (e.g., Dyke et al., 2012; Küskü et al., 2007; Tatli et al., 2008) and image of the profession (Dyke et al., 2012) are proximal influences that can sway a person's decision to enter or not to enter a gendered occupation. These variables are considered proximal given their presence during active phases of educational or career decision making (Lent et al., 2000). Studies that have explored the influence of background person and proximal contextual gender-related variables in predicting career goals and development using the SCCT framework in gendered occupations, are discussed next.

2.3.2 Gender-Related Variables and SCCT

Hackett and Betz (1981) was one of the first studies that presented a conceptual framework explaining the relationship between the development of women's self-efficacy beliefs and the nature of their occupation. The conceptual framework integrated four sources of information pertinent to the development of self-efficacy (Bandura 1977a) in explaining the effects of socialization on career related self-efficacy. According

to this approach, girls are more likely to develop greater self-efficacy for feminine-typed work because of their likely involvement in traditional feminine activities, their exposure to role models who are involved in feminine jobs, greater levels of anxiety experienced by more feminine individuals, and a lack of active encouragement or discouragement for pursuit of non-feminine work. However, if a woman possessed more masculine gender-role attributes, it is likely she would be involved in more non-traditional activities, would experience less anxiety, and would express more assertiveness and dominance, which then would help her to gain experiences that develop efficacy expectations for non-traditional or male-dominated occupations.

Examining the role of gender in SCCT, Tokar, Thomson, Plaufcan, and Williams (2007) investigated the influence of person inputs in career related learning experiences across Holland's (1997) RIASEC themes. The study indicated that the person variables of personality, gender, and conformity to gender-roles each contributed to the prediction of RIASEC-based learning experiences. Drawing attention to gender-role, the study reported that a feminine role orientation was positively related to Artistic and Social learning experiences, whereas a masculine role orientation was positively related to Realistic and Enterprising learning experiences. Examining the total effects of gender on learning experiences, women reported significantly more Artistic and Social learning experiences, and men reported significantly more Realistic, Investigative, and Enterprising learning experiences. Although Tokar et al. (2007) did not categorize the learning experiences according to specific occupations, it is reasonable to argue that the Realistic and Enterprising themes cater more toward male-dominated occupations as opposed to Artistic and Social learning themes. Taken together, these findings supported

the SCCT's proposition that gender and gender-role are important background person variables that influence self-efficacy beliefs in individuals. Tokar et al.'s (2007) findings shed light on the paradoxical aspects gender-role can play in gendered occupations. One possible explanation for this paradox can be that individuals conforming to cross-gender-roles gain experience in occupations congruent to their orientation yet can be subject to gender-biased evaluations. According to West and Zimmerman (1987) the paradox refers to the social construction of gender. They argue that gender is reconstructed as a 'normative conception' such that people are aware that they will be judged according to what is appropriate feminine or masculine behavior and so they act accordingly. Therefore, even when women have more masculine orientations, they may be pushed towards feminine occupations due to others' attitudes. The converse may occur for men.

Ku and Watt (2009) investigated interest and intention to pursue a feminine occupation (teaching) in a sample of high school students from Hong Kong and Australia. As the teaching profession is gendered, the authors included gender and gender-role to examine how these variables affect their career choice. The study revealed the importance of gender-role in relation to gendered occupations. Individuals with a feminine role orientation expressed more interest in the primary teaching profession in contrast with individuals with masculine gender-roles, who expressed more interest in the secondary teaching profession, indicating feminine characteristics were seem as more important in primary teaching than in secondary teaching. The authors reasoned that students in the primary level require more nurturing, which is more aligned with femininity as opposed to the students in the secondary level who are required to develop a sense of competiveness and academic success, which are aligned with masculinity. The

study further revealed that participants who did not conform to these traditional gender-roles were likely to attempt non-traditional careers.

Taken together these studies indicate that gender-role orientation has an influence on learning experiences that help to develop self-efficacy beliefs and outcome expectations and, through self-efficacy and outcome expectations, gender-role orientation influences choice goals. In addition to gender-role, there are other proximal variables such as gendered image of the occupation that can impact an individual's decision to enter a gendered occupation. For example, Lips (1992) hypothesized that stereotypes about a profession can create an image that favors a particular role type. For example, the stereotype of scientists as asocial and task-oriented, rather than people-oriented, creates an image favoring masculine characteristics. However, such an image, can be detrimental in career choice decisions for women. The results of the study were contrary to Lip's (1992) prediction. Females and males did not differ in their perception of stereotypes; in fact males viewed scientists as more asocial than their female counterparts. Lip's hypothesized relationship between occupational image and gender, however, found support in another study by Beyer, Rynes, Perrault, Hay, and Haller (2003). Beyer et al. found that the stereotypes of computer science majors as "nerds" who are obsessed with machines and lack interest in people, created an image that was in conflict with the traditional gender-roles of women and, because individuals like to conform to their gender-roles, many women decided not to pursue such a career path.

A similar finding on the role of gender in gendered occupations was reported by Dyke et al. (2012) in a sample of 849 Bangladeshi undergraduate students. The study examined intention to pursue a high-tech career by investigating perceived job attributes,

perceptions of women's position, and media portrayal of technology professionals. Both female and male students in Bangladesh strongly agreed that high tech is a challenging and creative career and this perception played the most important role in their intention to pursue a career in this fields. However, significant gender differences were observed regarding the perceptions of high tech's suitability for women. Male respondents perceived high tech profession as less suitable for women than did female respondents. This perception amongst male students may have reinforced gender stereotypes about the profession and discouraged female students from pursuing a career in the high tech sector. Furthermore, the study revealed the greater the extent to which male students perceived the anchors and models in high-tech related media reporting and commercials were predominantly male, they were more interested in pursuing high tech careers. Media representation was non-significant for women's intentions and women engineering students also scored lower in their perceptions that media representation tended to be predominantly male. Overall, the authors suggested that gender-role stereotypes influenced the career intentions of both women and men and the stereotypes of high tech as a male domain may become, for some women and men, a self-fulfilling prophecy.

Küskü et al. (2007) investigated the factors influencing women's choice of engineering majors in Turkish education. The study found significant gender differences with regard to beliefs about gender and professional choice, women engineers, women's interest in engineering, and the suitability of the engineering profession for women. Male students in general displayed stronger beliefs that there is a link between gender and professional career choice and that, because of their aptitude and interest, men were more suitable candidates for studying engineering. Male students also held weaker beliefs in

the value of women engineers than female students. Female students displayed a weaker belief on the link between gender and professional choice and reported the absence of proper guidance and lack of opportunities as reasons for lower interest in the engineering profession among women. Overall male students displayed stronger gender prejudice regarding women in engineering. Gender prejudice was more strongly displayed by students who belonged to either male-dominated or female-dominated departments as opposed to mixed sex departments. Despite Turkey having more gender friendly societal norms than South Asia, these gendered beliefs reinforced gender stereotypes and played an important role during an active decision making phase.

In another study on gendered disadvantages, Tatli et al. (2008), on the basis of three studies with undergraduate engineering students, university professors, and banking staff, discussed the case of gendered outcomes in Turkish employment sector. Despite the high number of women in engineering programs and in professional employment, women continue to be subjected to gender bias. For example at the societal level, state policies and reforms have been successful in increasing women's representation, but at organizational and individual levels women still face barriers due to structural practices and family values. These family values are ingrained in traditional gender-roles and enacted gendered prejudice among male engineering students, male banking staff, and male university professors. On the other hand these values also created practices and policies at the workplace that favored men. Stereotypes and gender prejudice were found to negatively influence women's career interest, choice, performance, and development.

Summing up, gender-role orientation is found to strongly influence the development of self-efficacy and outcome expectations particularly when individuals

intend to pursue a gendered career. Moreover, in high-tech, which is known as a male-dominated industry, contextual factors such as the stereotypical masculine image of the occupation and gendered perceptions can affect individual's career behavior differently depending on their gender. Simply put, gender will moderate the relationships between these proximal contextual variables and intention to pursue a high tech career. It should be noted, gender may also have a mediating or moderating effect on other SCCT interest and choice model constructs; however, many of the studies examining the gender differences in SCCT's interest and choice model found the model to be invariant (e.g., Lent et al., 2005, 2008, 2011) for non-traditional domains including engineering and computing. In Bangladesh, high-tech related educational majors and careers are in high demand and it is likely more women and men will be seen participating in this sector. This study may find women and men exhibiting similar patterns in terms of social-cognitive variables as evidenced by Western samples. However, a lack of studies supporting gender differences or similarities with respect to social cognitive variables in non-Western contexts, makes it difficult to hypothesize whether social cognitive constructs will be invariant across gender in a Bangladeshi sample. Finally, the focus of this study is to validate the applicability of social cognitive career theory in a non-Western developing context for a gendered occupation. Hence, it is beyond the scope of the present study to examine the potential mediating or moderating effects of gender with respect to social cognitive model predictors. With respect to proximal gender-related variables (masculine image of high-tech professionals and gendered perceptions), however, this study argues gender will moderate the relationships and influence men and women's intention to pursue a high-tech career differently.

2.4 Chapter Summary

SCCT interest and choice model offers a strong theoretical framework to study Bangladeshi engineering students' intention to pursue a high-tech career. Empirical research has validated the core SCCT choice model where self-efficacy and outcome expectations have an impact on interest; self-efficacy and outcome expectations, and interest together predict choice goals. Further, research suggested the relationships within the core SCCT model are invariant across gender. Gender as a background person variable may however, influence the relationship between gender-role orientation and development of self-efficacy beliefs and outcome expectations. Furthermore, gender can moderate relationships between proximal contextual variables (masculine image of the high-tech professionals and gendered perceptions) and intention to pursue an occupation. To clarify these relationships, the model in the next chapter presents the core SCCT's interest and choice model followed by expanded model incorporating gender-related variables.

Chapter 3: Research Model and Hypotheses

Social cognitive career theory's (SCCT: Lent et al., 1994, 2000) interest and choice model framework was applied in this study to investigate the influence of social cognitive predictors and gender-related variables in predicting engineering students' intentions to pursue high-tech careers in a new context - Bangladesh. This chapter presents twenty-two hypotheses relating to eight key predictors. The model is presented in two parts: the first part discusses SCCT's interest and choice model and the second part discusses the expanded model that includes masculine gender-role, feminine gender-role, masculine image of the high-tech professionals, and gendered perceptions. Each section ends with a table that presents the list of hypotheses tested in the present study.

3.1 SCCT Interest and Choice Model

The SCCT's interest and choice model (Lent et al., 1994; 2000) posits that self-efficacy beliefs serve as a source of outcome expectations and, together, outcome expectations and self-efficacy beliefs give rise to interest in related activities. The theory also posits that self-efficacy and outcome expectations through direct and indirect paths (via interest) stimulate choice goals. Choice goals refer to career behaviors that can include choice of an educational major or a career field, persistence in an educational program or a career, and intention to pursue an educational major or a professional career. For the present study, choice goal referred to the intention to pursue a high-tech career. The SCCT also postulates that major choice goals will be affected by social support and social barriers and that there is interplay between social support and social

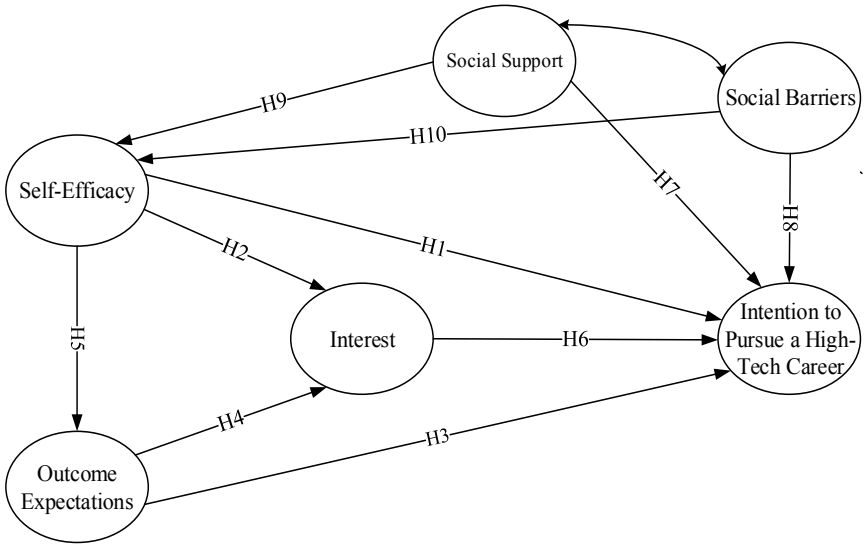
barriers (Lent et al., 2000, Lent et al., 2005). Lent et al. (2001) tested the SCCT's interest and choice model and found a better fit for a partially mediated model, where social support and barriers indirectly affected major choice goals through self-efficacy. These mediated paths of social support and barriers were part of Bandura's (1999) social cognitive model and later they were incorporated in the SCCT's interest and choice model (Lent et al., 2005, 2008, 2011). In the present study, this more recent version of SCCT's interest and choice model, as depicted in Figure 3.1, was applied. Discussion on the model's constructs (presented next) begins with the outcome variable.

3.1.1 Outcome Variable - Intention to Pursue a High-Tech Career

The outcome variable in this model is intention to pursue a high-tech career. Intention in this study referred to an individual's plan to obtain a career in the high-tech domain. In the SCCT's interest and choice model, choice goals are considered as the personal intentions in favor of some desired career behavior (Lent et al., 1994). Intentions are indicators of an individual's decision to act in order to achieve that desired outcome (Bandura, 1997; Lent et al., 1994). Intention, in essence, captures the motivational factors; they are indications of how much people are willing to try, and are planning to exercise effort, in order to perform the behavior (Azjen, 1991). Intention is a frequent outcome proposed in SCCT and has been used in numerous studies (e.g., Betz & Hackett, 1983; Betz & Voyten, 1997; Fouad & Smith, 1996; Lapan, Boggs, & Morrill, 1989; Lent et al., 1984). Different authors have used intention to measure different career outcomes for example, Betz and Voyten (1997) presented intention as a career exploratory and

Figure 3.1

SCCT's Interest and Choice Model



Note. The model is adopted from Lent et al. (2005). The number on the paths refers to the hypothesized relationship.

decision making behavior (e.g., intending to spend more time learning about careers, planning to talk to lots of people about careers), whereas Wyer, Nassar-McMillan, Schneider & Oliver-Hoyo (2010) presented intention as a career choice and pursuit behavior (e.g., having a lifelong career in science, getting experience working as scientist). In this study, intention is treated as career choice behavior (e.g., pursue a career in high-tech, apply for high-tech related job).

3.1.2 Predictor Variables Related to SCCT's Interest and Choice Model

The following section discusses the predictor variables related to the interest and choice model of SCCT.

3.1.2.1 Self-Efficacy. Self-efficacy is an extensively researched phenomenon in the social cognitive career literature. Self-efficacy refers to a person's belief in his or her ability to complete a specific task successfully (Bandura, 1977, 1986). Simply stated, self-efficacy is, "can I do this?" (Lent et al., 1994:83). According to self-efficacy theory (Bandura, 1977), efficacy beliefs influence motivational and self-regulatory processes, it influences the choices people make and the courses of action they pursue. It also helps to determine how much effort people are likely to put forward and how long they will continue in the face of difficulty. The strength of self-efficacy beliefs, that is, the person's level of confidence in his or her ability, is therefore hypothesized to influence choice and persistence of behavior. For example, a person with high self-efficacy beliefs in mathematical ability is expected to feel intrinsic motivation to solve challenging mathematical problems and is expected to exert efforts to solve the problem with an intention to master it. Conversely, a person with low self-efficacy beliefs in mathematical ability is expected to believe the mathematical problem is tougher than it really is which may demotivate, and subsequently result in avoidance of the problem or a narrow vision on how best to solve the problem. Hence, the person with high-self efficacy is expected to solve mathematical problems more successfully than a person with lower self-efficacy.

Bandura (1997) theorized four sources of self-efficacy: enactive mastery experience (person's actual successes and failures), vicarious experience (person watching a peer succeed or fail who s/he feels similar to her/him in this particular task), verbal persuasion (when significant others express faith in a person's capabilities), and physiological and affective states (amount of anxiety a person experiences while performing a specific task). These sources of efficacy information lead to the initial

development of efficacy expectations and also work together over time to influence and shape both self-efficacy and performance.

Bandura's theory that one's self-efficacy will influence career related behavior has largely been supported by extant research. Studies strongly suggest that self-efficacy significantly affects the development of core vocational choice predictors such as interest, values, and goals and subsequent career behaviors. Stronger self-efficacy beliefs lead to more interest in a given occupational area (e.g., Betz & Hackett, 1981; Lapan et al., 1989; Lent, Lopez, & Bieschke, 1991), academic achievement, persistence, and intention to pursue a career (e.g., Fouad et al., 2002; Gushue & Whitson, 2006: Lent et al., 1984). Because most people would like to attempt tasks in which they feel competent and confident, high self-efficacy is expected to motivate a person to pursue a high-tech career rather than to avoid it. Hence, the hypothesis related to self-efficacy and intention to pursue a high-tech career is:

Hypothesis 1: *Self-efficacy will be positively related to intention to pursue a high-tech career.*

According to the SCCT interest and choice model, self-efficacy beliefs also give rise to domain specific interest. The theoretical explanation for the self-efficacy to interest link is that self-efficacy serves as a motivational factor because when a person feels competent and confident about a task, s/he has an incentive to approach the task and develops interest toward the task. Empirical studies also have found self-efficacy to be predictive of vocational interest, yet many studies have raised questions about a possible

overlap of self-efficacy and interest within a similar domain (e.g., Lapan & Jingelski, 1992; Tracey, 1997) and about the unidirectional relationship between self-efficacy and interest (e.g., Nauta, Kahn, Angell, & Cantarelli, 2007; Tracey, 2002). Rottinghaus, Larson, and Borgen's (2003) meta-analysis considered sixty empirical studies on the relationship between self-efficacy and interest. Rottinghaus et al. found that, self-efficacy and interest are independent constructs that correlated moderately. Further, the finding that self-efficacy and interest are distinct constructs held firm for gendered occupations such as engineering or nursing compared to generalized domains such as art or science. These findings therefore refute the possibility of overlap between efficacy beliefs and interest in high-tech domain. Regarding the directionality between self-efficacy and interest, past research has found self-efficacy as a precursor of interest (e.g., Lent et al., 1994; Betz & Hackett, 1981). Yet, Nauta et al. suggested that there may be a bidirectional relationship between self-efficacy and interest i.e. not only that self-efficacy predicts interest, but that interest may also predict changes in self-efficacy. When testing for reciprocal relations, Nauta et al. found a stronger efficacy-interest pathway than interest-efficacy pathway. Likewise, Lent, Sheu, Gloster &Wilkins' (2010) longitudinal study offered better support for a unidirectional flow from self-efficacy to interest than for bidirectional relations between these two variables. Taken together it can be argued that self-efficacy and interest are distinct constructs and self-efficacy is a precursor of interest. People develop enduring interest in activities in which they view themselves to be efficacious. Therefore, the hypothesis related to self-efficacy and interest is:

Hypothesis 2: *Self-efficacy will be positively related to interest for intention to pursue a high-tech career.*

3.1.2.2 Outcome Expectations. According to Bandura (1986), outcome expectations are judgments an individual makes of the likely consequence a particular behavior will produce. Simply stated, outcome expectations are "If I do this, what will happen?" (Lent et al., 1994:83). Outcome expectations are distinct from the concept of self-efficacy. In essence, outcome expectations are beliefs about the consequences of a behavior, whereas self-efficacy is a belief concerning the ability to perform a behavior (Hackett & Betz, 1981).

Bandura (1977) described three forms of outcome expectations noting that positive outcomes in each area may work as incentives, whereas negative outcomes may work as disincentives, to continue that behavior. The first form is physical outcomes that include physical sensations such as pleasure or pain as well as financial outcomes such as an attractive salary. The second form is social outcomes that include social reactions such as approval, respect, and rejection. The third form is self-evaluative outcomes that may take the form of self-satisfaction or self-criticism. Bandura (1977a) argued that outcome expectations are dependent on self-efficacy beliefs and are therefore based on the same four sources of information: enactive mastery experience, vicarious experience, verbal persuasion, and physiological and affective states. Lent et al. (1994) found support for the hypothesized relation of self-efficacy to outcome expectations, particularly when outcomes are closely linked to the quality of one's performance. Lent et al. (1994) suggested, however, that outcome expectations may make a unique contribution to career behavior if the outcomes expected are not as strongly linked to quality of performance. For example, self-efficacy is presumed to predict intention to pursue a high-tech career more strongly than outcome expectations. But if a person expects negative outcomes

(e.g., lack of work-family balance) from entering a high-tech career, despite having high self-efficacy, the person may decide not to pursue that career path. Outcome expectations are also considered to be motivational factors and are likely to incorporate both expectancy and valence, that is, outcome expectations are likely to influence behavior when a person estimates that certain behaviors will produce an outcome and that outcome holds value to the person. For example, individuals may pursue a career in the high-tech sector if they expect the high-tech career will bring a good income and earning a good income is important to them.

Outcome expectations have been found to predict interest and choice goals (e.g., Byars-Winston et al., 2010; Kahn, 2001; Lent et al., 1994; Lopez, Lent, Brown, & Gore, 1997).Yet outcome expectations have received less attention than self-efficacy in the social cognitive career literature (Fouad & Guillen, 2006). For example, studies can be found that have examined empirically the relationship between self-efficacy and interest (e.g., Betz & Hackett, 1997; Nauta et al., 2002; Silvia, 2003) and self-efficacy and choice goal (e.g., Lent et al., 1991; Marra & Bogue, 2006; Niemivirta & Tapola, 2007), but only one study was found that focused exclusively on testing the relationship between outcome expectations and two other relevant social cognitive constructs - interest and choice goals (Diegelman & Subich, 2001). Several studies that have tested SCCT's interest and choice model (Lent et al., 2005, 2008, 2011), however, have found generally good support for the hypotheses related to outcome expectations and other social cognitive variables in the model (e.g., Fouad & Smith, 1996; Brown, Tramayne, Hoxha, Telander, Fay & Lent, 2008; Lent et al., 1994, 2005).

According to Lent et al. (1994), the basic hypotheses related to outcome expectations suggest a positive relationship between positive outcome expectations and interest, between positive outcome expectations and choice goal, and between positive outcome expectations and self-efficacy. Furthermore SCCT hypothesized and validated that self-efficacy and positive outcome expectations would account for more variance in vocational interest and choice goals than either self-efficacy or outcome expectations would account for alone.

Empirical results between outcome expectations and other social cognitive constructs provide support to Lent et al.'s (1994) outcome expectations hypotheses. Byars-Winston et al. (2010) examined academic interest and persistence among racially diverse undergraduate students from two groups. In agreement with SCCT propositions, a direct relationship was found between academic self-efficacy and outcome expectations. The study also revealed significant relationships between outcome expectations and persistence, between outcome expectations and academic interest, and between self-efficacy and interest. The authors noted that,

> "…the independent contribution of outcome expectations to goals in this study is due partly to the facilitative path from self-efficacy to outcome expectations. Thus, the physical, social, and self-evaluative consequences believed to flow from math/science goal attainment independently foster interest in and goals toward earning a STEM[1] degree, enhanced by the indirect effect of math/science self-efficacy beliefs" (p. 213).

Fouad and Smith (1996) also found support for SCCT's interest and choice model for middle school students. They found strong positive paths between self-efficacy and outcome expectations and outcome expectations and intention to pursue math and science

[1] STEM refers to science, technology, engineering, and mathematics.

majors. The result also suggested that the influence of self-efficacy on intentions is less due to the direct path and more to the indirect path through outcome expectations.

Lent, Lopez, and Bieschke (1993) in a study predicting mathematics-related choice and success behavior found that besides self-efficacy, outcome expectations made contribution and explained additional variance in both the interest and choice and outcome expectations moderated the relationship of self-efficacy to choice. That means, outcome expectations independently contributed to the prediction of interest and choice goals and individuals with high positive outcome expectations evinced stronger self-efficacy to choice correlations than individuals with low positive outcome expectations. This study further suggested that a combination of self-efficacy and outcome expectations predicted interest and choice goals better than does self-efficacy alone.

As demonstrated by the previous research and consistent with SCCT's interest and choice model, outcome expectations is a motivational variable. If an individual perceives achieving positive outcomes from performing a certain behavior, their interest in the behavior is expected to intensify subsequently, giving rise to performance of the behavior. Additionally, a person's belief in her or his competence in performing a task will increase their positive expectations from such task performance. On the basis of the previous discussion, and in line with SCCT's prepositions, the hypotheses related to outcome expectations are:

Hypothesis 3: *Outcome expectations will be positively related to intention to pursue a high-tech career.*

Hypothesis 4: *Outcome expectations will be positively related to interest in a high-tech career.*

Hypothesis 5*: Self-efficacy will be positively related to outcome expectations.*

3.1.2.3 *Interest*. Interest refers to patterns of likes, dislikes, and indifferences regarding career relevant activities and occupations (Lent et al., 1994). Greater interest in a particular domain leads to stronger intention to pursue a career in that domain. SCCT places high importance on interest, in fact the core of SCCT consists of self-efficacy, outcome expectations, and interest (Lent el al., 1994; 2000). According to Lent et al., self-efficacy and outcome expectations are precursors of interest. They further theorized that the level of interest a person has in a particular activity or subject area, as well as their self-efficacy for that task and the outcomes they expect for performing the task, will influence their future choice goals, specifically their intention to pursue, persist, and attain skills in a particular domain. Interest is likely to influence choice goals because intrinsic interest enhances motivation, which drives people to exert effort toward these goals. In addition to SCCT, Holland's (1985) general theory of vocational personalities also highlights the importance of interest in career choice. According to Holland's theory, people seek environments that fit their personalities along six RIASEC themes, and vocational personalities can be identified by using measures of vocational interest. A person's vocational interest can be predictive of future occupational activities and can be effectively used to guide career decision making. For example, a person with dominant artistic interest will be more inclined toward artistic occupations such as painting and interior designing.

As theorized, self-efficacy and outcome expectations are found to be strongly related to academic and career interest in multiple domains such as mathematics, engineering, computing, math and science, art, and social-sciences (e.g., Betz & Hackett,

1983; Fouad & Smith, 1996; Fouad et al., 2002; Lent et al., 2005, 2011). Yet, in studies with student samples from more collectivist cultures (Flores & O'Brien, 2002; Tang et al., 1999), interest was non-significant predictor of career choice. Leong & Gupta (2008) argued that due to cultural orientations, these students showed interest in a domain that aligned with their parents or family's interest over their own interest and therefore the individual's interest was not found predictive of one's choice goal. The possible presence of collectivist interest rather than individualistic interest is inconsistent with the SCCT's core framework of personal agency. Leong and Gupta's assertion on collectivist culture is questionable because in a study on Chinese fourth-year students, interest was found to be predictive of intention to pursue a career (Song & Chathoth, 2008). In alignment with the core premise of SCCT, it is hypothesized:

Hypothesis 6: *Interest will be positively related to intention to pursue a high-tech career.*

3.1.2.4 Social Support and Barriers. SCCT recognizes the importance of contextual determinants in predicting academic and career choice goals (e.g., Lent et al., 2000; Lent et al., 2002; Lent et al., 2003a). Lent et al. have defined contextual support and barriers as "environmental factors that persons perceive as having the potential, respectively, to aid or hinder their efforts to implement a particular educational or occupational goal" (2001: 475). In another study by Lent et al. contextual supports have been defined as "environmental variables that can facilitate the formation and pursuit of career choices" (2000: 42). Examples of support include parental support, peer support, financial support, support from mentors, etc. Career barriers, on the other hand are

defined as, “events or conditions, either within the person or in his or her environment, that make career progress difficult” (Swanson & Woitke, 1997:434). The definition indicates barriers include both intrapersonal and environmental factors. Examples of intrapersonal barriers include a sense of not fitting well with the environment, self-concept, etc. Examples of environmental barriers include discouragement from significant others such as parents, peers, teachers, etc. Lent et al., (1994, 2000) theorize that support and barriers influence individuals’ choice goals and intentions throughout their academic and career progression. High support and low barriers strengthen goals and increase the likelihood of persistence and intention to pursue a career (Lent et al., 2002). In contrast, low support and high barriers weaken choice goals and decrease the likelihood of pursuing a career. For example, a female computer science graduate who wants to pursue a high-tech career may be confronted with a hostile work environment that overtly and covertly discourages women. This environmental factor may undermine her original goal and she may shy away from pursuing a high-tech career.

Contextual determinants relate to the features of the environment that can be appraised and perceived as support and barriers. Lent et al. (1994) have placed these contextual determinants into two categories depending on when they occur within the choice process. The first type includes distal background influences (e.g., parental involvement or educational quality) that help shape self-efficacy and outcome expectations in children and adolescents. The second type includes proximal influences (e.g., actual and perceived support system, personal career network contacts, lack of financial support, or perceived disapproval) that can be particularly important during active phases of educational or career decision making (Lent et al., 2000). In other words,

these factors within educational, occupational, and social settings influence the development of academic and career choice goals (choice of major, persistence, intention to pursue a career, etc.). According to SCCT (Lent et al., 2000), proximal contextual variables are hypothesized to have direct effects on choice goals. More specifically, choice goals are hypothesized to be positively influenced by the presence of contextual support and negatively influenced by contextual barriers.

Different studies have indicated that supports are positively and barriers are negatively, related to choice goals (e.g., Flores & O`Brien, 2002; Lent et al., 2001, 2003). Flores and O`Brien (2002), testing SCCT`s interest and choice model among Mexican American adolescent women, found that parental support had a positive effect on career aspirations. Kenny, Blustein, Chaves, and Grossman's (2003) study on 9th grade urban high-school students demonstrated that perceived barriers and general perceptions of support and kinship support contributed to adolescent attitudes toward school and future career. However, the authors noted that perceived barriers were found to be less robust and consistent than the perceptions of support. Authors reasoned that perception of high support may have neutralized the effect of barriers and therefore barriers were found to be less robust. Another explanation for this finding could be that these studies used samples of adolescent students, who due to their age or career development level may not be actively involved in educational or career decision making and consequently are unable to comprehend the significance of barriers on career choice (Lent et al., 2003). The influence of contextual support and contextual barriers on choice goals has been tested in other studies with students pursuing different academic majors and with international samples and the findings were consistent with SCCT's predictions (e.g.,

Schaefers et al., 1997; Song & Chathoth, 2008). In studies conducted by Lent and colleagues (2003a, 2005), results indicated efficacy beliefs, interest congruence, supports and barriers each added significantly in predicting persistence among upper-level undergraduate engineering students.

Although empirical studies support the direct influence of contextual supports and barriers on choice goals, Bandura (1999) questions SCCT's direct effect hypothesis and argues that contextual variables will affect choice goals indirectly via their influence on self-efficacy. Bandura's assertion with proximal contextual variables suggests that high support and low barriers may inform self-efficacy and help individuals to feel more competent and confident. Stronger self-efficacy then motivates the individual to put greater effort toward her or his goal pursuits.

In order to examine the validity of Bandura's indirect path effects, Lent et al. (2001) investigated the role of contextual support and barriers in pursuit of math and science majors. They found a better fit for Bandura's (1999, 2000) indirect paths in which support and barriers directly, and indirectly through self-efficacy, influenced choice goals than Lent et al.'s (1994) direct path model. In another study, Lent et al. (2005) examined SCCT's interest and choice model in historically black and predominantly white universities and found a good fit for the overall model for both universities. Historically black university students experienced higher support compared to predominantly white university students; the groups, however, did not differ in their experience of social barriers. The study also found partial support for the direct path hypothesis in that barriers, but not supports, produced a significant, though small, direct path to goals in the full sample. This study found more support in favor of Bandura's (1999, 2000)

hypothesis that contextual variables relate to choice goals indirectly, via their linkage to self-efficacy, in contrast to SCCT's hypothesis that support and barriers should relate to choice goals directly.

Sheu, Lent, Brown, Miller & Hennessy's (2010) meta-analysis on SCCT's interest and choice model across Holland's themes provided mixed support for the view that support and barriers produced both direct paths to choice goals and indirect paths through self-efficacy and outcome expectations. The support – goal path was significant only in the Enterprising theme and the barriers – goal path was significant only in the Realistic and Investigative themes, while support and barriers were each predictive of choice goals through self-efficacy. The correlation between support and barriers was negative, as expected, across the three themes: Realistic, Investigative, and Enterprising. Due to the inconclusive findings regarding the direct and indirect paths between support and barriers and choice goals, more recent studies by Lent and his colleagues (e.g., 2005, 2008, and 2011) have included both direct and indirect path hypotheses.

The present study is focused on predicting intention to pursue a high-tech career among undergraduate engineering students. The support and barriers include immediate proximal influences such as encouragement or discouragement from family, friends and faculty, (Lent et al., 2000). Given the theoretical arguments and partial empirical support for both direct and indirect paths this research examined both theoretical paths (Bandura, 1999; Lent et al., 2000) and hypothesized that both social support and barriers relate to intention to pursue a high-tech career directly and indirectly through occupational self-efficacy as follow:

Hypothesis 7: *Social support will be positively related to intention to pursue a high-tech career.*

Hypothesis 8: *Social Barriers will be negatively related to intention to pursue a high-tech career.*

Hypothesis 9: *Self-efficacy will mediate the relationship between social support and intention to pursue a high-tech career.*

Hypothesis 10: *Self-efficacy will mediate the relationship between social barriers and intention to pursue a high-tech career.*

3.1.3 Summary of SCCT Interest and Choice Model Hypotheses

Table 3.1 lists the hypothesized relationships tested in this study with respect to SCCT predictors and intention to pursue a high-tech career.

3.2 SCCT's Interest and Choice Model and Gender-Related Variables

SCCT provides a useful framework for studying the academic and career development process. The theoretical framework acknowledges that an individual's career development process can be influenced by objective and perceived aspects of the environment, and highlights the period during which such influences may occur (Lent et al., 2000). Empirical testing of the theory has been criticized for its lack of attention to social-contextual variables (Leong & Brown, 1995; Leung, 1995). Given opposing trends of women's participation in engineering and technology majors

Table 3.1

Hypotheses for SCCT's Interest and Choice Model

No.	*Hypothesis*
H1	Self-efficacy will be positively related to intention to pursue a high-tech career.
H2	Self-efficacy will be positively related to interest for intention to pursue a high-tech career.
H3	Outcome expectations will be positively related to intention to pursue a high-tech career.
H4	Outcome expectations will be positively related to interest in a high-tech career.
H5	Self-efficacy will be positively related to outcome expectations.
H6	Interest will be positively related to intention to pursue a high-tech career.
H7	Social support will be positively related to intention to pursue a high-tech career.
H8	Social Barriers will be negatively related to intention to pursue a high-tech career.
H9	Self-efficacy will mediate the relationship between social support and intention to pursue a high-tech career.
H10	Self-efficacy will mediate the relationship between social barriers and intention to pursue a high-tech career.

that is decreasing in North America (Canada and the USA) and increasing in South Asia (e.g., India and Bangladesh), the present study empirically tested the influence of background person and proximal contextual gender-related variables on engineering students intention to pursue high-tech careers. As per the SCCT framework, person and contextual influences are divided into two categories depending on their relative proximity to career choice-making process. The first category is distal and the second category is proximal. The distal, background variables affect individual's learning experiences through which career relevant efficacy beliefs and outcome expectations develop. On the other hand, proximal, contextual variables affect individual's career

outcomes directly. As, high-tech occupations are gendered, this study incorporated both background person and proximal, contextual variables within the SCCT framework to predict engineering students' intention to pursue high-tech careers.

One of the important background person variables is gender-role orientation. According to Hackett and Betz (1981), the development of self-efficacy beliefs for male-dominated occupations like high-tech is likely to be influenced by gender-role orientation. Because self-efficacy beliefs and outcome expectations both are informed by the same sources (Bandura, 1986), gender-role orientation also contributes to the development of outcome expectations necessary to pursue a high-tech career. Gender-role orientation is important for understanding men and women's career choices especially for women. Most of the research using a SCCT framework in predicting women's interest and career choices has treated gender from a biological sex perspective. Treating gender as 'sex' is problematic because it makes a uniformity assumption that all men are the same or all women are the same. In order to investigate intentions to pursue a gendered occupation like a high-tech, it is important to examine the socio-psychological dimension of gender-role (Bem, 1974, 1993; Spence & Helmreich, 1978). Incorporating gender-role in the research model of the present study allows the direct influence of gender-role on the development of self-efficacy beliefs and outcome expectations to be studied, to guard against the uniformity assumption, and to understand the indirect impact of gender-role on interest and intention to pursue a high-tech career.

Other contextual variables related to gender, such as masculine image of the high-tech professionals and gendered perceptions about high-tech, may influence female engineering students to avoid high-tech careers but may not have the same effect on male

engineering students. The stereotypes about high-tech professionals as boring and nerdy (Ahuja, 2002), coupled with more men participating as anchors, models, and experts in high-tech related programs and product or service advertisements, creates a masculine image of high-tech professionals. This masculine image may go against the social norms and identity of women and therefore demotivate women from pursuing gender incongruent occupations. Also, gendered perceptions (i.e. beliefs held by men and women about the place of gender in engineering and technology professions) can further reinforce gender stereotypes and discourage women from entering such careers (Küskü et al., 2007). To date, the masculine image of high-tech professionals and gendered perceptions have not been tested to predict career intention using the SCCT framework of interest and choice. Therefore, the present study incorporated these two independent variables. It is argued that beyond personal agency men and women can be directly swayed in their intentions due to the presence of such gender-related variables during the active career decision making phase.

Summing up, three new independent variables are added to the existing SCCT's interest and choice model to predict intention to pursue a high-tech career. According to this expanded model (Figure 3.2), in a challenging male-dominated occupation like high-tech it is assumed that gender-role orientation of masculinity and femininity as a background person variable influences the development of self-efficacy beliefs and outcome expectations. Strong beliefs about their ability to perform (self-efficacy) and strong beliefs that their efforts will be successful (positive outcome expectations), will be instrumental in predicting intentions. However, beyond self-efficacy beliefs and outcome expectations, proximal contextual variables - masculine image of the high-tech

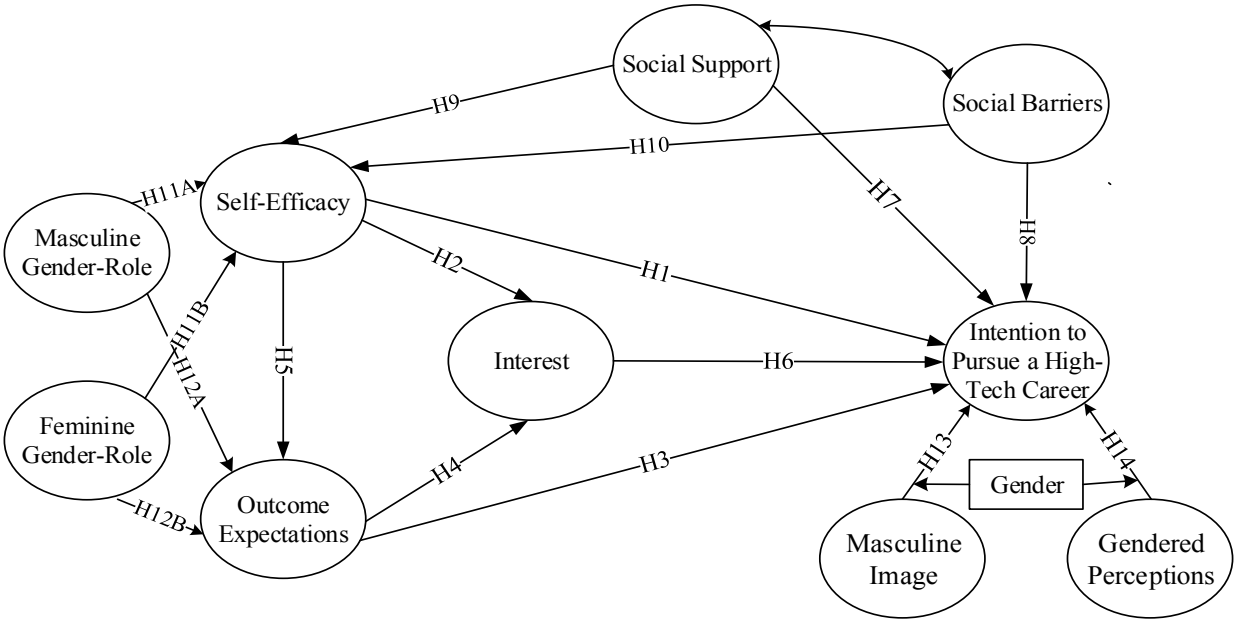
professionals and gendered perceptions - can influence men's and women's decision to enter a gendered occupation differently.

3.2.1 Gender-Related Variable.

The following section discusses the distal, background and proximal, contextual variables that are added to SCCT's interest and choice model to elaborate on the role of gender-related variables and the subsequent hypothesized relationships tested in the present study. This expanded research model is illustrated in Figure 3.2.

Figure 3.2

SCCT's Interest and Choice Model and Gender-Related Variables



Note. The number on the paths refers to the hypothesized relationship.

3.2.1.1 <u>*Gender-role*</u>. Gender-role is a socio-psychological dimension that reflects differences in personality orientation. According to Bem (1974, 1993), every person

possesses both stereotypically masculine and stereotypically feminine traits to varying degrees. Masculine traits include characteristics such as assertiveness, aggressiveness, competitiveness, and independence. Feminine traits include characteristics such as compassionate, gentle, sympathetic, and loyal. Masculine traits are characterized as agentic-instrumental and feminine traits are characterized as expressive-communal. These masculine and feminine traits reflect the characteristics people traditionally associate with the personalities of men and women, respectively. Individuals do not necessarily adhere to the traditional personality ascribed to their biological sex; rather they assume independent combinations of both masculinity and femininity. Bem identified four categories of gender-role orientations for individuals: masculine (high in instrumental and low in expressive traits); feminine (high in expressive and low in instrumental traits); androgynous (high in both traits); and undifferentiated (low in both traits). Instead of identifying men and women on the basis of their biological sex, gender-role is reconstructed as two continua within which men and women may assume more or less masculine or feminine characteristics or behavior (Schneidhofer, Schiffinger, & Mayrhofer, 2010). Although, individuals vary in their degree of masculinity and femininity, social role theory (Eagly, Wood, & Diekman, 2000) suggests that the sexual division of labor (e.g., women engage in more nurturing work, such as nursing while men engage in more agentic work, such as engineering), creates normative pressures to conform to traditional roles. Consequently women may portray themselves as less agentic and more expressive than men (more feminine) and men may portray themselves as more agentic and less expressive than women (more masculine) thus producing gender differentiated behavior. While sex differences have been commonly explored in the

career choice and intention literature (e.g., Betz & Hackett, 1981; Fouad et al., 2002; Lent et al., 2008), only a few studies have explored the impact of gender-role on career choices (e.g., Gushue & Whitson 2006; Mahalik, Perry, Coonerty-Femiano, Catraio, & Land, 2006; O'Brien & Fassinger, 1993; Tokar et al., 2007).

Tokar et al. (2007) examined personality, gender, and conformity to gender-role as antecedents to career-related learning experiences for each of Holland's (1997) six career themes RIASEC: Realistic, Investigative, Artistic, Social, Enterprising, and Conventional. They found that women reported significantly more Artistic and Social learning experiences, and men reported significantly more Realistic, Investigative, and Enterprising learning experiences. Furthermore, conformity to masculine role norms related positively to Realistic and Enterprising learning experiences and inversely to Social learning experiences. Although Tokar et al. (2007) did not categorize the six themes of learning experiences according to specific occupations, it is reasonable to expect that engineering and technology fall under the Realistic and Investigative themes. As learning experiences inform self-efficacy and outcome expectations in SCCT, these findings support the notion that gender and gender-role are critical person inputs that can influence the SCCT's interest and choice model through self-efficacy and outcome expectations (Lent et al., 1994).

In another study, Gushue and Whitson (2006) investigated 'gender-role attitude' and 'ethnic identity' within the framework of SCCT and found that higher non-traditional gender-role attitudes and higher ethnic identity influenced career decision making self-efficacy to pursue a non-traditional career. Studies have shown consistently women with non-traditional gender-role attitudes have higher levels of career orientation, aspirations,

and expectations, compared to women with traditional gender-role attitudes (Fitzgerald et al., 1995; McWhirter, Hackett, & Bandalos, 1998; O'Brien & Fassinger, 1993).

Discussing the biasing effects of gender-role socialization, Hackett and Betz (1981) have suggested that boys and girls develop abilities and self-efficacy at tasks that are more gender appropriate and pursue careers accordingly. Specifically, girls would develop abilities and self-efficacy at tasks that are more feminine in nature and boys would develop abilities and self-efficacy at tasks that are more masculine in nature. Therefore, the girls who would like to pursue a non-traditional career need to align more with masculine roles as opposed to feminine roles. Because of the male-dominated nature of high-tech careers (e.g., Adya & Kaiser, 2005; Ahuza, 2002; Snir et al. 2009; von Hellens, et al., 2004), prevalent stereotypes, and gender-role socialization biases, in the present study it is hypothesized that individuals who intend to pursue a high-tech career would score higher on the masculinity dimension and lower on the femininity dimension. As understood by SCCT's interest and choice model, gender-role can be an important background person variable that influences self-efficacy and outcome expectations and subsequently (through self-efficacy and outcome expectations) gender-role orientation will influence other social cognitive variables of interest and choice goals. This study, however, is interested in testing the direct hypothesized paths as follow:

Hypothesis 11A*: Masculine gender-role will be positively related to self-efficacy in the high-tech sector.*

Hypothesis 11B: *Feminine gender-role will be negatively related to self-efficacy in the high-tech sector.*

Hypothesis 12A: *Masculine gender-role will be positively related to outcome-expectations in the high-tech sector.*

Hypothesis 12B*: Feminine gender-role will be negatively related to outcome-expectations in the high-tech sector.*

*3.2.1.2 Masculine image of the high-tech professionals***.** The SCCT interest and choice model postulates that apart from environmental variables, other proximal contextual influences can impact individuals' career choices. The image of the professional can be one such proximal factor. Image can be understood as the associations individuals have in their minds about the professionals. Image about professionals has included personality and stereotypes that are both positive and negative (Wyer, 2003). Although some research has been done on the image of scientists and engineers (Krajkovich & Smith, 1982; Wyer, 2003) and how it influenced academic choices (Lips, 1992) or intention behavior (Wyer, 2003); no research has been done on the image of high-tech professionals and its impact on intention to pursue a high-tech career or a more broadly-based technology career.

Wyer (2003) found that a positive image of scientists and engineers was the only factor that was a consistent predictor of three measures of persistence – intention to continue with the undergraduate major, intention to pursue a graduate degree, and intention to pursue a career in science and engineering. Carter (2006), investigating students' interest in pursuing a computer science major, found that two of the major causes cited for not being interested in the major were the perception of 'sitting in front of computers the whole day' and 'not being people oriented.' Extant research has also shown that in the case of the high-tech profession, the industry and professionals traditionally project a macho image – boring, rigorous, and technical in approach (Snir et al., 2009; von Hellens et al., 2004). von Hellens and Neilson (2001) found that both boys

and girls felt that such an image of high-tech professionals may lead to greater interest in computing amongst boys than girls.

von Hellens, Pringle, Neilsen, and Greenhill (2000) suggested that high-tech professionals, such as information technology or computer science professionals, are typically viewed as nerdy. Such views may further accentuate the image of the high-tech profession and professionals as difficult, boring, and uncool, and such an image may discourage individuals, especially females, from pursuing high-tech careers (von Hellens et al., 2004). The image of professionals is further reinforced by the media. The gendered representation of the high-tech profession in the media has been identified as one of the root societal causes that influence recruitment and retention of students in non-traditional careers for women (Reha, Lufkin, & Harrison, 2009). Adya and Kaiser (2005) have also suggested that the media often promotes gender stereotypes by showcasing men and women differently. Women's representation in media is often in relation to fashion, motherhood, sex, and relationships, whereas men's representation is often in relation to power, knowledge, and technology. Such gendered representation in the media further accentuates gender stereotypes and does little to encourage women to pursue professional, technological careers. For example, Na (2001) reported very few pictures of women appear in computer magazines and computer related textbooks. These few pictures often portray women in a stereotypically passive role rather than as active technology users (Brownell, 1992). For example, a man is seen fixing a computer while a woman is standing next to the man holding tools. Furnham and Mak's (1999) review of television advertisements in Asia, Australia, Europe, North America, and South America indicated that gender stereotypes are pervasive in the global media and hence suggested

providing programs that build positive images about women in non-traditional professions. Dyke et al. (2012), in a sample of 849 engineering students, found that male students' intention to pursue a high-tech career was influenced by the presence of male anchors, male experts, and male models in high-tech related media reporting and commercials; however, such an influence was not found for female students. One possibility is very few women might have been portrayed in media in active tech roles and therefore such scanty portrayals did not have influential effects on female students' intention to pursue a high-tech career. When an industry is portrayed and perceived as masculine, women may find it difficult to reconcile the image of the profession with their own self-image. Furthermore, women may fear that others will perceive them negatively for engaging in a profession that undermines their femininity (West & Zimmerman, 1997). Thus, it is argued that the hypothesized relationship between masculine image and intention to pursue a high-tech career is moderated by gender such that:

Hypothesis 13A: *A masculine image of high-tech professionals will be negatively related to intention to pursue a high-tech career for female students.*

Hypothesis 13B: *A masculine image of high-tech professionals will be positively related to intention to pursue a high-tech career for male students.*

*3.2.1.3 Gendered Perceptions***.** In addition to masculine image, another proximal contextual variable that can influence intention to pursue a high-tech career is gendered perceptions about high-tech domain, especially for women students (von Hellens et al., 2004). Female students' interest in pursuing a high-tech career may diminish if they have negative perceptions of the domain. The notion of gendered perceptions is distinct from

industry image. Gendered perceptions are beliefs that men and women hold about the place of gender in engineering and technology professions. They constitute knowledge of both the common and subtle barriers that await women in engineering and technology professions that can impede career choices (Küskü et al., 2007). These barriers refer to events or conditions that exist within the person, or in his or her environment, due to the person's gender (Swanson & Woitke, 1997) whereas, image refers to the mental picture a person may have about the profession and the professionals.

Küskü et al. (2007) revealed that gendered perceptions have an impact on professional career choice and intention behaviors. The authors further noted that these deeply seated beliefs "tacitly condemn women to traditional roles" (Küskü et al., 2007: 27). In another study, Tatli et al. (2008) noted that the number of women in gendered occupations such as engineering has substantially increased in Turkey, yet gender prejudice prevailed as these professional women had to shoulder a larger share of domestic responsibilities. Tatli et al., note, these dual responsibilities in professional and domestic spheres, "erect barriers that jeopardize their efforts at sustaining a balance of work and life demands" (2008:294). Both male and female students hold positive opinions about the profession, which reflects the social image of the profession in Turkey, but male students expressed stronger opinions about gender and occupational preference compared to female students. Male students reported lower support for the idea that there are successful women engineers, and that engineering is a suitable career for women. These results provided preliminary evidence that, although female students may graduate with high-tech related majors, gendered perceptions may lessen their intentions to pursue such a career path. Dyke et al. (2012) also found that perceptions about the unsuitability of high-tech careers for women had a dampening effect on women's intentions to pursue a

high-tech profession but not on those of men. Hence gendered perceptions may reinforce gender stereotypes and make women shy away from pursuing high-tech careers. Hypotheses related to gendered perceptions and intentions to pursue a high-tech career tested in this research argue that biological sex would moderate the relationships. The hypotheses are as follow:

Hypothesis 14A. *Gendered perceptions about the high-tech sector and intention to pursue a high-tech career will be negatively related for female students*

Hypothesis 14B. *Gendered perceptions about the high-tech sector and intention to pursue a high-tech career will be unrelated for male students.*

3.2.2 Summary of Gender-Related Hypotheses

The hypothesized relationships between gender-related variables and outcome variable are listed in Table 3.2 for ease of reference.

3.3 Chapter Summary

Building on SCCT's interest and choice model, an expanded model for engineering students in Bangladesh is tested in this research. According to this research model, background person, core person, environmental, and gender-related contextual variables together would predict intention to pursue a high-tech career among engineering undergraduate students. The methodology to test these relationships and measures are discussed in detail in the next chapter.

Table 3.2

Hypotheses Related to SCCT's Interest and Choice Model and Gender-Related Variables

Number	***Hypothesis***
H11 A	Masculine gender-role will be positively related to self-efficacy for intention to pursue a high-tech career.
H11 B	Feminine gender-role will be negatively related to self-efficacy for intention to pursue a high-tech career.
H12 A	Masculine gender-role will be positively related to outcome-expectations for intention to pursue a high-tech career.
H12 B	Feminine gender-role will be negatively related to outcome-expectations for intention to pursue a high-tech career.
H13 A	A masculine image of high-tech professionals will be negatively related to intention to pursue a high-tech career for female students.
H13 B	A masculine image of high-tech professionals will be positively related to intention to pursue a high-tech career for male students.
H14 A	Gendered perceptions about the high-tech sector and intention to pursue a high-tech career will be negatively related for female students
H14 B	Gendered perceptions about the high-tech sector and intention to pursue a high-tech career will be unrelated for male students.

Chapter 4: Method

This chapter begins with an introduction on methodology that explains the procedure used in data collection including information about participants' recruitment and survey completion. In the next section, survey measures are discussed that give specifics about the source of the instrument, reliability, and item examples. The subsequent section presents details on data preparation including data screening and missing values. The chapter ends with a general overview about the participants' demographics.

4.1 Methodology

4.1.1 Procedures

This study involved a new questionnaire administered to a sample of undergraduate students who were pursuing engineering or other high-tech related majors such as computer science, information systems, information technology, and telecommunications in Bangladeshi universities. The questionnaire was specifically designed to collect data on social-cognitive career and contextual variables as identified in the model presented in Chapter 3 of this thesis and to gather demographic information about the participants.

Relevant faculty members from some of the Bangladeshi universities were contacted earlier with the request to give access to their classes in order to administer questionnaires to students in their classrooms. The faculty members who expressed their

willingness to participate were given contact information for a local researcher who is also a senior lecturer in a private university in Dhaka, Bangladesh and who agreed to collect the data on the author's behalf. The Bangladeshi researcher then coordinated with the respective faculty members to set the times and dates for survey administration during the period of January - April 2014.

On the scheduled date, the local researcher went to undergraduate classes in the presence of the respective faculty. The faculty member introduced the researcher and briefly explained the purpose of the study and left the classroom. The local researcher invited the students to participate in the study by reading the verbal script (Appendix 1) and distributed the survey packages. Each survey package contained an information sheet, questionnaire, and an envelope. The survey took about 35 minutes to complete.

4.1.1.1 Information Sheet. The information sheet (Appendix 2) contained details on the purpose of the study, the risks and benefits involved in participation, and the rights of participants. It also informed participants that participation was voluntary and the information obtained from the study would remain confidential as only aggregated data would be reported.

4.1.1.2 Survey Participation. Participants were asked to complete the questionnaire (Appendix 3) in the class and return it in the sealed envelope. An announcement was made that participation was voluntary and student should return the questionnaire in a sealed envelope to the researcher whether it is complete, partially complete, or blank. All the sealed envelopes were collected by the local researcher in

each class. Since the information sheet addressed all of the issues that are typically raised in informed consent and debriefing forms, no consent forms were provided. Moreover, following common practice in survey research, the completion and return of the survey were taken to imply the consent of participants (Dillman, 2000). Therefore, no signature from participants was required.

4.1.2 Sampling Method and Sample Size

The overall sample was a 'sample of convenience' drawn from twelve universities located in three Bangladeshi cities - Dhaka, Khulna, and Sylhet. Convenience sampling is appropriate in cross-sectional data collection particularly when there are no accurate or accessible lists of the total population available (Lonner & Berry, 1986). Examples of universities that participated include "Bangladesh University of Engineering and Technology (BUET)," "Khulna University of Engineering and Technology (KUET)," "BRAC University," and "North-South University (NSU)." A complete list of universities is provided in Appendix 4. A total of 2,248 surveys were distributed in 54 different engineering undergraduate classes. Since all distributed surveys were collected in sealed envelopes, the local researcher sorted out the ones that were either blank or partially completed. From the collected questionnaires, 1,021 surveys were found to be usable through manual screening by the local researcher in Bangladesh and were mailed to the researcher of the present study.

Sample size was an important criterion for the present study, because the goal was to use structural equation modelling (SEM) in estimating the hypothesized model. For SEM, an adequate sample size is necessary to ensure the stability of parameter estimates

(Schreiber, Nora, Stage, Barlow, & King, 2006). As a general rule of thumb, a minimum threshold of 200 participants is needed to run SEM models. According to the suggestions of Garver and Mentzer (1999) and Hoe (2008) for one-sample analysis, 10 participants for every estimated parameter are sufficient. According to the hypothesized model there are 16 regressions, 2 covariance, and 16 variances to be specified, totaling 34 parameters that need to be estimated. Hence, if 10 participants for each estimated parameters are obtained, the required sample size would be 340. The sample size of 1,021 participants significantly exceeded minimum threshold of 200 as well as the threshold of 340 for stable parameter estimation.

4.2 Measures

The questionnaire was designed to measure gender-role orientation, social-cognitive, environmental, and proximal contextual variables as identified in the hypothesized model, as well as to gather demographic information about the participants. Some of the measures used pre-existing validated scales like gender-role orientation and occupational self-efficacy, while some other measures, social-cognitive and environmental variables, such as technology self-efficacy, outcome expectations, interest, and social support and barriers used modified scales. This study was based on a new context, Bangladesh, and therefore the scale development for proximal contextual variables was exploratory in nature and included sub-scales. The sub-scales were developed incorporating a mix of existing scales and newly developed scale items. In order to modify and develop measures, an extensive literature review was undertaken to

gain an understanding of what the constructs represent (Hinkin, 1998; Schwab, 1980). The literature review also helped in identifying existing scales that were statistically validated in previous studies or were part of qualitative studies. The thorough literature review was useful in understanding how well the existing scales relate to the new context. In the event, where there was some misfit between the existing scales and the context, scales were modified. In instances where no sound measures were found, items were generated from qualitative studies and through brainstorming sessions between the author and thesis supervisor. Details on each measure are presented below. The order in which they appear is: outcome variable, predictor variables, and control variables.

4.2.1 Intention to Pursue a High-Tech Career

Intention to pursue a high-tech career scale was an eight-item scale. Four items were adopted from Wyer et al. (2010) career intentions in science (CIS) scale and four items were newly developed for this study. The CIS is a 12-item scale with a reliability coefficient of 0.98. Six items from the original scale were dropped because they reflected intention to pursue an advanced academic degree in science and two items were additionally cut because of redundancy in the items. The remaining four items were re-worded to suit the high-tech context. Four new items were also added to the list to better reflect students' intention to work in a high-tech job. The question stem for this construct read, "In your future career, how likely is it that you will:" An example of an existing item is, "…Become a high-tech professional." An example of a newly added item is, "…Apply for high-tech related jobs." Participants responded to this scale along a 7-point

scale (1 = *very unlikely* and 7 = *very likely*). Higher scores indicated stronger intentions to pursue a high-tech career.

4.2.2. Self-Efficacy

This study collected data on two measures of self-efficacy: technology self-efficacy and occupational self-efficacy. According to Lent and Brown (2006), self-efficacy can reside on a continuum from most general at one end to more specific on the other. Because the dependent variable is intention to pursue a high-tech occupation, technology self-efficacy was appropriate as a domain specific measure. Lent and Brown, however, note that sometimes there is a risk of studying self-efficacy at a domain specific level because the domain specific measure may sound "theoretically interesting" but there is a possibility that it may be less relevant to "practical vocational applications" (p. 20). Hence, the authors suggest, depending on the context, it is acceptable to use self-efficacy measures with moderate level of specificity instead of high level of specificity. For example data collection for this thesis involved undergraduate engineering students' who may or may not belong to high-tech majors, yet they also responded to questions asking about their intention to pursue a high-tech occupation. In the light of this, occupational self-efficacy was a second measure on which data were collected. Occupational self-efficacy is neither too generic nor too specific and hence represents a moderate level of specificity.

4.2.2.1 Technology Self-efficacy. The technology self-efficacy scale was adopted from Compeau and Higgins (1995) ten-item computer self-efficacy scale. According to Compeau and Higgins computer self-efficacy refers to "a judgment of one's capability to

use a computer (1995:192). Reliability for the ten-item scale was reported as 0.95. The language of the scale was modified to reflect technology instead of software packages. Two items from the original scale were dropped as they seemed repetitive and therefore the technology self-efficacy was measured using an eight-item scale. The question stem for this read, "I am confident, I can complete the task/assignment using a technology:" An example of an item is, "…If I have only manuals for reference." Participants responded to this scale along a 7-point scale (1 = *no confidence at all* and 7 = *complete confidence*). Higher scores indicate higher technology self-efficacy.

4.2.2.2 Occupational Self-efficacy. A short version of Rigotti, Schyns, & Mohr's (2008) occupational self-efficacy scale with six items was used for the present study. Occupational self-efficacy referred to the competence a person feels about his or her ability to successfully fulfill the tasks involved in the job (Rigotti et al., 2008). The scale had been previously used in five countries and demonstrated good internal consistency with Cronbach's Alpha reliability coefficient ranging between 0.85 and 0.90. For the present study, the items were reworded to reflect beliefs about a future job. The question stem read, "I am confident that in pursuing my future job:" An example of an item is, "…When I will be confronted with a problem, I will usually find several solutions." Participants responded to this scale along a 7-point scale (1 = *no confidence at all* and 7 = *complete confidence*). Higher values reflect high occupational self-efficacy.

4.2.3 Outcome Expectations

Bandura (1997) had described three forms of outcome expectations noting that positive outcomes in each area may work as incentives, whereas negative outcomes may work as disincentives, to continue that behavior. The first form was material outcomes such as financial gain or loss and physical comfort or discomfort. The second form was social outcomes such as approval or disapproval. The third form was self-evaluative outcomes that may take the form of self-satisfaction or self-criticism. The items in the outcome expectations measure used by Lent et al. (2011) reflected all three forms, however they were all combined as a uni-dimensional measure and only reflected positive outcomes. Some of the recent studies involving students in computing (Lent et al., 2008; Lent et al., 2011) or introductory engineering courses (Lent et al., 2010) reported that this outcome expectations measure did not produce significant paths to interest or choice goals. The studies explaining the findings also suggested that existing outcome expectations measures may have failed to capture the forms of outcome expectations that influence interest and goals among undergraduate science, technology, engineering and mathematics (STEM) majors. The authors further elaborated that outcome expectations measures should be expanded in future research by incorporating underrepresented intrinsic values (e.g., making a contribution to others) and negative outcome expectations (e.g., lack of work-family balance) which could possibly account for additional variance and hence have stronger construct validity.

In a qualitative study by Shoffner, Newsome, & Barrio (2005) on young adolescents' outcome expectations, the authors identified two additional forms of outcome expectations – generativity and relational. The generativity form refers to giving

back to others (e.g., making a contribution) and the relational form focuses on the effect that a given behavior has on relationships (e.g., time spent in close relationships, lack of work-life balance, etc). Given the concerns expressed by Lent et al. (2011) and the additional expectations identified by Schoffner et al., (2005), this study investigated five forms of outcome expectations: career, social, personal, generativity, and lack of work-life balance. The material outcome expectation for this study included physical expectations from a future career and was referred to as career expectations. Also, the relational expectations measured lack of work-life balance and hence was called lack of work-life balance expectations.

The five sub-scales of outcome expectations consisted of twenty-two items. Ten items were from Lent et al.'s (2011), eleven item scale, one item was from Marra and Bogue (2006), and eleven items were newly developed. Lent et al.'s (2011) outcome expectations reflected only positive outcomes with a reliability coefficient of 0.93. Out of the eleven items, one item "have the right type and amount of contact with other people (i.e., "right" for you)" was dropped because undergraduate students at this stage may not have an understanding of who they have to have contact with to make the "right" connections. Marra and Bogue's (2006), engineering career outcome expectations, was a seven-item scale with a reliability coefficient of 0.84. Out of seven items, only one item "get a job where I can use my talents and creativity" was included, and the remainder of the items were discarded as they mirror similar items in Lent et al.'s (2011) measure. Among the eleven newly constructed items, two items reflected career expectations. An example is, "obtain a high paying job.' Two items related to social expectations to elaborate on respect and recognition. An example of

an item is, “earn respect from family members.” One item related to self-evaluative expectations to reflect the dimension of challenging work. An example is, “do work that I would find challenging.” Two items were included for generativity expectations and an example is, “make a contribution to society.” Finally four items, developed for this study, reflected expectations about the lack of work-life balance. An example of an item is, “work long hours.” The question stem for this scale read, “When I pursue a career, I expect to:” Participants responded to this scale along a 7-point scale (1 = *strongly disagree* and 7 = *strongly agree*). Negatively worded items for lack of work-life balance expectations were reverse coded. Thus, higher scores would indicate positive expectations.

4.2.4 Interest

Interest refers to patterns of preferences regarding career relevant activities and occupations (Lent et al., 1994). Data was collected on an interest scale with five items. Four items were from Lent et al.’s (2011) six-item scale with reliability coefficient of 0.81. Two items from the existing scale were dropped because they referred to interest in project work as opposed to technology. One new item was added that probed into an individual’s interest in using technology for task completion. The item is, “…Solving complicated technical problems.” The question stem for this scale read, “How much interest do you have in each of the following activities?” Participants responded to this scale along a 7-point scale (1 = *very low interest* and 7 = *very high interest*). Higher score indicated greater interest in the technology domain.

4.2.5 Social Support

Social support are environmental variables that assist individuals in their pursuit of educational or occupational goals (Lent et al., 2000). These supports include positive family influences, social encouragement, and access to role models or mentors. The social support measure from Lent et al. (2011) was used in this study. The original measure consisted of nine items with Cronbach's alpha of 0.86; however, for this study seven items were used. Two items were removed as they related to assistance students would like to receive from tutors or advisors in order to persist in their program. The question stem read, "In order to pursue your intended career, how likely you will:" A sample item is, "…Feel support for pursuing this field from important people in your life." Participants responded to this scale along a 7-point scale (1 = *strongly disagree* and 7 = *strongly agree*) with higher scores indicating stronger support.

4.2.6 Social Barriers

Social barriers are environmental barriers that impede individual's efforts to implement particular educational or occupational goals (Lent et al., 2001). The five-item social barriers measure from Lent et al., (2011) with Cronbach's alpha of 0.86 was used in this study. The question stem read, "In order to pursue your intended career, how likely you will:" An example of an item is, "…Receive negative comments or discouragement for choosing this field from family members." Participants responded to this scale along a 7-point scale (1 = *strongly disagree* and 7 = *strongly agree*) with higher scores indicating stronger barriers.

4.2.7 Masculine and Feminine Gender-Role Orientation

Gender-role is a socio-psychological dimension that reflects individual differences in traits associated with women and men. Instead of identifying men and women on the basis of their biological sex, the concept of gender-role suggests that men and women may assume more or less masculine or feminine characteristics or behavior (Schneidhofer et al., 2010). Individuals who score high on male-typical attributes are said to possess a masculine gender-role, whereas individuals who score high on female-typical attributes are said to possess a feminine gender-role. To measure gender-role, sixteen items from the short form of Spence and Helmreich's (1978) personal attributes questionnaire (PAQ) was used. It includes eight items for the masculinity scale and eight items for the femininity scale. According to Spence and Helmreich, the correlations between the original version scale scores and short form version scale scores for both scales were 0.93, which means that it is reliable and valid to use the short form version instead of the full version to measure gender-role. The reliability coefficients for the short form of the masculinity and femininity scales were 0.85 and .082 respectively. Each item in the masculinity and femininity scales was measured through a pair of opposite characteristics, which means that an individual cannot be both at the same time. One example is, 'very passive' at one end and 'very active' on the other end. Participants responded to items on a 5-point scale. This was the only measure that used a 5-point scale as opposed to a 7-point scale. This response format was utilized in order to compare the results with other studies using the same scale. An example of an item from the masculine gender-role scale is, "Not at all independent …Very independent." An example of an item from the feminine gender-role scale is, "Not at all emotional …Very

emotional." Items were scored 1 to 5. High scores on the masculine gender-role indicated stronger masculine traits and higher scores on the feminine gender-role indicated stronger feminine traits. Only one item on the masculine gender-role needed to be reversed to fit the scale scores.

4.2.8 Masculine Image of High-Tech Professionals

Image of high-tech for this study included two subscales, perceived stereotypes about high-tech professionals and gender representation of high-tech professionals in the media. Stereotypical perceptions about the high-tech professionals included personality and work characteristics that were both positive and negative. Gender representation in the media referred to the biological sex of the models, anchors, and experts, who feature in high-tech related product advertisements, host high-tech related television and radio shows, and participate as an expert in high-tech related programs. Image of a profession and professionals has been examined in a few studies such as, the image of science and scientists (Krajkovich & Smith, 1982) and the image of scientists and engineers (Wyer, 2003), but these scales were designed for scientists and could not be modified to fit high-tech professionals. Therefore, based on previous qualitative studies (e.g., Adya & Kaiser, 2005; Ahuja, 2002; von Hellens et al., 2000; von Hellens et al., 2004), a new scale with six items was developed to measure stereotypical perceptions about high-tech professionals. The question stem for stereotypical perceptions read, "I think people who work in high-tech…" An example of a positive item was, "…Are very intelligent." An example of a negative item was, "…Are computer geeks/nerds." As the stereotypical negative perceptions align more with the macho image of high-tech professionals (von

Hellens et al., 2004), the positively worded items were reverse coded and the higher score on stereotypical perceptions would indicate a masculine image. Participants responded to this scale along a 7-point scale (1 = *strongly disagree* and 7 = *strongly agree*).

Gender representation of high-tech professionals in the media was measured with three items. Dyke et al. (2012) had measured the same construct with four items, two items to assess male representation and two items to assess female representation on a 5 point scale (1 = *strongly disagree* and 5 = *strongly agree*). The authors treated this variable as a formative variable and did not report a reliability coefficient. For this study these four items were combined into two items, that is, instead of asking whether participants agree or disagree on the sex of the anchors and models, the items were reframed on a 7-point scale (1 = *mostly female* and 7 = *mostly male*). An example of an item is, "Anchors hosting high-tech related TV and radio shows are…" A new item, "Most of the high-tech experts featured in media are…," was added based on the recommendation of Thomas and Allen (2006). Higher scores on this dimension would indicate a masculine image.

4.2.9 Gendered Perceptions

For the purpose of this study, gendered perceptions are beliefs that men and women hold, about the place of gender in engineering and technology professions. A twenty-item scale was used to measure gendered perceptions. Out of the twenty items, sixteen items were adopted from Küskü et al. (2007) and four items were newly added. Küskü et al. developed a thirty-six item scale on beliefs about gender and engineering that resulted in ten factors. Among the ten factors, the authors found significant statistical

differences between the responses of male and female engineering students for four factors consisting of eighteen items. Küskü et al. did not report the coefficient reliability for each factor separately but reported that constructs in the scale had Cronbach's alphas between 0.65 and 0.87.

These four factors adopted from Küskü et al. (2007) were beliefs about gender and professional choice (five items), beliefs about women engineers (four items), beliefs about women's interest in engineering (five items), and beliefs about the suitability of engineering to women (four items). For the present study, the language of the scale was modified to reflect the high-tech instead of the engineering profession. One item from the 'beliefs about women engineers' scale and one item from 'beliefs about the suitability of engineering fields to women' were dropped due to repetitive content. The question stem for gendered perceptions read, "We are interested to know about your perceptions regarding gender and career. Using the scale below, please indicate the extent to which you agree or disagree with each of the following statements." An example of an item for 'beliefs about gender and professional choice' is, "A person's gender is important in choosing a profession, as certain professions require certain physical capabilities." An example of an item for 'beliefs about women in high-tech profession' is, "I believe women can be very successful in the high-tech industry." An example of an item for 'beliefs about women's interest in high-tech' is, "Female students are not interested in the fields of high-tech, as they are not guided sufficiently during high school education." An example of an item for 'beliefs about the suitability of high-tech for women' is, "I think that the working conditions make it difficult for women to work as a high-tech professional." One new factor with four items was added to reflect the male opportunity

in the high-tech profession. This new scale was labeled as 'beliefs about male opportunity in the high-tech'. An example of an item for the newly developed factor is, "I believe male high-tech professionals have better access to networking opportunities than female high-tech professionals." Participants responded on a 7-point scale (1 = *strongly disagree* and 7 = *strongly agree*). To be consistent across the five subscales, one factor with positively worded items, 'beliefs about women in high-tech profession' was reverse-scored so that higher scores on all items indicate that women's position in the high-tech sector is problematic.

4.2.10 Control Variables

Data were collected on two measures that are treated as control variable in the present study: Intention to pursue a career and attitudes toward high-tech careers.

4.2.10.1 *Intention to Pursue a Career*. The target population for this study was undergraduate engineering students and the focus was whether they intend to pursue a high-tech career or not. In order to predict the dependent variable, it was important to ascertain first whether the respondents were interested in pursuing any career. This was important because in Bangladesh some women may pursue professional education for reasons other than career opportunities. Hence, a three-item construct was developed for this purpose. The question stem read, "After you graduate how likely is it that you will:" An example of an item is, "…Apply for a job." Participants responded on a 7-point scale (1 = *strongly disagree* and 7 = *strongly agree*). Higher scores indicate stronger career intentions.

4.2.10.2 Attitude toward High-Tech Profession. This study was interested in testing the impact of social cognitive and contextual gender-related predictors in ascertaining students' intention to pursue a high-tech career. In order to predict the outcome variable, it was important to control for attitude as positive attitudes are likely to positively influence intention decisions. Hence, a five-item construct was developed. The question stem read, "In this country, people view high-tech…" An example of an item is, "…As a prestigious career." "Participants responded on a 7-point scale (1 = *strongly disagree* and 7 = *strongly agree*). Higher scores indicate stronger positive attitude toward the profession.

4.3 Descriptive Analysis

4.3.1 Data Preparation

After the survey data were entered, the data were inspected and screened to prepare for statistical analyses. Data screening was done to check for data entry errors, incomplete surveys, and missing values. A frequency distribution was run on each survey item to check the range, mean value, and the standard deviation. The frequency distribution and the range helped to identify any out of range values in the surveys. Out of range values were identified and each such survey was then manually checked to correct data entry errors. Next, a preliminary screening of questionnaires was conducted to screen out surveys with patterned or incomplete responses. Patterned response can be identified when respondents' use the same response option for long strings of questions (Costa & McCrea, 2008). For example, responding 'strongly agree' to all responses in a

section that consists of both positively or negatively worded items is problematic. Incomplete responses can be identified when respondents leave sections of a questionnaire completely blank. Preliminary visual inspection detected 45 such surveys. Listwise deletion was employed to delete these cases. The approach was deemed appropriate to address the issue of insufficient effort in responding because the data size (1,021 completed surveys) was large compared to the numbers of cases (45). According to Kline (2005), listwise deletion will not affect the results of data analysis in situations where the number of missing value cases is small and the data set is large.

To apply greater caution with missing values, after a visual inspection that resulted in listwise deletion of 45 surveys, a statistical procedure of missing value analysis (MVA) was employed. MVA was run on the dataset in order to ensure that any missing values in the data were random and did not conform to any systematic pattern related to the questions. According to IBM SPSS (2011), MVA performs three primary functions: (1) it describes the pattern of missing data, (2) it estimates descriptive analyses for different missing value methods such as listwise, pairwise, regression, or expectation-maximization (EM), and (3) it imputes missing values with valid estimated values.

Two important checks in MVA are whether the missing values are less than 5% of the total number of cases and the non-significance ($p \geq .05$) of EM. When the missing values are less than 5%, missing values do not affect the results. Alternatively, EM estimation checks whether the subjects with missing values are different than the subjects without missing values or not. Significant EM estimation ($p \leq .05$) indicates that the two groups are different from each other and the missing values are non-random. In the present study, the number of individual missing items was found to be very small, less

than 2.5% for any single item and the EM estimation was non-significant ($p \geq .05$) for all items, indicating the randomness of missing values. Therefore, no further action was taken to treat the missing values.

4.3.2 Participants

Participants were engineering undergraduate students enrolled in public (*n* = 531; 54%) and private (*n* = 445; 46%) universities located in Bangladesh. Age ranged between 18 to 29 years with a mean of 21.82. Survey participants included both male (*n* = 623; 64%) and female (*n* =348; 36%) students. First, second, third, and fourth year (and beyond) students accounted, respectively, for 18% (*n* = 169), 26.3% (*n* = 246), 36% (*n* = 337), and 19.6% (*n* = 183) of the sample. Table 4.1 gives a breakdown of gender with the year in the program. The Chi-square test of independence results on gender by year [χ^2(3, N = 935) = 22.90, p <.01] was significant. The results indicate that there was a

Table 4.1

Cross Tabulation Year x Gender

Year in the Program	By year	Gender	
	By Gender	Male (*n* =623)	Female (*n* =348)
Year 1 (*n* = 169)	% within year	72.8%	27.2%
	% within gender	20.6%	13.6%
Year 2 (*n* = 246)	% within year	70.3%	29.7%
	% within gender	29.0%	21.5%
Year 3 (*n* = 337)	% within year	60.8%	39.2%
	% within gender	34.4%	38.9%
Year 4 and beyond (*n* = 183)	% within year	51.9%	48.1%
	% within gender	15.9%	26.%

significant association between percentage of male and female representation and the year in the program. Percentage of female respondents increased with the year in the program whereas percentage of male respondents decreased.

With respect to majors, students were classified as high-tech and non-high-tech majors. High-tech majors included computer and electronics related majors such as computer, computer science, information technology, software, systems, electronics and electrical. The other group comprised majors such as chemical, civil, environmental, mechanical, mining, and industrial. Among the survey participants, 53.6% (n = 513) belonged to high-tech related majors and 46.4% (n = 444) belonged to non-high-tech related majors. Further, Table 4.2 gives a breakdown of gender with the major. The Chi-square test of independence results on gender by major [$\chi^2(1, N = 957) = .28, >.05$] was non-significant indicating that about the same number of male and female respondents completed the survey across high-tech and non-high-tech majors.

Table 4.2

Cross Tabulation Major x Gender

Major	By major	Gender	
	By Gender	Male	Female
High-tech	% within major	64.7%	35.3%
	% within gender	54.2%	52.5%
Non High-tech	% within major	63.1%	36.9%
	% within gender	45.8%	47.5%

Finally, with respect to income, World Bank's (2014) income categorization was used to segregate students as low-income, mid-income, and high-income. Among the survey participants, 5.8% (n = 55) belonged to low-income, 75.2% (n = 711) belonged to mid-income, and 18.9% (n = 179) belonged to high-income group. Table 4.3 gives a breakdown of gender with the income level.

Table 4.3

Cross Tabulation Income Level x Gender

Major	By Income Level	Gender	
	By Gender	Male	Female
Low Income	% within income	87.3%	12.7%
	% within gender	8.0%	2.0%
Mid Income	% within income	60.9%	39.1%
	% within gender	71.9%	81.5%
High Income	% within income	67.6%	31.4%
	% within gender	20.1%	16.5%

The Chi-square test of independence on gender by income [χ^2(2, N = 941) = 17.26, p <.01] revealed a significant association. The result indicates that male and female respondents' distribution across income level differs. Although a larger percentage of men and women respondents come from households with a medium income level, only 2% of the female respondents belonged to the low-income group compared to 8% of the male respondents. This finding is consistent with earlier studies that suggest women who enter or pursue engineering or technology related educational or career paths generally belong to a higher socio-economic category (e.g., Adya & Kaiser, 2005; Saifuddin et al., 2013).

Chapter 5: Assessment of Measures

In this study, I have used two pre-existing scales, eight constructs with modified scales, and three constructs developed for this study (see Table 5.1 for details). This study is also based on a new context - Bangladesh, where none of the scales have been previously tested. Therefore, before running a confirmatory factor analysis (CFA) on the measures, an exploratory factor analysis (EFA) was conducted to assess construct validity and to remove weaker items from further consideration. As EFA and CFA should not be performed on the same data set, the data for the present study were randomly split into two groups (DeCoster, 1988). Prior to running factor analysis, some items were reverse coded to ensure consistency in the subscale items.

EFA was performed on the first half of the sample to identify the factor structure using principal axis factoring with Varimax rotation. Principal axis factoring (PAF) was used over principal component analysis (PCA) because PAF explicitly focuses on common variance among the items and therefore its purpose is to understand the latent factors or constructs that account for the shared variance among items (DeCoster, 1988; Henson & Roberts, 2006; Tabachnick & Fidell, 2001; Worthington & Whittaker, 2006). Gerbing and Hamilton (1996) argue that PAF as an exploratory method is able to recover the correct factor model a majority of the time.

Rotation is defined as "Any of several methods in factor analysis by which the researcher attempts to relate the calculated factors to theoretical entities. This is done differently depending upon whether the factors are believed to be correlated (oblique) or uncorrelated (orthogonal)"

Table 5.1

Scales for Outcome and Predictor Variables

Scale	Factors	Source	Cronbach's Alpha	Number of Items included in this study	Reason for adding or removing items
Intention to pursue a high-tech (HT) career		Wyer et al. (2010)	0.98 (12 items)	4 (adapted) and 4 (new)	The four items from Wyer (2010) that measured students' long term plan to have a science career were adapted. Four new items were added to better capture students' short term plans.
Technology self-efficacy		Compeau and Higgins (1995)	0.95 (10 items)	8 (adapted)	Two items from the original scale were deleted for repetitive content.
Occupational self-efficacy		Rigotti et al. (2008)	0.85 -0.90	6 (adapted)	
Outcome expectation	Career expectations	Lent et al. (2011)	NA	4 (existing) & 2 (new)	Items were added to better reflect career expectations.
	Social expectations	Lent et al. (2011)	NA	2 (existing) & 2 (new)	Items were added to reflect the dimension of value and respect.
	Self-evaluative expectations	Lent et al. (2011) and Marra and Bogue (2006)	NA	4 (existing: 3 from Lent et al., and 1 from Marra & Bogue) & 1 (new)	One item was added from Marra and Bogue to reflect the dimension of creativity and one new item was added to reflect the dimension of challenging work.

	Generativity expectations	Lent et al. (2011)	NA	1 (existing) & 2 (new)	To elaborate on the concept of generativity
	Lack of work-life balance expectations	Developed by researcher	NA	4 (new)	
Interest		Lent et al. (2011)	0.81 (6 items)	4 (existing) & 1 new	Two items from the original scale relating to work in a project were removed for lack of relevance to the present study.
Social supports		Lent et al. (2011)	0.85 (9 items)	7 (adapted)	Two items from the original scale relating to assistance from tutor and advisor were removed due to non-relevance.
Social barriers		Lent et al. (2011)	0.79	5 (existing)	
Masculine gender-role		Spence and Helmreich (1978)	0.85	8 (existing)	
Feminine gender-role			0.82	8 (existing)	
Masculine image of the HT professionals	Perceptions about HT professionals	Developed by researcher	NA	6 (new)	

	Gender Representation in Media	Dyke et al. (2012)	NA	2 (adapted) & 1 (new)	1 new item was added to reflect the sex of high-tech expert participating in media shows.
Gendered perceptions	Beliefs about gender and professional choice	Küskü et al. (2007)	0.65 - 0.87	5 (adapted)	
	Beliefs about women's interest in HT			5 (adapted)	
	Beliefs about suitability of HT for women			3 (adapted)	One item was removed for repetitive content.
	Beliefs about women HT professionals			3 (adapted)	One item was removed for repetitive content.
	Beliefs about male opportunity in HT profession		NA	4 (new)	

Note. NA refers to Not Applicable.

(Vogt, 1993:91). In the current study orthogonal rotation, namely Varimax, was used. Varimax is widely used in behavioral and psychological research (Fabrigar, Wegener, MacCallum, & Strahan, 1999) because of its simplicity and conceptual clarity (Nunnally, 1978).

With regard to factor and item retention in the preliminary EFA, several rules were followed based on the suggestions of Costello and Osborne (2005), Fabrigar et al. (1999), Tabachnick and Fidell (2001), and Worthington and Whittaker (2006). Factor retention followed two rules: 1) Eigenvalue greater than one (Kaiser, 1960); and 2) a factor must consist of at least two items. With respect to item retention, as a general rule, items in a factor should have high communalities without cross loadings, and multiple items should load strongly on each factor. These conditions can be difficult to meet in practice and so Tabachnick and Fidell recommended that an item can be retained if the item loading meets a cutoff (0.32); this equates to approximately 10% overlapping variance with the other items in that factor. For the present study, however, a more rigorous cut-off (0.40) was enforced in order to reduce the chances for cross loading. An item is cross-loading if it loads at 0.32 or higher on two or more factors. Item deletion followed three rules: 1) If any item loaded on two factors, the lower loading was disregarded. 2) An item that did not contribute meaningfully to a factor was deleted. 3) In two cases, as detailed below, if items loaded on a factor that could not be identified theoretically, the items, and subsequently the factor, were deleted. Cronbach's alpha was calculated for each factor to ascertain the reliability.

After the initial round of EFA on the first half of the sample, CFA using the second half sample was conducted on the remaining factors and items to validate the

measurement structure (Garson, 2010; Henson & Roberts, 2006; Tabachnick & Fidell, 2001). CFA was conducted using Lisrel 9.1 and fit indices were used to assess the overall fit of each measurement model. Fit refers to the ability of a model to reproduce the data using the variance-covariance matrix or the correlation matrix (Adelodun, Obilade, & Awe, 2013). A model is said to be a good fitting model if it is reasonably consistent with the data and does not require re-specification (Kenny, 2014). A variety of fit indicators are currently available to assess the model fit with data and they can be broadly categorized under three types: absolute fit, parsimony fit, and comparative or incremental fit (Brown, 2006).

Absolute fit indices measure model fit at an absolute level. They assess how far the model is from a perfect fit (Kenny, 2014; Brown, 2006). The best fitting model has a value of zero. Examples of absolute fit indices include Chi-Square and Standardized Root Mean Residual (SRMR). Parsimony model fit indices are also sometimes grouped under absolute fit indices (Hu & Bentler, 1999); however parsimony model fit indices are more robust than absolute fit indices. These fit indices incorporate a penalty function for lack of model parsimony (e.g., over-identified models or under-identified models) and adjust for degrees of freedom. Examples include Root Mean Square Error of Approximation (RMSEA), Akaike Information Criterion (AIC), Parsimony Normed Fit Index (PNFI), and Parsimony Goodness of Fit Index (PGFI). The third type of fit indicators assesses the incremental or relative fit. Incremental measures compare the Chi-Square for the model to a null model (also called a “baseline” model or “independence” model). Typically the baseline model specifies that all measured variables are uncorrelated. Given the liberal criteria of no relationships among the variables,

comparative or relative fit indices often look more favorable. Examples of incremental fit indices include the Tucker Lewis Index (TLI) or Non-normed Fit Index (NNFI), Comparative Fit Index (CFI), and Bentler-Bonnet Index or Normed Fit Index (NFI).

Many types of goodness of fit indices are available; however, some of these are sensitive to sample size, to number of items used to measure a latent variable, to the normality of data, and/or to the high or low correlations among the variables of a latent construct. Because of the sensitivities, the issues surrounding which model fit indices and what cutoff should be used to indicate a good fit are highly debated (Barrett, 2007; Brown, 2006; Hayduk, Cummings, Boadu, Pazderka-Robinson, & Boulianne, 2007). According to the current state of practice and recommendations about model fit and cutoff (Browne, 2006; Kenny, 2014; Kline, 2005; Hu & Bentler, 1988, 1989), the present study reports on four fit measures: SRMR (absolute), RMSEA (parsimony), and NNFI and CFI (incremental or comparative). These four fit indices cover the three broad categories discussed above and work as checks and balances against each other. The cutoff criteria for each of the indices are presented in Table 5.2.

Table 5.2

Cutoff Criteria for Goodness of Fit Indices

Fit Index	Study	Good	Acceptable	Mediocre	Poor
RMSEA	MacCallum, Browne, and Sugawara (1996)	< 0.05	0.05 – 0.08	0.08 -0.10	≥ 0.10
CFI	Bentler (1990)	≥ 0.95	0.90 - 0.95		< 0.90
TLI/ NNFI	Bentler (1990)	≥ 0.95	0.90 - 0.95		< 0.90
SRMR	Hoe (2008)		< 0.08		> 0.08

With regards to validating the latent structures in CFA, several rules were followed based on the suggestions of Brown (2006), Kenny (2014), and Kline (2005).1) In general, if three out of the four fit indices were good, the factor model was considered confirmed, otherwise the model was re-specified. 2) If RMSEA showed a poor or mediocre fit, the model was re-specified for improvement in model fit. More emphasis was given to RMSEA model fit because it is considered to be a robust measure of model fit and is based on the non-centrality parameter. 3) Model re-specification was based on theoretical justification (i.e., what the underlying construct is expected to measure), corrected item-total correlations in EFA, low reliability of the extracted factor from EFA, and cross-loaded items in EFA. To ensure that the re-specification decisions were not driven by suggested modifications in the CFA output, all empirical decisions to re-specify the models were based either on theoretical justifications or on the results of EFA. The next section gives details on the assessment of each measure - outcome variable, predictor variables, and control variables.

EFA was conducted on one half of the data with a sample size of 486 and CFA was conducted using the second half, with the sample size of 490. For each measure, the EFA is first presented followed by the CFA conducted on the extracted factors. Cronbach's alpha reliability are calculated on both EFA extracted factors and CFA validated factors.

5.1 Outcome Variable: Intention to Pursue a High-Tech Career

Intention to pursue a high-tech career was designed to be an eight-item scale with four items adapted from Wyer et al.'s (2010) twelve-item scale (Cronbach's alpha of 0.98) and four newly developed items. The EFA yielded a one factor solution (Eigenvalue = 4.36, with 54.47% of variance). As only one factor was extracted, the solution could not be rotated. The factor matrix is given in Table 5.3. The Cronbach's alpha for EFA sample was 0.88 for eight items.

When all eight items were run together for CFA, the model showed a poor fit in terms of RMSEA. RMSEA (0.10) was large enough to reject the null hypothesis; however, CFI (0.97), NNFI (0.96), and SRMR (0.04) were all acceptable and indicative of good fit. In order to improve the parsimony fit, 'item h' with the lowest corrected item-

Table 5.3

Intention to Pursue a High-Tech Career: EFA Initial Factor Matrix

Item #	Items	HTC ($\alpha = 0.88$)
a.	Pursue a career in high tech	0.75
b.	Apply for high-tech related jobs	0.73
c.	Receive a job offer in the high-tech industry	0.70
d.	Work in the high-tech industry	0.73
e.	Have the ability to become a high-tech professional	0.63
f.	Become a high-tech professional	0.76
g.	Be a successful high-tech professional	0.70
h.	Have a lifelong career in high-tech	0.54

Note. HTC refers to intention to pursue a high-tech career.

total correlation was deleted and the model was run with seven items. The model fit showed no improvement. RMSEA (0.10) was still large enough to reject the null hypothesis but CFI (0.98), NNFI (0.97), and SRMR (0.04) were good. As the RMSEA was still large, next 'item e' with the lowest corrected item-total correlation was removed. RMSEA (0.09) improved indicating a mediocre fit but CFI (0.98), NNFI (0.97), and SRMR (0.03), were all indicative of a good fit (see Table 5.4 for model comparison). Factor loadings for all the observed variables in this six-item one-factor CFA model are presented in Appendix 5.1.

RMSEA is a robust fit index that penalizes a lack of parsimony. For one-factor solutions, usually three moderately to strongly correlated indicators are sufficient (Brown, 2006); however, here there were eight items with moderate to strong correlations. Hence, RMSEA was indicative that the factor 'intention to pursue a high-tech career' could have been measured with fewer items because RMSEA fit improved with the removal of items.

Table 5.4

Intention to Pursue a High Tech Career: CFA Model Comparison

Fit Indices	Eight item one-factor model	Seven-item one-factor model (Item h removed)	Six-item one-factor model (Item e & h removed)
RMSEA	0.10	0.10	0.09
CFI	0.97	0.98	0.98
NNFI	0.96	0.97	0.97
SRMR	0.04	0.04	0.03

From a theoretical perspective, the intention to pursue a high-tech career taps into dimensions of occupational choice: goals, ambition, and duration (Ellis & Herrman, 1983). While these students may have known what their short term goals and ambitions were, they may not have been very certain about the distant future. This may be the reason why the items that tapped into the long-term dimension (e and h) had a lower mean correlation with other items.

Conclusion. The best measure of the outcome variable "intention to pursue a high-tech career" is the six-item scale. The Cronbach's alpha for the six items for CFA sample was 0.90.

5.2 Predictor Variables

5.2.1 Technology Self-Efficacy

EFA on the eight-item technology self-efficacy (TSE) scale adapted from Compeau and Higgins's (1995) yielded a two factor solution presented in Table 5.5: Factor 1 (Eigenvalue = 2.64, with 32.94% of variance) referred hereafter as TSE 1, and Factor 2 (Eigenvalue = 1.38 with 17.25% of variance) referred hereafter as TSE 2. The Cronbach's alphas for TSE 1 (0.70) and TSE 2 (0.60) were within the acceptable range (Nunnally, 1978). TSE 1 captured an individual's perceptions of his or her ability in using a technology to complete a task or assignment without any assistance and/or prior experiences whereas, TSE 2 captured an individual's perceptions of his or her ability in using a technology to complete a task or assignment with assistance from others, prior experience, and with ample time.

Table 5.5

Technology Self-Efficacy: EFA Rotated Solution on Eight Items

Item #	Items	Factor	
		TSE 1 (α= 0.70)	TSE 2 (α= 0.60)
a.	When there is no one around to tell me what to do as I go	0.59	
b.	When I have never used a technology like this before	0.72	
c.	If I have only manuals for reference	0.60	
d.	If I have seen someone else using it before trying it myself	0.45	~~0.37~~
e.	If I could call someone for help if I get stuck		0.45
f.	If someone else helps me get started		0.50
g.	If I have a lot of time to complete the task		0.58
h.	If I have used similar technology before this to do the same job		0.53

Note. TSE 1 refers to Factor 1 and *TSE 2* refers to Factor 2.

The CFA on this two factor solution showed a mediocre model fit with respect to RMSEA (0.09), CFI (0.94), and NNFI (0.91), and SRMR = 0.06 (see Table 5.6); therefore the model was respecified. As a first step, 'item d' from the first factor was removed due to both theoretical and empirical reasons. Theoretically, "item d" indicates some form of external influence and leans more toward the second factor. Empirically, the item cross-loaded on both factors and had the lowest corrected item-total correlation for TSE 1. With 'item d' removed, all goodness of fit measures improved. The RMSEA (0.08), SRMR (0.05), and NNFI (0.93) indicated an acceptable fit, while CFI (0.96)

showed a good fit. The standardized factor loadings for this seven-item two-factor model are presented in Appendix 5.2.

Table 5.6

Technology Self-Efficacy: CFA Model Comparison

Fit Indices	Eight-item two-factor model	Seven-item two- factor model (item d removed from TSE 1)
RMSEA	0.09	0.08
CFI	0.94	0.96
NNFI	0.91	0.93
SRMR	0.06	0.05

Conclusion. Considering the overall results, the seven-item two-factor model was found to be the best measure of technology self-efficacy. The Cronbach's alpha for TSE1 (0.65) and for TSE 2 (0.68) were within the acceptable range.

5.2.2 Occupational Self-Efficacy

A second measure of self-efficacy was occupational self-efficacy (Rigotti et al., 2008). EFA on the six items extracted one-factor (Eigenvalue = 2.63 with 43.95% of variance) with Cronbach's alpha of 0.74. As only one factor was extracted, the solution could not be rotated. CFA was conducted which confirmed the EFA results and indicated good to acceptable model fit statistics. The EFA's factor matrix and the CFA's fit statistics are presented in Table 5.7 and Table 5.8 respectively. Factor loadings for all the observed variables in this six-item one-factor measurement model are presented in Appendix 5.3.

Table 5.7

Occupational Self-Efficacy: EFA Factor Matrix on Six Items

Item #	Items	OSE (α= 0.74)
a.	I expect I will remain calm when facing difficulties in my job because I will rely on my abilities	0.72
b.	Whatever comes my way in my job, usually I will be able to handle it	0.71
c.	My past experiences will have prepared me well for my occupational future	0.61
d.	When I will be confronted with a problem in my job, I will usually find several solutions	0.50
e.	I will meet the goals that I set for myself in my future job	0.44
f.	I expect to feel prepared for most of the demands in my future job	0.44

Note. OSE refers to occupational self-efficacy.

Table 5.8

Occupational Self-Efficacy: CFA Goodness of Fit

Fit Indices	RMSEA	CFI	NNFI	SRMR
Base model	0.07	0.99	0.97	0.05

Conclusion. Occupational self-efficacy with six items was confirmed as a valid factor. The Cronbach's alpha for the CFA sample was 0.80.

5.2.3 Outcome Expectations

Outcome expectations were proposed as a multidimensional construct with 22 items forming five subscales: career, social, self-evaluative, generativity, and work-life

balance. The initial factor analysis on these 22 items resulted in a five-factor solution; however, the items did not load as proposed (Appendix 5.4: Rotated factor matrix on 22 items). Also many of the items did not load on any factors, particularly the items intended to measure work-life balance expectations; three out of four of these items did not load on any factor at the cut off score of 0.4. Hence, the work-life balance expectations factor was completely dropped as a subscale and EFA was then run on 18 items with four sub-scales. Out of these 18 items, six items did not load on any factors (Appendix 5.5: Rotated factor matrix on 18 items). The EFA results suggest the first factor reflected respect, a social aspect; the second factor captured personal satisfaction, a self-evaluative aspect; and the third factor reflected career expectations. The fourth factor included one cross-loaded item with a higher loading on factor 3 and only one other item. Therefore the fourth factor was not retained in the subsequent EFA run.

The third run of EFA with 11 items presented in Table 5.9 gave a three factor solution, one item (item u) did not load on any factors and the first item cross loaded strongly (>.50) on Factor 1 and Factor 3, and therefore was dropped. In this three factor solution, Factor 1 with three items reflected career expectations (Eigenvalue = 4.21 with 38.26% of variance), the second factor with three items reflected self-evaluative expectations (Eigenvalue = 1.10 with 10.01% of variance), and the third factor with three items reflected social expectations (Eigenvalue = 1.03 with 9.37% of variance). The Cronbach's alpha for career outcome expectations (Factor 1; $\alpha = 0.67$), self-evaluative outcome expectations (Factor 2; $\alpha = 0.72$), and Social outcome expectations (Factor 3; $\alpha = 0.61$) were all within the acceptable range for the CFA sample.

Table 5.9

Outcome Expectations: EFA Rotated Solution on 11 items

Item #	Items	Factor 1 (CarOE; α= 0.67)	Factor 2 (SlfOE; α= 0.72)	Factor 3 (SocOE; α= 0.61)
b.	Earn respect from other people	~~0.54~~		~~0.54~~
l.	Be valued by my family members			0.57
q.	Be valued by other people			0.46
m.	Increase my sense of self-worth			0.49
h.	Do work that I find satisfying		0.52	
r.	Do interesting work		0.67	
u.	Do work that I would find challenging			
i.	Make a contribution to society		0.50	
a.	Receive a good job offer	0.63		
f.	Earn an attractive salary	0.50		
c.	Get a job where I can use my talents and creativity	0.57		

Note. *CarOE, SlfOE*, and *SocOE* refer to career, self-evaluative, and social outcome expectations respectively.

Table 5.10

Outcome Expectation: CFA Model Comparison

Fit Indices	Nine- item three-factor solution	Eight-item three-factor solution (item q removed from social expectations)	Six-item two-factor solution (after removing social expectation factor)
RMSEA	0.13	0.10	0.08
CFI	0.94	0.94	0.98
NNFI	0.91	0.97	0.97
SRMR	0.06	0.04	0.03

Subsequent CFA on the nine-item, three factor solution resulted in RMSEA (0.13) which was too high to indicate a good fit. The other three fit indices, CFI (0.94), NNFI (0.91), and SRMR (0.06), however, indicated a moderate fit. Additional analysis showed that the correlation (r=0.92) between self-evaluative and social expectations was too high (≥ 0.85) which suggests that both the self-evaluative and social expectations are tapping into the same underlying dimension. This multicollinearity is problematic (Brown, 2006; Kline, 2005).

To improve the model fit, in the first step, item 'q' from social expectations (Factor 3) was removed as it had the lowest corrected item-total correlation for the factor. The model fit improved slightly for all fit indices: RMSEA (0.10), NNFI (0.94), CFI (0.97), and SRMR (0.04). Although the model fit improved, the correlation between self-evaluative and social expectations was still high (0.84). EFA results earlier showed the social expectations factor had comparatively lower reliability (α = 0.61), therefore in the respecification, this factor was completely removed. CFA was then run on a six-item, two-factor solution. For this two factor solution, three out of the four model fit statistics were in the range of good fit and RMSEA also showed an acceptable fit. The results are presented in Table 5.10. Factor loadings for all the observed variables in this six-item two-factor model are presented in Appendix 5.6.

Conclusion. The two-factor model of outcome expectations: career expectations (3 items; α= 0.65) and self-evaluative expectations (3 items, α= 0.74) was retained for further analysis.

5.2.4 Interest

Interest was designed to be a five-item scale with four items adapted from Lent et al.'s (2011) six-item interest scale and one newly added item. The EFA yielded a one factor solution (Eigenvalue = 2.55, with 51.04% of variance). As only one factor was extracted, the solution could not be rotated. The factor matrix is given in Table 5.11. The Cronbach's alpha was 0.76 for five items.

Table 5.11

Interest: EFA Factor Matrix

Item #	Items	Interest (α= 0.76)
a.	Solving practical math problems	0.68
b.	Solving computer software/hardware problems	0.72
c.	Using technology to complete a task or an assignment	0.57
d.	Solving complicated technical problems	0.61
e.	Learning new computer applications	0.54

CFA run on the five-item one-factor showed a poor fit for RMSEA (0.15) and NNFI (0 .86), while CFI (0.93) and SRMR (0.06) indicated a mediocre fit. Hence, this one-factor model was respecified. As a first step, 'item e' was removed as it had the lowest corrected item-total correlation. The model fit improved significantly with RMSEA (0.00), CFI (1.00), NNFI (1.00), and SRMR (0.01) all indicating very good fit. The fit indices for model comparisons are presented in Table 5.12. Standardized factor loadings for this four-item, one-factor model are presented in Appendix 5.7. This four-item interest scale also made sense theoretically. Three of the five items in the original scale indicated interest in solving problems, one item tapped into interest in using a

technology for completion of a task, and the fifth item related to learning new applications. What the four items that hold well together seem to have in common is that they relate to the application of knowledge, whereas the item that does not correlate relates to the acquisition of knowledge.

Conclusion. The measure of interest retained for further analysis included four items with Cronbach's alpha of 0.75.

Table 5.12

Interest: CFA Model Comparison

Fit Indices	Five-item one-factor solution	Four-item for one factor solution (Item e removed)
RMSEA	0.15	0.00
CFI	0.93	1.00
NNFI	0.86	1.00
SRMR	0.06	0.01

5.2.5 Social Support and Barriers

EFA was run on a twelve-item scale adopted from Lent et al.'s (2011) fourteen-item scale with seven support items and five barrier items. EFA yielded a three-factor solution (Appendix 5.8). Four items formed Factor 1: Social barriers (Eigenvalue = 2.53, with 21.11% of variance), four items formed Factor 2: Social supports received from close family and friends (Eigenvalue = 2.15, with 17.95% of variance). This type of social support is more proximal to self and is referred to as proximal support from here on. Finally, four items formed Factor 3 (Eigenvalue = 1.77, with 14.77% of variance).

Out of these four items in Factor 3, two items indicated support and two items indicated barriers; one of the barriers items was cross-loading with higher loading on the social barriers factor. Further in Factor 3, the two support items had positive loadings while the barrier item had a negative loading. When the cross-loaded and negative loading item were removed from this factor, the third factor reflected the kind of support one expects to receive from having access to mentors and role models i.e. from people outside family and friends. This type of support is more distal in nature to the self and is referred to as distal support from here on. Thus EFA was run again on 10 items that gave a three factor solution (Table 5.13), four items for social barriers (Eigenvalue = 2.34, with 23.38% of variance), four items for proximal social supports (Eigenvalue = 2.03, with 20.30% of variance), and two items for distal social supports (Eigenvalue = 1.50, with 15.02% of variance). The Cronbach's alpha for proximal social support was 0.63, for social barriers was 0.73, and for distal social supports was 0.58.

CFA on the ten- item three-factor model gave a moderate fit result with respect to RMSEA (0.09), CFI (0.91) and SRMR (0.06); however, NNFI (0.87) indicated a poor fit. In order to see whether the model could be improved or not, 'item j' was removed from the social supports factor as it had the lowest corrected item-total correlation. All fit indices indicated a poorer fit compared to the base model. Next, as the distal supports factor had only two items, it was removed to see whether the model fit improved or not. The improvement in model fit was very low. In the absence of strong theoretical justification for model re-specification, the model with ten items was retained. Model comparison results are presented in Table 5.14. Standardized factor loadings for this ten-item three-factor model are presented in Appendix 5.9.

Table 5.13

Social Support and Social Barrier: EFA Rotated Factor Matrix

Item #	Items	SocBar (α =.73)	ProSup (α =.63)	DisSup (α =.58)
c.	Feel support for pursuing this field from important people in your life		0.56	
g.	Feel that your family members support your decision		0.55	
i	Get encouragement from your friends for pursuing this field		0.59	
j.	Feel that close friends or relatives would be proud of you for making this decision		0.50	
d.	Do not receive negative comments or discouragement from family (reversed)	0.62		
f.	Do not feel pressure from family (reversed)	0.74		
h.	Feel that I socially fit with other people in this field (reversed)	0.65		
l.	Do not receive negative comments or discouragement from friends (reversed)	0.57		~~0.42~~
a.	Have access to a "role model" in the field			0.57
k.	Have access to a "mentor" who could offer you advice and encouragement			0.75

Note. SocBar refers to social barriers, and *ProSup* and *DisSup* refer to proximal and distal support respectively.

Conclusion. The ten item three-factor solution extracted through EFA showed a moderate fit in CFA and was retained for further analysis. The Cronbach's alpha reliability using the CFA sample for social barriers was 0.75, for proximal social supports was 0.68, and for distal social supports was 0.60.

Table 5.14

Social Support and Barriers: CFA Model Comparison

Fit Indices	Ten-item three-factor solution	Nine- item three-factor solution (item j removed from ProSup)	Eight-item two- factor solution (DisSup factor removed)
RMSEA	0.09	0.10	0.09
CFI	0.91	0.89	0.93
NNFI	0.87	0.84	0.90
SRMR	0.07	0.07	0.07

5.2.6 Masculine Gender-Role

Masculine gender-role was an eight-item scale from Spence and Helmreich (1978) with Cronbach's alpha of 0.85. The EFA yielded a one factor solution retaining seven items (Eigenvalue = 3.01, with 37.61% of variance). As only one factor was extracted the solution could not be rotated. The factor matrix is presented in Table 5.15. The Cronbach's alpha was 0.68 for seven items. CFA conducted on the seven items resulted in a well-fitting model. The fit indices are given in Table 5.16. Standardized factor loadings for this seven-item one-factor model are presented in Appendix 5.10.

Conclusion. The seven-item one factor solution for masculine gender-role with Cronbach's alpha of 0.67 for CFA sample was confirmed as a valid measure.

Table 5.15

Masculine Gender-Role: EFA Factor Matrix

Item #	Items	MAS (α = 0.68)
a.	Independence	0.54
c.	Activeness	0.67
e.	Competitiveness	0.60
g.	Difficulty making decision (reversed)	
i.	Not giving up	0.57
k.	Self-confidence	0.61
m.	Inferior or superior	0.47
o.	Handle pressure	0.43

Note. MAS refers to masculine gender-role.

Table 5.16

Masculine Gender-Role: Goodness of Fit Indices

Fit Indices	RMSEA	CFI	NNFI	SRMR
Base model	0.03	0.99	0.96	0.03

5.2.7 Feminine Gender-Role

Feminine gender-role was an eight-item scale from Spence and Helmreich (1978) with Cronbach's alpha of 0.82. The EFA yielded a one factor solution (Eigenvalue = 3.01, with 37.61% of variance) retaining seven items. As only one factor was extracted the solution could not be rotated. The factor matrix is given in Table 5.17. The Cronbach's alpha was 0.62 for seven items.

Table 5.17

Feminine Gender-Role: EFA Factor Matrix

Item #	Items	FEM (α = 0.62)
b.	Emotional	0.43
d.	Devote self to others	0.46
f.	Gentle	0.47
h.	Helpfulness	0.53
j.	Kindness	0.61
l.	Awareness of others	0.56
n.	Understanding of others	0.51
p.	Relationship with others	

Note. FEM refers to feminine gender-role.

CFA conducted on this one factor model gave an acceptable model fit in terms of RMSEA (0.07) and SRMR (0.05); however, CFI (0.89) and NNFI (0.83) indicated a poor fit. In order to improve the model, 'item b' with the lowest corrected item-total correlation was deleted. The model fit improved with RMSEA (0.05) and SRMR (0.04) indicating a good fit but CFI (0.94) and NNFI (0.91) indicated only a moderate fit. The model was respecified by removing 'item d,' the next item with lowest corrected item-total correlation. The model fit showed improvement over the previous model: RMSEA (0.03), CFI (0.99), NNFI (0.98), and SRMR (0.02) with all fit indices indicating a good fit. The five-item one-factor model, therefore, was retained for further analysis. The model fit comparisons are presented in Table 5.18. Standardized factor loadings for this model are presented in Appendix 5.11.

Examining these changes through a theoretical lens suggests that the notion of femininity may have changed over time. The items that were not as highly correlated

with the overall measure were those that reflected a more traditional, self-effacing notion of femininity. Diekman and Eagly (2000) have shown that the roles of women and men have become more similar and that their attributes have converged in the last 50 years. Femininity is now seen as a balance between nurturance and achievement and women view themselves as increasingly more agentic in recent times (Spence & Buckner, 2000). Hence the items, such as being emotional and devoting one's self completely to others, that conflict with the agentic attributes may no longer hold well with the femininity construct.

Conclusion. The five-item one-factor model was retained for further analysis. The Cronbach's alpha using CFA sample was 0.51 indicating a low reliability.

Table 5.18

Feminine Gender-Role: CFA Model Comparison

Fit Indices	Seven-item one-factor solution	Six-item one-factor solution (b removed)	Five-item one-factor solution (b & d removed)
RMSEA	0.07	0.05	0.03
CFI	0.89	0.94	0.99
NNFI	0.83	0.91	0.99
SRMR	0.05	0.04	0.02

5.2.8 Masculine Image of High-Tech Professionals

Masculine image was measured by two scales. The first one, stereotypical perceptions about high-tech professional was newly developed for this study and

included six items: three positive and three negative. To be consistent across scale, positive stereotypes were reverse coded. The second scale measured the gender representation in the media with three items. The EFA on these nine items resulted in an eight-item three-factor solution (see Table 5.19). The newly added item for the factor, gender representation in the media, did not load at the cutoff of 0.40.

Factor 1 (Eigenvalue = 2.46, with 27.41% of variance) captured negative stereotypical perceptions about high-tech professionals, Factor 2 (Eigenvalue = 1.78 with 19.71% of variance) captured positive stereotypical perceptions about high-tech professionals, and Factor 3 (Eigenvalue = 1.17 with 13.00% of variance) captured the gender representation in the media. The Cronbach's alpha for negative stereotypical perceptions (Factor 1; $\alpha = 0.78$), for positive stereotypical perceptions (Factor 2; $\alpha = 0.63$), and for gender representation in the media (Factor 3; $\alpha = 0.63$) were within acceptable reliability ranges. Although this scale was meant to have two subscales, it resulted in three sub-scales. This finding is consistent with earlier research on scales with positively and negatively worded items. Research indicates that when a scale consists of both negative and positive items, even when the items are reversed, the factor extraction results in two factor solutions with originally worded items as one factor and reverse coded items as another factor. Further research shows that the negatively worded items have a stronger association compared to positively worded items, as people tend to react more strongly to negative words (Anderson, 1965; Herche & Engelland, 1996).

Subsequent CFA on the eight-item three-factor model validated the same factor structure. RMSEA indicated acceptable fit whereas CFI, NNFI, and SRMR all indicated a

Table 5.19

Image of High-Tech Professionals: EFA Rotated Factor Matrix

Item #	Items	NegPHT (α = 0.78)	PosPHT (α = 0.63)	MedRep (r = 0.63)
a.	Are not outgoing (reversed)		0.63	
c.	Are not effective communicators (reversed)		0.66	
e.	Are not very intelligent (reversed)		0.54	
b.	Are nerds or geeks	0.67		
d.	Are boring	0.80		
f.	Are uncool	0.68		
a_MR.	Models in computer and technology related product advertisements in television, newspapers, magazines, and internet are			0.66
b_MR	Anchors hosting high-tech related TV and radio shows			0.64
c_MR	High-tech experts featured in the media			

Note. *NegPHT* and *PosPHT* refer to stereotypical negative and positive perceptions respectively. *MedRep* refers to gender representation in the media. *MR* represents item numbers corresponding to *MedRep* factor.

Table 5.20

Image of High-Tech Professionals: CFA Goodness of Fit Indices

Fit Indices	RMSEA	CFI	NNFI	SRMR
Base model	0.06	0.97	0.95	0.04

good fit. The fit statistics are given in Table 5.20. Factor loadings for this eight-item three-factor model are presented in Appendix 5.12.

Conclusion – The three factor solution was retained for further analysis. Using the CFA sample, the Cronbach's alpha for negative and positive stereotypical perceptions

about high-tech professionals were 0.77 and 0.63 respectively. The correlation for gender representation in the media was 0.64.

5.2.9 Gendered Perceptions

Gendered Perceptions was proposed as a multidimensional construct with twenty items forming five sub-scales – beliefs about gender and professional choice, beliefs about women's interest in the high-tech, beliefs about suitability of high-tech for women, beliefs about women high-tech professionals, and beliefs about male opportunity in the high-tech profession. The first-four scales were adopted from Küskü et al. (2007) who reported Cronbach's alphas between 0.65 and 0.87 for these scales.

The EFA on the twenty-item resulted in a five-factor solution (Appendix 5.13). Out of twenty items, two items did not load on any factor. Five items loaded on Factor 1 reflecting beliefs about women's interest in the high-tech; however, one item from beliefs about male opportunity in the high-tech profession also loaded on this factor. The item on male opportunity did not contribute meaningfully to Factor 1 and therefore was deleted altogether. Two items loaded on Factor 3 reflecting beliefs about male opportunity in the high-tech profession. Two items loaded on Factor 4 that also reflected aspects of beliefs about women's interest in the high-tech. Factor 2, beliefs about gender and professional choice and Factor 4, beliefs about women high-tech professionals, loaded as proposed.

The subsequent EFA was run on 17 items. This EFA (Table 5.21: Rotated factor matrix) gave a five-factor solution, beliefs about gender and professional choice as Factor 1with five items (Eigenvalue = 4.57, with 26.89% of variance), beliefs about women's

Table 5.21

Gendered Perceptions: EFA Rotated Factor Matrix

Item #	Items	Factor				
		1	2	3	4	5
b	Female students are not interested as they are not guided sufficiently during high school education		0.66			
c	Female students are not interested as the job opportunities are limited for women		0.63			
g	Female students are not interested as they are not guided sufficiently by their families		0.65			
h	Women are generally less interested in high-tech professions		0.48			
o	Female students are not interested because of low representation of successful female professionals		0.59			
a	A person's gender is important as certain professions require certain physical capabilities	0.69				
f	A person's gender is important because of the working conditions in certain professions	0.71				
j	A person's gender is important as men and women have different interests	0.59				
n	In my opinion a person's gender is important in choosing a profession	0.79				
s	A person's gender is important in choosing a profession because of socio-cultural expectations	0.52				
d	Male high-tech professionals get promoted more quickly than female professionals			0.71		
q	Male high-tech professionals have better access to networking opportunities than female professionals			0.72		
k	Female students are not interested as their physical capabilities do not fit this profession					0.47
t	Female students are not interested as these fields do not match their interests					0.82
e	Women cannot be very successful (reversed)				0.50	
m	HT is not suitable for women (reversed)				0.60	
r	There are not many successful female HT professionals (reversed)				0.60	

interest in high-tech as Factor 2 with five items (Eigenvalue = 2.09, with 12.31% of variance), beliefs about male opportunity in the high-tech as Factor 3 with two items (Eigenvalue = 1.73, with 10.17% of variance), beliefs about women high-tech professionals as Factor 4 with three items (Eigenvalue = 1.34, with 7.85% of variance), and Factor 5 with two items (Eigenvalue = 1.02, with 6.02% of variance) that also reflected women's interest in the high-tech domain. EFA extracted two factors that reflected beliefs about women's interest in the high-tech profession; Factor 2 reflects dimension of socialized interest (interest that is nurtured) whereas Factor 5 reflects dimension of innate interest (interest that exits naturally in a person). From here on Factor 2 would be referred to as beliefs about women's socialized interest in high-tech and Factor 5 would be referred to as beliefs about women's innate interest in high-tech. The Cronbach's alpha for beliefs about gender and professional choice (Factor 1) was 0.81, beliefs about women's socialized interest in the high-tech (Factor 2) was 0.79, beliefs about male opportunity in the high-tech (Factor 3) was 0.73, beliefs about women high-tech professionals (Factor 4) was 0.57, for beliefs about women's innate interest in the high-tech (Factor 5) was 0.63.

The CFA was run on the seventeen-item five-factor solution. The results suggested a mediocre fit with respect to CFI (0.94) and NNFI (0.93). In order to improve the model fit, as a first step, beliefs about women HT professionals (Factor 4) was removed because of the factor's low reliability ($\alpha = 0.57$). The CFA was then run on fourteen items with four-factors. The model fit improved both for CFI (0.95) and NNFI (0.94); SRMR (0.06) and RMSEA (0.07) remained unchanged. Factor loadings for all the observed variables in this fourteen-item four-factor model are presented in Appendix

5.14). In the next step, CFA was run on three factors with twelve items after removing Factor 5, beliefs about women's innate interest in the high-tech. No major improvement was found in the model fit by removing the Factor 5. The comparison across different models is presented in Table 5.22.

Table 5.22

Perceptions about Gender and Profession: CFA Model Comparison

Fit Indices	Seventeen-item five-factor solution	Fourteen-item four-factor solution (Factor 4 removed)	Twelve-item three-factor solution (factor 4 & 5 removed)
RMSEA	0.07	0.07	0.07
CFI	0.94	0.95	0.96
NNFI	0.93	0.94	0.95
SRMR	0.06	0.06	0.05

Conclusion. Comparing the results presented in Table 5.22 across different models, a decision was made to remove the fourth factor, beliefs about women high-tech professionals, which had relatively low reliability. Hence, the fourteen-item four-factor solution was retained for further analysis as all the model fit statistics were within the acceptable range. Based on the CFA sample, the Cronbach's alpha for beliefs about gender and professional choice was 0.76; for beliefs about women's socialized interest in the high-tech was 0.76; for beliefs about male opportunity in the high-tech was 0.60; and for beliefs about women's innate interest in the high-tech was 0.69. The standardized factor loadings for fourteen-item four-factor solution are given in Appendix 5.14.

5.3 Control Variables

The present study included two control variables - intention to pursue a career and attitudes toward the high-tech profession. The EFA and CFA results for these two control variables are presented next.

5.3.1 Intention to Pursue a Career

Intention to Pursue a Career is a three-item scale developed for this study. The EFA resulted in a one-factor solution (Eigenvalue = 1.74, with 58.06% of variance). The factor matrix is given in Table 5.23. The Cronbach's alpha was 0.66 for three items. As there were only three items, CFA resulted in a just identified model with RMSEA (0.00) indicating perfect fit. For just identified models, CFA output does not give any model fit statistics. The factor loadings for this model is given in Appendix 5.15

Decision. The three-item one-factor solution for intention to pursue a career was retained. The Cronbach's alpha from the CFA sample was 0.72.

Table 5.23

Intention to Pursue a Career: EFA Factor Matrix

Item #	Items	CAR ($\alpha = 0.66$)
a.	Apply for a job	0.80
b.	Work full time	0.44
c.	Have a life long career	0.61

Note. CAR refers to intention to pursue a high-tech career.

5.3.2 Attitude toward the High-Tech Profession

Attitude toward the high-tech profession was a five-item scale developed for this study. The EFA resulted in a one-factor solution (Eigenvalue = 2.63, with 52.61% of variance). As only one factor was extracted, the solution could not be rotated. The factor matrix is given in Table 5.24. The Cronbach's alpha was 0.77 for five items in the EFA sample.

CFA on this five-item one-factor solution did not give a desirable result, RMSEA (0.12) was too high and NNFI (0.94) indicated a mediocre fit. Therefore, the model was respecified by deleting 'item e' with the lowest corrected item-total correlation. The model fit improved; however the RMSEA (0.10) was still large - high enough to reject the null model. In order to improve the model fit, 'item c' with next lowest corrected item-total correlation was removed. The three-item factor is just identified. Lisrel output, therefore, did not give any model statistics. The two removed items are closely related to pay whereas the other three items are related to the status and prestige of the high-tech profession. As the focus of this measure was peoples' attitude toward the high-tech profession rather than how much individuals can earn, the removal of these items is justified theoretically. Factor loadings for this three-item, one-factor model are given in Appendix 5.16 and the fit indices for model comparison are presented in Table 5.25.

Conclusion. The three-item one-factor solution for attitude toward the high-tech profession was retained. The Cronbach's alpha for CFA sample was 0.78.

Table 5.24

Attitude toward a HT Profession: EFA Factor Matrix

Item #	Items	AHT ($\alpha = 0.77$)
a.	As a prestigious career	0.69
b.	As a respected career	0.70
c.	To be high in demand in the job market	0.64
d.	As a high-profile career	0.58
e.	As a better paying career	0.58

Note. AHT refers to attitude toward high-tech profession.

Table 5.25

Attitude toward High-Tech Profession: CFA Model Comparison

	Five-item one-factor solution	Four-item one-factor solution (e deleted)	Three-item one-factor solution (c & e deleted)
RMSEA	0.12	0.11	0.00
CFI	0.97	0.98	No model fit statistics is available as model is saturated
NNFI	0.94	0.95	
SRMR	0.041	0.03	

5.4 Chapter Summary

EFA was run on the first half of the dataset with principal axis factoring and varimax rotation. The extracted factors were then validated and further pruned using CFA on the second half of the dataset. The details on the final measures of the outcome and all

predictor variables, along with the Cronbach's alpha for the full sample, are presented in Table 5.26. According to Nunnally (1978), for newly developed scales, the lower limit of 0.60 for the reliability coefficient is acceptable. This limit is also acceptable in the case of modified scales and in the event where the scale is tested in a context that is distinctly different from the context where the scale had originated. All the measures meet Nunnally's specified criteria, except for distal social supports and feminine gender-role; however, their values are close to the cutoff score and were retained for this study.

Table 5.26

Final Measurement Scale for Outcome and Predictor Variables

Scale	Dimensions	Source	Number of Items	Cronbach's alpha (α)
Intention to Pursue a High-Tech (HT) Career		Wyer et al. (2010) and new items	6	0.89
Technology Self-Efficacy (TSE)	TSE with minimal assistance	Compeau and Higgins (1995)	3	0.69
	TSE with some assistance		4	0.69
Occupational Self-Efficacy		Rigotti et al. (2008)	6	0.78
Outcome Expectation	Career expectations	Lent et al. (2011) and new items	3	0.68
	Self-evaluative expectations		3	0.75
Interest		Lent et al. (2011) and and new items	4	0.76

Social Supports	Proximal Support	Lent et al. (2011)	4	0.66
	Distal Support		2	0.59
Social Barriers			4	0.74
Masculine Gender-Role		Spence and Helmreich (1978)	7	0.69
Feminine Gender-Role		Spence and Helmreich (1978)	5	0.55
Masculine Image of the HT Professionals	Pos. perceptions about HT professionals	New items	3	0.64
	Neg. perceptions about HT professionals		3	0.76
	Gender Rep. in Media	Dyke et al. (2012)	2	0.61
Gendered perceptions	Beliefs about gender and professional choice	Küskü et al. (2007)	5	0.78
	Beliefs about women's socialized interest in HT		5	0.76
	Beliefs about women's innate interest in the HT		2	0.64
	Beliefs about male opportunity in the HT	New items	2	0.65

Chapter 6: Quantitative Analyses –Measures and Relationships

This chapter presents the results of the quantitative data analyses employing the measures extracted through EFA and CFA discussed in chapter 5. The analysis tests hypothesized relationships between the model constructs, after first ascertaining the predictive validity of the subscales. Next, the effects of gender-related variables on the outcome variable, intention to pursue a high-tech career, are examined. Finally, the full model is tested to ascertain the predictive ability of the independent variables and overall predictive power of the model in the Bangladeshi context.

The chapter is organized in four sections: the first section presents the results of correlation analysis on predictor variables that emerged as multidimensional constructs from the factor analysis presented in Chapter 5, and the outcome variable. The correlation analysis helps to determine the magnitude and direction of bivariate relationships between each independent and the dependent variable (Nathans, Oswald, & Nimon, 2012) and also is useful in ascertaining the predictive ability of an indicator (Nunnally & Bernstein, 1994). In the event where a single independent variable is predicting a dependent variable, the correlation coefficient is equivalent to its standardized beta weight. Further, when the correlation coefficients are squared, they equal to the R square from the regression analysis and show the variance explained by the independent variable in the dependent variable (Pedhazur, 1997). According to Nunnally and Bernstein (1994), in a situation where the researcher has to select one independent variable among multiple variables, the researcher should select the one with the highest correlation coefficient because it quantifies how much variance is directly shared between the independent and

dependent variable, without being affected by the shared variance of other independent variables. Using the same analogy, this study employed correlation analysis to ascertain the measurement sub-dimensions with the highest correlation coefficients. The purpose of this analysis was to help decide which dimensions of these variables should be used in the final model analysis.

The second section presents results of correlation analysis between the dimensions of the gender-related contextual factors (masculine image of the high-tech professionals and gendered perceptions) and the dependent variable, intention to pursue a high-tech career. Both contextual measures are multidimensional in nature and therefore the correlation analysis was run to ascertain the predictive power of each dimension on the intention to pursue a high-tech career. These results were instrumental in determining which sub-dimensions of the contextual variables should be retained and which should be removed from further analysis.

The third section tested the hypothesized relationships presented in Chapter 3. Although, some of the hypotheses were tested using the results of correlation analysis presented in earlier two sections, some hypotheses required testing for mediation and moderation effects. Mediation and moderation effects were tested using Baron and Kenny's (1986) approach and therefore several sets of regression analysis were conducted. Details on the mediation and moderation analyses are presented in Section 3. Moreover, as outcome expectations measures had two dimensions – self-evaluative and career outcome expectations, any hypothesis that had outcome expectations as an independent variable, multiple regressions were employed to understand whether both measures were significant or not, and which measure of outcome expectations was a

better predictor of the dependent variable. The third section helped to validate the hypothesized relationships.

In Section four, the hypothesized model is tested in segments using regression analysis. The first segment tested the core SCCT interest and choice model that posits that individuals will pursue a career in a field that is consistent with their self-efficacy, outcome expectations, and interest. The second segment tested the expanded SCCT's interest and choice model (Lent et al., 2000) by adding social support and social barriers to the core SCCT model. In the third segment, the background person variables of masculine gender-role and feminine gender-role, and proximal contextual variables of masculine image of the high-tech and gendered perceptions were examined. Finally, the full hypothesized model was tested that included both SCCT variables and the gender-related variables. This series of regression models contributes to our understanding of the hypothesized relationships and also in understanding the explanatory power of the model. This exercise further helped in pruning the hypothesized model by identifying and eliminating any other redundant factor(s). The pruned model was then tested using Structural Equation Modeling as reported in Chapter 7.

6.1 Selection of Sub-scales

Self-efficacy, outcome expectation, and social support are three important latent variables in the SCCT model. Factor analysis led to the creation of subscales for each of these construct. In order to test the full model, it was necessary to choose between the alternate measures of these constructs. Correlation analyses were run to ascertain which dimension of self-efficacy and social support should represent these constructs in

subsequent analysis. For the outcome expectations measure, however, no such analyses were run.

According to Bandura (1997) outcome expectations include different types of positive and negative outcomes which may work as incentives and disincentives respectively. Most of the studies employing SCCT in predicting choice goals have combined different types of positive expectations in a one-dimensional scale (e.g., Lent et al., 2005; Lent et al., 2008; Lent et al., 2011; Marra & Bogue, 2006). This is potentially problematic because different people may be motivated by different types of expectations and therefore when combined under one construct, it may be difficult to ascertain which type of expectations may have played a more dominant role in their pursuit of career. For example, women may intend to pursue a career with an expectation that it will give them an opportunity to contribute toward society (self-evaluative) whereas men may intend to pursue a career with an expectation to earn an attractive salary (material). Hence, in order to investigate whether differences prevail in the relationships between different expectations and intentions, a decision was made to retain both forms for further analyses.

6.1.1. Self-Efficacy

Data were collected on two measures of self-efficacy: technology self-efficacy and occupational self-efficacy. During the exploratory factor analysis (EFA), the measure of technology self-efficacy resulted in two sub-scales: Technology self-efficacy 1 (TSE 1) captured an individual's perceptions of his or her ability to use technology to complete a task or assignment without help from others and/or prior experiences whereas,

technology self-efficacy 2 (TSE 2) captured an individual's perceptions of his or her ability to use technology to complete a task or assignment with assistance from others, prior experience, and with ample time. Occupational self-efficacy (OSE), however, remained as one-dimension.

With three measures of self-efficacy, a decision had to be made regarding which measure to use. Generally, a single measure of technology self-efficacy would have been preferable as it would be more domain specific; however, the two distinct dimensions of technology self-efficacy cast doubts on the validity of the predictor. In order to ascertain the best measure of self-efficacy, correlation analysis was run using three measures of self-efficacy with all of the dependent variables self-efficacy is expected to predict in the hypothesized model. The dependent variables are intention to pursue a high-tech career, interest, self-evaluative expectations, and career expectations. The results of the correlation analysis are presented in Table 6.1.

The results presented in Table 6.1 show that all three measures of self-efficacy have significant relationships with the outcomes. In all instances, occupational self-efficacy was found to be related more strongly to the outcomes, compared to the other two measures of technology self-efficacy (see Table 6.1).

Summary and Decision. Among the three measures of self-efficacy, occupational self-efficacy was found to be the strongest predictor. It explained larger variance in the intention to pursue a high-tech career, self-evaluative and career outcome expectations, and interest. Therefore, occupational self-efficacy was used as the measure of self-efficacy for all further analyses.

Table 6.1

The Three Alternative Measures of Self-Efficacy and the Dependent Variables

Dependent Variables / Self-efficacy Measures	Intention to pursue a high-tech career	Interest	Self-evaluative outcome expectations	Career outcome expectations
Technology self-efficacy 1	0.18^{***}	0.27^{***}	0.17^{***}	0.25^{***}
Technology self-efficacy 2	0.30^{***}	0.34^{***}	0.37^{***}	0.32^{***}
Occupational self-efficacy	$\mathbf{0.44}^{***}$	$\mathbf{0.50}^{***}$	$\mathbf{0.48}^{***}$	$\mathbf{0.48}^{***}$

Note. All cells are reporting correlation coefficients (r). Significant at: *p < 0.05, **p < 0.01 and ***p < 0.001.

6.1.2. Social Support

Social support was another construct that resulted in two dimensions during the factor analysis. The two dimensions were proximal social support and distal social support. Proximal support referred to the type of support one receives from close family and friends and distal support referred to the type of support one receives from having access to mentors and role models (i.e. from people outside family and friends). In order to ascertain the better predictor of social support, correlation analysis was run using two measures of social support with the dependent variables being intention to pursue a high-tech career and occupational self-efficacy. The results of the correlation analysis are presented in Table 6.2.

Table 6.2

The Two Alternative Measures of Social Support and the Dependent Variables

Dependent Variables / Social Support Measures	Intention to pursue a high-tech career	Occupational self-efficacy
Distal Support	0.11***	0.14***
Proximal Support	**0.32*** **	**0.39*** **

Note. All cells are reporting correlation coefficients (r). Significant at: *p < 0.05, **p < 0.01 and ***p < 0.001.

The results presented in Table 6.2 show that both measures of social support are significant ($p < 0.01$). The positive value of the correlations and the significance of the coefficients indicate that both measures of social support are positively related to the dependent variables. Proximal support was found to be more strongly related to both intention to pursue a high-tech career ($r = .32$, $p < 0.01$) and occupational self-efficacy ($r = .39$, $p < 0.01$) compared to the distal support measure.

Summary and Decision. Correlation analysis was run for both measures of social support and the results indicated that proximal social support was a better predictor explaining larger variance in the dependent variables. Therefore, proximal social support was used as the measure of social support for the present study and from here on this measure will be referred to as social support.

6.2 Selection of Sub-Scales for Gender-Related Contextual Variables

The aim of the current study was to identify the extent to which SCCT's interest and choice model predictors could predict Bangladeshi undergraduate engineering students' intention to pursue a career in the high-tech sector. Further, this study was interested in exploring whether gender-related contextual factors played a role in female and male engineering students' career intentions in Bangladesh. Because the contextual variables of masculine image and gendered perceptions have never been empirically tested in this context, scale development for these measures was more exploratory in nature and therefore incorporated multiple dimensions. Correlation analyses were therefore conducted to ascertain which sub-dimensions of masculine image and gendered perceptions were most strongly related to the intention to pursue a high-tech career.

6.2.1 Masculine Image of High-Tech Professionals

Two dimensions of masculine image of high-tech professionals were proposed: stereotypical perceptions about high-tech professionals and gender representation in the media. During factor analysis, stereotypical perceptions about high-tech professionals resulted in two dimensions - positive stereotypical perceptions and negative stereotypical perceptions. With two distinct stereotypical perception measures and a third measure of gender representation in media, it was important to ascertain the measure that would be most appropriate in testing the hypothesized relationship to masculine image. Correlation analysis was therefore used and the results are presented in Table 6.3.

Table 6.3

The Three Measures of Masculine Image and Intention to Pursue a High-Tech Career

Dimensions of Masculine Image of the High-Tech Professionals (Independent Variables)	Intention to Pursue a High-Tech Career (Dependent Variable)
Stereotypical Positive Perceptions of the HT Professionals	0.45***
Stereotypical Negative Perceptions of the HT Professionals	-0.11**
Media Representation of the HT Professionals	**0.37*** **

Note. All cells are reporting correlation coefficients (r). Significant at: *p < 0.05, **p < 0.01 and ***p < 0.001

The results presented in Table 6.3 show that all three dimensions of masculine image of high-tech professionals are significantly related to intention to pursue a high-tech career. The positive value of the correlations and the significance of the coefficients for stereotypical positive perceptions and media representation indicate that these two measures are positively related to the intention to pursue a high-tech career, whereas, the negative value of the correlation and the significance of the coefficient for stereotypical negative perceptions indicates that this dimension is negatively related to the intention behavior. Among the three dimensions, stereotypical positive perceptions was more strongly related to intention to pursue a high-tech career (r = .45, p < 0.01) followed by gender representation in the media (r = .38, p < 0.01). A relatively lower association was found between negative stereotypical perceptions and intention to pursue a high-tech career (r = -.11, p < 0.01).

Summary and Decision. Correlation analysis was run between three measures of masculine image of high-tech professionals and the intention to pursue a high-tech career. As negative stereotypical perception about high-tech professionals indicated a weaker relationship with very low predictive power, it was removed from future analyses.

This study hypothesized that men and women's intention to pursue a high-tech career may be swayed by a masculine image of high-tech professionals. Among the remaining two dimensions of masculine image: positive stereotypical perceptions about high-tech professionals and gender representation in the media, a lower score on positive stereotypical perceptions does not necessarily reflect a masculine image (e.g., intelligent and outgoing) but a higher score on gender representation in the media does reflect a masculine image (e.g., more male models and anchors in high-tech related product advertisements and shows). Despite positive perceptions about high-tech professionals being a stronger predictor of intentions, gender representation in the media was retained as the measure of masculine image due to its closer fit with the construct. The term masculine image of high-tech professionals and gender representation in the media from hereafter refer to the same construct and may be used interchangeably.

6.2.2 Gendered Perceptions

Gendered perceptions were originally proposed as a multidimensional construct with five sub-scales; however, due to the results of factor analysis presented in Chapter 5, one sub scale was dropped. Subsequent CFA validated a four-factor measurement model for gendered perceptions. The dimensions were beliefs about gender and professional choice, beliefs about women's socialized interest in the high-tech profession, beliefs

about male opportunity in the high-tech profession, and beliefs about women's innate interest in the high-tech profession. Among these four dimensions, it was important to ascertain which measure(s) would be most appropriate for testing the hypothesized relationship. Correlation analysis was therefore conducted using the four measures of gendered perceptions with the intention to pursue a high-tech career. The results of the correlation analysis are presented in Table 6.4.

Table 6.4

The Four Measures of Gendered Perceptions and Intention to Pursue a High-Tech Career

Gendered Perceptions (Independent Variables)	Intention to Pursue a High-Tech Career (Dependent Variable)
Gender and Professional Choice	**0.14****
Women's Socialized Interest in the HT Profession	0.02
Women's Innate Interest in the HT Profession	-0.03
Male Opportunity in the HT Profession	-0.06

Note. All cells are reporting correlation coefficients (r). Significant at: *p < 0.05, **p < 0.01 and ***p < 0.001.

The results presented in Table 6.4 show that except for the dimension of beliefs about gender and professional choice, all the three other dimensions of gendered perceptions were not significant ($p > 0.05$). The positive value of the correlation and the significance of the coefficient for beliefs about gender and professional choice indicated that this measure was positively related to the intention to pursue a high-tech career (r =

.14, $p < 0.01$); however, the relationship was weak and explained only 2.0% of the variance in the dependent variable.

Summary and Decision. Correlation analysis was run between the four measures of gendered perceptions and the intention to pursue a high-tech career. Three of the four measures were found to be unrelated and therefore, these three measures - beliefs about women's socialized interest, beliefs about male opportunity in the high-tech, and beliefs about women's innate interest – were eliminated. On the basis of the correlation results, only the dimension of beliefs about gender and professional choice was significant and therefore was retained as a measure of gendered perceptions.

6.3 Testing Hypothesized Relationships in the Proposed SCCT Model

In this section results of correlation and regression analyses are used to test the hypothesized relationships presented in Chapter 3 of this study. The list of hypotheses is presented in Table 6.5 for ease of reference.

The hypotheses were tested using correlation and regression analysis and are presented in the same sequence as presented in the Table 6.5. The hypotheses - H1, H2, H5, H6, H7, and H8 - were tested using correlation analysis. Hypotheses H3 and H4 were tested using multiple regressions. Hypotheses H9 and H10 are tested for mediated relationships using Baron and Kenny's (1986) approach to test for mediation. Next, hypotheses H11 and H12, the relationship between gender-role and intention to pursue a high-tech career, were tested using correlation analysis. Finally hypotheses H13

Table 6.5

List of the Study Hypotheses

No.	Hypothesis
H1	Occupational self-efficacy will be positively related to intention to pursue a high-tech career.
H2	Occupational self-efficacy will be positively related to interest in a high-tech career.
H3	Outcome expectations will be positively related to intention to pursue a high-tech career.
H4	Outcome expectations will be positively related to interest in a high-tech career.
H5	Occupational self-efficacy will be positively related to outcome expectations.
H6	Interest will be positively related to intention to pursue a high-tech career.
H7	Social support will be positively related to intention to pursue a high-tech career.
H8	Social barriers will be negatively related to intention to pursue a high-tech career.
H9	Occupational self-efficacy will mediate the relationship between social support and intention to pursue a high-tech career.
H10	Occupational self-efficacy will mediate the relationship between social barriers and intention to pursue a high-tech career.
H11A	Masculine gender-role will be positively related to occupational self-efficacy for intention to pursue a high-tech career.
H11B	Feminine gender-role will be negatively related to occupational self-efficacy for intention to pursue a high-tech career.
H12A	Masculine gender-role will be positively related to outcome-expectations for intention to pursue a high-tech career.
H12B	Feminine gender-role will be negatively related to outcome-expectations for intention to pursue a high-tech career.
H13A	A masculine image of high-tech professionals will be negatively related to intention to pursue a high-tech career for female students.
H13B	A masculine image of high-tech professionals will be positively related to intention to pursue a high-tech career for male students.
H14A	Gendered perceptions about the high-tech sector and intention to pursue a high-tech career will be negatively related for female students
H14B	Gendered perceptions about the high-tech sector and intention to pursue a high-tech career will be unrelated for male students.

and H14 were tested for moderated relationships using Baron and Kenny's (1986) approach to test for moderation.

As per the analysis of Section 6.1, all the relationships that involve self-efficacy used the occupational self-efficacy measure and all the relationships that involve social support used the proximal social support measure referred to as social support hereafter. Also, as per the analysis of Section 6.2, masculine image of the high-tech professionals was measured by the gender representation in the media and gendered perceptions were measured by beliefs about gender and professional choice for all subsequent analysis.

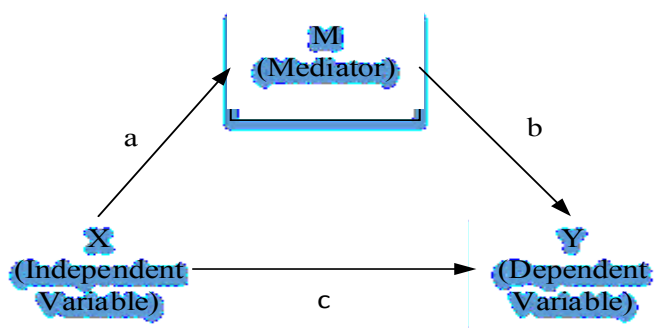
Some of the hypotheses presented in Table 6.5 required testing for mediating and moderating effects. Baron and Kenny define a mediator as "a variable, which represents the generative mechanism through which a focal independent variable is able to influence the dependent variable of interest" (1986: 1173). In contrast, Baron and Kenny define a moderator as "a qualitative (e.g., sex, race, class) or quantitative (e.g., level of reward) variable that affects the direction and/or strength of the relation between an independent or predictor variable and a dependent or criterion variable" (1986: 1174). Put simply, mediation is present when one variable affects a second variable that in turn affects a third variable. Moderation is present when a third variable is able to change the relationship between an independent and dependent variable.

To illustrate mediation, Baron and Kenny (1986) presented the casual chain model depicted in Figure 6.1 and proposed a four step approach to test it. Regression analyses are conducted for each step to examine the significance of the coefficients. Thus, the four steps are:

1. Conduct a simple regression analysis with X predicting Y to test for path 'c' alone. The effect of X on Y must be significant.
2. Conduct a simple regression analysis with X predicting M to test for path 'a'. The effect of X on M must be significant.
3. Conduct a simple regression analysis with M predicting Y to test for path 'b.' (As a check also run hierarchical regression analysis M predicting Y, while X is controlled for. The effect of M on Y controlled for X must be significant. X is treated as a control variable because M and Y may be correlated as they both are caused by X. Thus by controlling for X, the effect of M on the Y can be established).
4. Conduct a multiple regression analysis with X and M predicting Y. The effect of X on Y controlled for M must be smaller than the total effect of X on Y i.e. the indirect path of X to Y through M ($a\ x\ b$) must be smaller than total effects of X on Y ($a\ x\ b + c$).

Figure 6.1

Mediation Model



Mediation is said to occur only if the relationships in Steps 1, 2, and 3 are significant. Mediation is not possible if one or more of these relationships are non-significant. Assuming the first three steps are significant, one moves to the fourth step. In Step 4, if X is no longer significant, after controlling for M, the finding supports full mediation. If X is still significant, that is both X and M significantly predict Y, the finding supports partial mediation. Because mediation includes both direct effects through path 'c' and indirect effects through paths 'a' and 'b', MacKinnon, Lockwood, Hoffman, West, & Sheets (2007) argue that Baron and Kenny's (1986) approach to test mediation can be problematic as it does not test the significance of the indirect effects. This issue can be addressed by calculating indirect effects and testing for their significance. The regression coefficient for the indirect effect represents the change in Y for every unit change in X that is mediated by M.

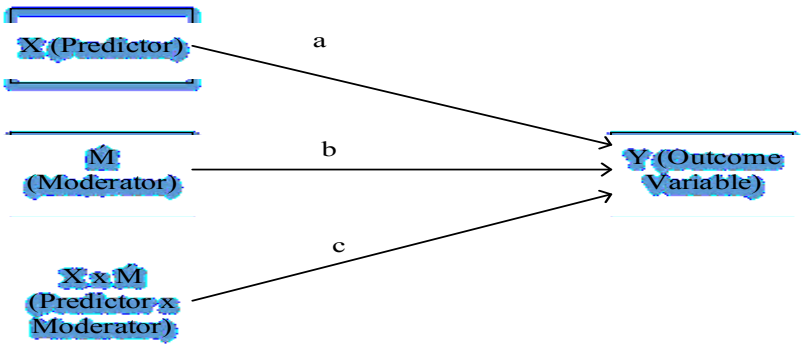
Sobel (1982) has provided a significance test for indirect effects of the independent variable on the dependent variable via a mediator. Sobel's (1982) test first calculates the indirect effects by multiplying two regression coefficients: the beta coefficient obtained from Step 2 (X predicting M) and the beta coefficient obtained from Step 3 (the association between M and Y). In the next step, the standard error of the indirect effect is calculated by multiplying the two standard errors (obtained from Steps 2 and 3). The presence of mediation is then assessed by dividing the regression coefficients of the indirect effects by the standard errors of the indirect effects. The obtained value is then compared against a standard normal distribution to test for significance. If significance is found, mediation is considered to be present. Sobel's test is said to be one of the most widely used methods in testing mediation using regression coefficients and

standard errors in psychological research (Kenny 2014; MacKinnon et al., 2007). Thus to test for the mediating effects in this study, Baron and Kenny's (1986) four step approach, along with Sobel's (1982) test for the significance of indirect effects, have been used.

Moderators, on the other hand, are calculated by creating a product term between the independent variable and the moderator (See Figure 6.2). This is also known as an interaction term. Multiple regression analysis is used to determine the moderation effect. Moderation is said to exist if the interaction term is significant. This indicates that the effect of the independent variable changes depending on the level of the moderator (Baron & Kenny, 1986).

Figure 6.2

Moderator Model



It is important to note that in order to run mediation and moderation analysis, variables and their interaction terms need to be centred before they are entered into the regressions to test for mediation and moderation effects (Fairchild & MacKinnon, 2009). Therefore in the present study, the relevant variables and interaction terms were centered before entering them into the regressions for mediation and moderation analysis.

The following sections present the hypothesis testing results in the sequence identified in Table 6.5. Because many of the hypotheses are tested using correlation analysis, correlations of all the study variables are presented in Table 6.6 and reference is made to this Table where appropriate.

6.3.1 Occupational Self-efficacy and Intention to Pursue a High-Tech Career

The first hypothesis examines the relationship between self-efficacy and intention to pursue a high-tech career. The correlation results presented in Table 6.6 show that occupational self-efficacy is positively related to intention to pursue a high-tech career (r = 0.44, p<.01) and the relationship is highly significant. Thus, hypothesis H1 was supported.

6.3.2 Occupational Self-efficacy and Interest

The second hypothesis examines the relationship between self-efficacy and interest. The result presented in Table 6.6 show that occupational self-efficacy is positively and significantly related to interest in the technology domain (r = 0.50, p<.01). Thus, hypothesis H2 was supported.

6.3.3 Outcome Expectations and Intention to Pursue a High-Tech Career

The third hypothesis examines the relationship between outcome expectations and intention to pursue a high-tech career. Previous analysis showed that outcome expectations are a multi-dimensional construct comprised of self-evaluative expectations and career expectations. The same theoretical logic can be applied to both dimensions of

Table 6.6

Correlation Analysis for Model Predictors (*n* = 976)

	HTC	OSE	SlfOE	CarOE	INT	SocSup	SocBar	FEM	MAS	MasImg	GenPer
HTC	1.00										
OSE	0.44***	1.00									
SlfOE	0.45***	0.48***	1.00								
CarOE	0 .40***	0.48***	0.63***	1.00							
INT	0.49***	0.50***	0.48***	0.42***	1.00						
SocSup	0.32***	0.39***	0.32***	0.25***	0.39***	1.00					
SocBar	-0.05	-0.05	-0.26***	- 0.20***	-0.07*	-0.11**	1.00				
FEM	0.28***	0.20***	0.28***	0.16***	0.25***	0.21***	-0.09**	1.00			
MAS	0.27***	0.31***	0.26***	0.26***	0.33***	0.12***	-0.05	0.39***	1.00		
MasImg	0.38***	0.28***	0.36***	0.34***	0.34***	0.23***	-0.08*	0.22***	0.21***	1.00	
GenPer	0.14***	0.21***	0.18***	0.19***	0.18***	0.02	0.06	0.17***	0.31***	0.19***	1.00

Note. Significant at: *p < 0.05, **p < 0.01 and ***p < 0.001. Due to space limitations, abbreviated forms of the variable names are used. *HTC* refers to intention to pursue a high-tech career; *OSE* refers to occupational self-efficacy; *SlfOE* and *CarOE* refer to self-evaluative and career outcome expectations; *INT* refers to interest; *SocSup* and *SocBar* refer to social support and social barriers respectively; *FEM* and *MAS* refer to feminine gender-role and masculine gender-role; *MasImg* refers to masculine image of the high-tech professionals; and *GenPer* refers to gendered perceptions.

outcome expectations; hence it is hypothesized that both self-evaluative and career expectations will positively predict intention to pursue a high-tech career.

The correlation results presented in Table 6.6 indicates that both measures of outcome expectations were positively, and significantly, related to intention to pursue a high-tech career, however, the magnitude of the relationship was different. The relationship between self-evaluative expectations (r = 0.45, p<.01) and intention to pursue a high-tech career was slightly stronger than the relationship between career expectations (r = 0.40, p<.01) and intention to pursue a high-tech career. Overall, Hypothesis 4 was supported i.e. outcome expectations were positively related to intention to pursue a high-tech career.

In addition to the correlation analysis, this relationship was also examined through multiple regression analysis. Multiple regression was employed to understand which measure of outcome expectations was a better predictor of the intention to pursue a high-tech. The multiple regression results are presented in Table 6.7.

The results show that both outcome expectations measures predict intention to pursue a high-tech career. The significant standardized beta values for self-evaluative (β =0.32, p<.01) and career (β=0.20, p<.01) expectations indicate that both measures positively predicted intention to pursue a high-tech career. Between the two measures, however, self-evaluative expectations was found to be a stronger predictor of intention behavior than career expectations lending support to the correlation results. The outcome expectations measures together explained 22.3% of the variance in the intention to pursue a high-tech career.

Table 6.7

Outcome Expectations and Intention to Pursue a High-Tech Career

Predictor	Standardized β Coeffs.	Sig.	Model Summary	
			Adjusted R Square	Sig.
Self-evaluative Outcome Expectations	0.32	0.00	0.22	0.00
Career Outcome Expectations	0.20	0.00		
Dependent Variable: Intention to Pursue a High-Tech Career				

6.3.4 Outcome Expectations and Interest

The fourth hypothesis examines the relationship between outcome expectations and interest in the technology domain. It was predicted that both measures of outcome expectations - self-evaluative and career - would positively predict interest in the technology domain.

According to the correlation results presented in Table 6.6, both measures of outcome expectations were positively and significantly related to interest in the technology domain, however, the magnitude of relationship was different. The relationship between self-evaluative expectations (r = 0.48, p<.01) and intention to pursue a high-tech career was marginally stronger than the relationship between career expectations (r = 0.42, p<.01) and intention to pursue a high-tech career. Overall, Hypothesis 4 was supported i.e. outcome expectations were positively related to intention to pursue a high-tech career.

In addition to the correlation analysis, this relationship was examined using multiple regression analysis. The multiple regression results presented in Table 6.8 show that the model is highly significant. The significant standardized beta values for self-

Table 6.8

Outcome Expectations and Interest

Predictor	Standardized βeta Coeffs.	Sig.	Model Summary	
			Adjusted R Square	Sig.
Self-evaluative Outcome Expectations	0.35	0.00	0.25	0.00
Career Outcome Expectations	0.20	0.00		
Dependent Variable: Intention to Pursue a High-Tech Career				

evaluative expectations (β =0.35, p<.01) and career expectations (β=0.20, p<.01) show that both measures positively predicted intention. Between the two measures, however, the self-evaluative measure was a better predictor of intention behavior. The outcome expectations measures together explained 24.9% variance in the dependent variable, interest. The results supported Hypothesis 4 that outcome expectations will positively relate to interest.

6.3.5 Occupational Self-efficacy and Outcome Expectations

The fifth hypothesis examines the relationship between occupational self-efficacy and outcome expectations. There are two measures of outcome expectations - self-evaluative outcome expectations and career outcome expectations. The same theoretical logic applied to both measures. The hypothesis H5 therefore predicts that occupational self-efficacy will be positively related to both: self-evaluative and career outcome expectations.

The results of the correlation analysis as presented in Table 6.6 show that occupational self-efficacy is positively and significantly related to both self-evaluative

outcome expectations (r = 0.48, p<.01) and career outcome expectations (r = 0.48, p<.01). Thus, hypothesis H5 is supported, that is, higher efficacy beliefs were positively related to self-evaluative expectations and career expectations.

6.3.6 Interest and Intention to Pursue a High-Tech Career

Hypothesis H6 states that interest will be positively related to intention to pursue a high-tech career. The results in Table 6.6 showed that the relationship is positive and significant (r = 0.49, p<.01). Thus, hypothesis H6 is supported - higher interest in the technology domain may strengthen the intention to pursue a high-tech career.

6.3.7 Social support and Intention to Pursue a High-Tech Career

The seventh hypothesis examines the relationship between social support and intention to pursue a high-tech career. The results presented in Table 6.6 indicate that social support is significantly and positively related to intention to pursue a high-tech career (r=.32, p<.01). Thus, hypothesis H7 is supported.

6.3.8 Social Barriers and Intention to Pursue a High-Tech Career

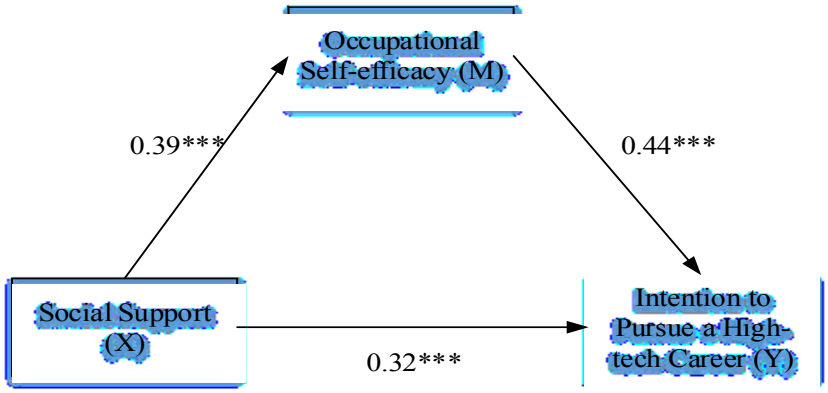
Hypothesis 8 suggests that social barriers will be negatively related to intention to pursue a high-tech career. According to the results of Table 6.6, the relationship between social barriers and intention to pursue a high-tech career was not significant (r= -.05, p>.05). Thus, hypothesis H8 was not supported. The presence of social barriers does not have any significant impact on students' intention to pursue a high-tech career.

6.3.9 Social Support and Intention to Pursue a High-tech Career: Mediating Effect of Occupational Self-Efficacy

Hypothesis 9 suggests that occupational self-efficacy will mediate the relationship between social support and intention to pursue a high-tech career. Following Baron and Kenny's (1986) suggested steps, regression analyses were run to test the mediation. The relationship between social support and intention to pursue a high-tech career was found to be mediated by occupational self-efficacy (results for all the regressions for all four steps are presented in Appendix 6).

Figure 6.3

Social Support and Intention to Pursue a High-Tech Career: Occupational Self-efficacy as a Mediator



Note. Significant at: *p < 0.05, **p < 0.01 and ***p < 0.001.

As Figure 6.3 illustrates, the standardized beta coefficient between social support and occupational self-efficacy was statistically significant (β = .39, p <0.01), as was the standardized beta coefficient between occupational self-efficacy and intention to pursue a

high-tech career (β = .44, p <0.01). The standardized indirect effect was (.44)(.39) = 0.17. The significance of this indirect effect was assessed using Preacher and Leonardelli's (2003) interactive calculation tool for the Sobel test. The results for indirect effects significance testing are also presented in Appendix 6). The indirect effect was found to be significant at the 95% confidence level (p<0.05). Therefore, hypothesis H9 was supported. Occupational self-efficacy mediates the relationship between social support and intention to pursue a high-tech career.

6.3.10 Social barriers and Intention to Pursue a High-tech Career: Mediating Effect of Self-Efficacy

Like Hypothesis 9, Hypothesis 10 also states that self-efficacy will mediate the relationship between social barriers and intention to pursue a high-tech career. Mediation analysis could not be tested for this hypothesis because the necessary conditions were not met. Mediation is only present when one variable affects a second variable that in turn affects a third variable. In the relationship between social barriers and occupational self-efficacy, the standardized beta coefficient between social barriers and occupational self-efficacy was not significant (β = -0.05, p >0.05) indicating that social barriers do not affect occupational self-efficacy. Thus, hypothesis H10 was not supported; occupational self-efficacy does not mediate the relationship between social barriers and intention to pursue a high-tech career.

6.3.11 Gender-role Orientation and Occupational Self-Efficacy

Hypothesis 11 examines the relationship between gender-role and occupational self-efficacy. Two types of gender-role orientation are examined in this study - masculine

gender-role and feminine gender-role. Hypothesis 11A suggests, masculine gender-role will be positively related to occupational self-efficacy whereas, Hypothesis 11B suggests, feminine gender-role will be negatively related to occupational self-efficacy.

The correlation results presented in Table 6.6 indicate that masculine gender-role was positively and significantly related to occupational self-efficacy (r = 0.31, p<.01) and therefore supported Hypothesis 11A. Likewise, the relationship between feminine gender-role and occupational self-efficacy as presented in Table 6.6 was significant (r = 0.20, p<.01). The positive relationship between feminine gender-role and occupational self-efficacy contradicts the hypothesized relationship. Since feminine gender-role was not negatively related to occupational self-efficacy, Hypothesis H11B was not supported. This indicates that a feminine gender-role orientation does not weaken, but may strengthen, one's efficacy beliefs.

6.3.12 Gender-role Orientation and Outcome Expectations

Hypothesis 12 examines the relationship between gender-role orientation and outcome expectations. There are two measures of outcome expectations – career and self-evaluative - that constituted two dependent variables. Extending the original theoretical logic, Hypothesis H12A therefore predicts that masculine gender-role will be positively related to both measures of outcome expectations: self-evaluative and career outcome expectations. Hypothesis 12B, predicts that feminine gender-role will be negatively related to both measures of outcome expectations.

The correlation results presented in Table 6.6 indicate that the relationships between masculine gender-role and self-evaluative outcome expectations and career outcome expectations are highly significant. Masculine gender-role is positively related

to both self-evaluative expectations (r = 0.26, p<.01) and career expectations (r = 0.26, p<.01). The magnitude of the relationship was equal for both outcome expectations measures. Thus, Hypothesis H12A was supported - individuals with more masculine attributes have higher self-evaluative and career expectations.

The correlation results presented in Table 6.6 also indicate that the relationships between feminine gender-role and self-evaluative outcome expectations and career outcome expectations are highly significant. Feminine gender-role is positively related to both self-evaluative outcome expectations (r = 0.28, p<.01) and career outcome expectations (r = 0.16, p<.01). The positive relationship between feminine gender-role and outcome expectations contradicts the hypothesized relationship. Since feminine gender-role was not negatively related to outcome expectations, Hypothesis 11B was not supported. This indicates that a feminine gender-role does not weaken, but rather strengthens, one's expectations.

6.3.13 Masculine Image of High-Tech Professionals and Intention to Pursue a High-Tech Career

Hypothesis 13 suggests that masculine images of high-tech professionals have differential effects on engineering students' intention to pursue a high-tech career based on their biological sex. In other words, Hypothesis H13A proposes that a masculine image of high-tech professionals will be negatively related to intention to pursue a high-tech career for female students while Hypothesis H13B proposes that a masculine image of high-tech professionals will be positively related to intention to pursue a high-tech career for male students. In order to test these hypotheses for moderating effects, hierarchical regression analysis was used. To test the moderating effects, in Step 1, the main effects of the predictors were tested. If the

main effects were significant, then an interaction term between the two variables was tested in Step 2. A significant beta for the interaction term and a significant change in R^2 from Step 1 to Step 2 suggests a moderating effect.

The regression results for Step 1 are presented in Table 6.9. Masculine image as measured by gender representation in the media, was entered into the model along with gender as independent variables. Intention to pursue a high-tech career was the dependent variable. The results presented in Table 6.9 show that the tested model in the first step is highly significant ($p<.01$). The standardized beta for masculine image was significant (β =.38, $p<.01$) however, the standardized beta for gender was not significant (β = -.02, $p>.05$), indicating that biological sex of engineering students' does not influence their intention to pursue a high-tech career. Next the interaction term was entered into the model, the standardized beta for the interaction term (β = -.176, $p>.05$), and the overall model was not significant. Thus, based on the results presented in Table 6.9, it is evident that masculine image of high-tech professionals does positively influence engineering students' intention to pursue a high-tech career, however, the influence is invariant across gender, that is, both male and female engineering students' intention to pursue a high-tech career are strengthened by a masculine image of high-tech professionals. This finding contradicts Hypothesis H13A that suggested a masculine image of the high-tech professionals would weaken female students' intention to pursue a high-tech career. Therefore Hypothesis H13A was not supported. On the other hand, masculine image does positively influence intention behavior for both male and female engineering students and therefore, technically, support was found for Hypothesis H13B.

Table 6.9

Moderating effect of Gender on Image and Intention to Pursue a High-Tech Career

Steps	Predictors	Standardized Beta Coefficients	Sig.	Model Summary		Change Summary	
				Adjusted R Square	Sig.	R Square Change	Sig.
1.	MasImg	0.38	0.00	0.14	0.00	0.15	0.00
	Gender	-0.02	0.56				
	MasImg	0.40	0.00	.00	0.32	0.00	0.32
	Gender	-0.19	0.31				
2	MasImg x Gender	-0.18	0.35				
	Dependent Variable: Intention to Pursue a High-Tech Career						

Note. MasImg refers to masculine image of high-tech professionals.

6.3.14 Gendered Perceptions and Intention to Pursue a High-Tech Career

Hypothesis 14 suggests gendered perceptions about the high-tech profession have differential effects on engineering students' intention to pursue a high-tech career based on their biological sex. In other words, Hypothesis 14A suggests that gendered perceptions and intention to pursue a high-tech career will be negatively related for female students while Hypothesis 14B suggests that gendered perceptions and intention to pursue a high-tech career will be unrelated for male students. In order to test the moderating effect of gender, In Step 1, the independent variables of gendered perceptions and gender were entered. The regression results are presented in Table 6.10.

The regression results presented in Table 6.10 show that the tested model in the first step was highly significant ($p<.01$); the standardized beta for gendered perceptions was significant (β =.14, $p<.01$), however, the standardized beta for gender was not significant (β = .04, $p<.01$). Next the interaction term was entered into the model, the

standardized beta for the interaction term (β = -.16, p>.05), and the overall model was also not significant.

The regression results presented in Table 6.10 indicate that gendered perceptions do positively influence intention to pursue a high-tech career, however, the influence is invariant across gender, that is, both male and female engineering students' intention to pursue a high-tech career are strengthened due to gendered perceptions as represented by beliefs about gender and professional choice. This finding is contrary to Hypothesis H14A that suggested gendered perceptions would weaken female students' intention to pursue high-tech careers and therefore Hypothesis 14A was not supported. Likewise, support was not found for Hypothesis H14B that suggested, gendered perceptions will be unrelated to male students' intention to pursue high-tech careers.

Table 6.10

Moderating effect of Gender on Gendered Perceptions and Intention to Pursue a High-Tech Career

Steps	Predictors	Standardized Beta Coefficients	Sig.	Model Summary		Change Summary	
				Adjusted R Square	Sig.	R Square Change	Sig.
1.	GenPer	0.14	0.000	0.02	0.15	0.20	0.00
	Gender	0.04	0.170				
	GenPer	0.23	0.006	0.02	0.30	0.00	0.30
	Gender	0.17	0.170				
2	GenPer x Gender	-0.16	0.300				
Dependent Variable: Intention to Pursue a High-Tech Career							

6.3.15 Summary of Hypothesis Testing Results

A summary of the hypotheses tests is presented in the following Tables 6.11 and 6.12. Table 6.11 consists of hypotheses related to SCCT's interest and choice model, while Table 6.12 presents gender-related hypotheses.

Table 6.11

Hypotheses Testing for SCCT's Interest and Choice Model

Hypothesis		Supported	Sig. Opp
H1	*Self-efficacy will be positively related to intention to pursue a high-tech career.*	√	
H2	*Self-efficacy will be positively related to interest for intention to pursue a high-tech career.*	√	
H3	*Outcome expectations will be positively related to intention to pursue a high-tech career.*	√	
H4	*Outcome expectations will be positively related to interest in a high-tech career.*	√	
H5	*Self-efficacy will be positively related to outcome expectations.*	√	
H6	*Interest will be positively related to intention to pursue a high-tech career.*	√	
H7	*Social support will be positively related to intention to pursue a high-tech career.*	√	
H8	*Social barriers will be negatively related to intention to pursue a high-tech career.*	*X*	
H9	*Self-efficacy will mediate the relationship between social support and intention to pursue a high-tech career.*	√	
H10	*Self-efficacy will mediate the relationship between social barriers and intention to pursue a high-tech career.*	*X*	

Note. √ refers to supported and *X* refers to not supported. *Sig. Opp* refers to significant opposite.

Table 6.12

Hypothesis Testing for Gender-Related Variables

Hypothesis		Supported	Sig. Opp
H11 A	*Masculine gender-role will be positively related to self-efficacy for intention to pursue a high-tech career.*	√	
H11 B	*Feminine gender-role will be negatively related to self-efficacy for intention to pursue a high-tech career.*		√
H12 A	*Masculine gender-role will be positively related to outcome-expectations for intention to pursue a high-tech career.*	√	
H12 B	*Feminine gender-role will be negatively related to outcome-expectations for intention to pursue a high-tech career.*		√
H13 A	*A masculine image of high-tech professionals will be negatively related to intention to pursue a high-tech career for female students.*	*X*	
H13 B	*A masculine image of high-tech professionals will be positively related to intention to pursue a high-tech career for male students.*	√	
H14 A	*Gendered perceptions about the high-tech sector and intention to pursue a high-tech career will be negatively related for female students*	*X*	
H14 B	*Gendered perceptions about the high-tech sector and intention to pursue a high-tech career will be unrelated for male students.*	*X*	

Note. √ refers to supported and *X* refers to not supported. *Sig. Opp* refers to significant opposite.

6.4 Testing of Hypothesized Models

In this section, the hypothesized model presented in Chapter 3 of this study is tested. The model was tested in four parts in order to understand the impact of each segment on the intention to pursue a high-tech career. The first segment measures the core SCCT interest and choice model (Lent et al., 1994). The second segment measures the expanded SCCT interest and choice model (Lent et al., 2000) to understand the influence of social support and barriers on intention to pursue a high-tech career. The third segment tests the effects of gender-related variables: the background person variable of gender-role orientation and contextual variables of masculine image of high-tech professionals and gendered perceptions. The final segment tests the full model that includes both SCCT variables and the gender-related variables.

6.4.1 Core SCCT Interest and Choice Model

The core SCCT model is depicted in Figure 6.4. In this model, intention to pursue a high-tech career is predicted by the independent variables: Occupational self-efficacy, two measures of outcome expectations: self-evaluative and career outcome expectations, and interest. The results of hierarchical regression analysis presented in Table 6.13 show that the model is highly significant.

Occupational self-efficacy was first entered into the model. Step 1 results in Table 6.13 show a highly significant standardized beta for occupational self-efficacy (β= .44, p<.01). Further, the significant adjusted R^2 in this step shows that occupational self-efficacy explained 19.4% variance in intention to pursue a high-tech career.

Figure 6.4

Core SCCT's Interest and Choice Model

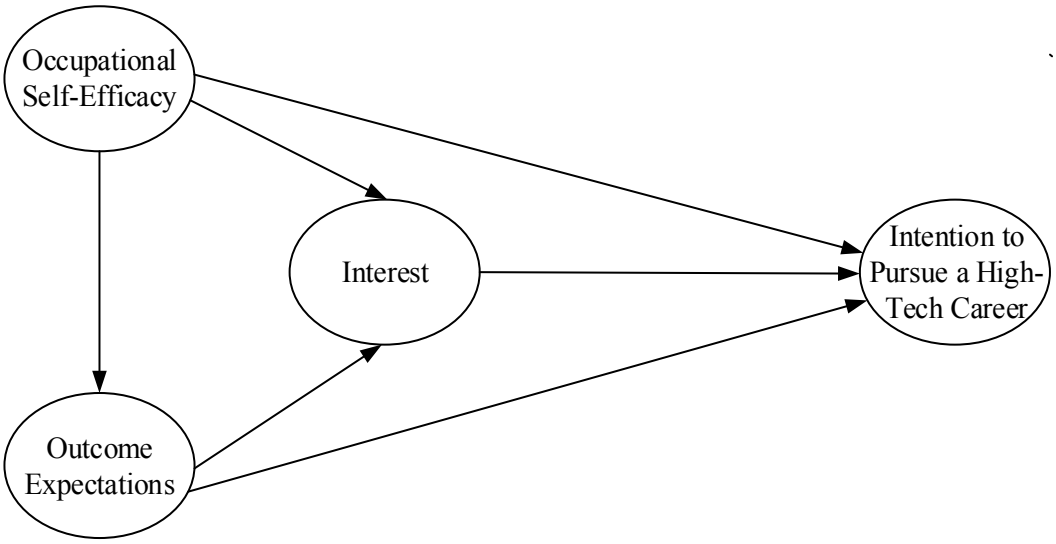


Table 6.13

Core SCCT's Interest and Choice Model

Model Steps	Predictors	Std. Beta Coeff.	Sig.	Model Summary		Change Summary		Collinearity Statistics	
				Adjusted R^2	Sig.	R^2 Change	Sig.	Tolerance	VIF
1.	OSE	0.441	.000	0.194	.193	0.194	.000	1.00	1.000
2.	OSE	0.267	.000	0.274	.000	0.082	.000	.722	1.385
	SlfOE	0.247	.000					.563	1.775
	CarOE	0.118	.001					.561	1.781
3.	OSE	0.177	.000	0.326	.000	0.053	.000	.650	1.540
	SlfOE	0.175	.000					.533	1.875
	CarOE	0.089	.012					.557	1.797
	INT	0.281	.000					.674	1.485
Dependent Variable: Intention to Pursue a High-Tech Career									

Note. OSE refers to occupational self-efficacy, *SlfOE* and *CarOE* refer to self-evaluative and career outcome expectations, and *INT* refers to interest.

In Step 2, the two outcome expectations measures were added to the model. The model is highly significant and together occupational self-efficacy and outcome expectations explained 27.4% of the variance in the intention. The positive value of beta coefficients for self-evaluative expectations (β= .25, p<.01) and for career expectations (β= .12, p<.01) show that both measures of outcome expectations positively relate to intention to pursue a high-tech career, above and beyond the effects of occupational self-efficacy. The contribution of these variables is further confirmed by the significant R^2 change showing that outcome expectations explained an additional 8.2% of the variance in the intention to pursue a high-tech career. In this step also, occupational self-efficacy was found to be the strongest predictor of intention to pursue a high-tech career.

In Step 3, interest was added to the model and the model was found to be highly significant. The beta coefficient for interest (β= .28, p<.01) shows that interest positively predicts intention to pursue a high-tech career above and beyond the effects of occupational self-efficacy and outcome expectations. The significant R^2 change suggests that interest added 5.3% variance to the explanatory power of the model. Interestingly, once interest was added to the model it became the strongest predictor suggesting that interest mediates the relationship between occupational self-efficacy and intention to pursue a high-tech career, and between outcome expectations and intention to pursue a high-tech career. This is consistent with the SCCT logic that self-efficacy and outcome expectations directly, and indirectly, through interest would predict choice goals. In this model no evidence of multicollinearity was found among the factors in this model as indicated by collinearity statistics of tolerance > 0.20 and VIF < 5.

Overall, the results show that the base model of SCCT is highly significant (p<.01) and explains 32.6% of the variance in intention to pursue a high-tech career. The present findings are consistent with prior results indicating that SCCT variables are strongly predictive of engineering students' academic interests and their career choice goals (Lent et al., 2003a).

6.4.2 Expanded SCCT Interest and Choice Model

The expanded SCCT interest and choice model is depicted in Figure 6.5. In this model, two environmental variables, social support and social barriers, were added to the core social cognitive variables. The results of the hierarchical regression analysis for this model are presented in Table 6.14

Figure 6.5
Expanded SCCT's Interest and Choice Model

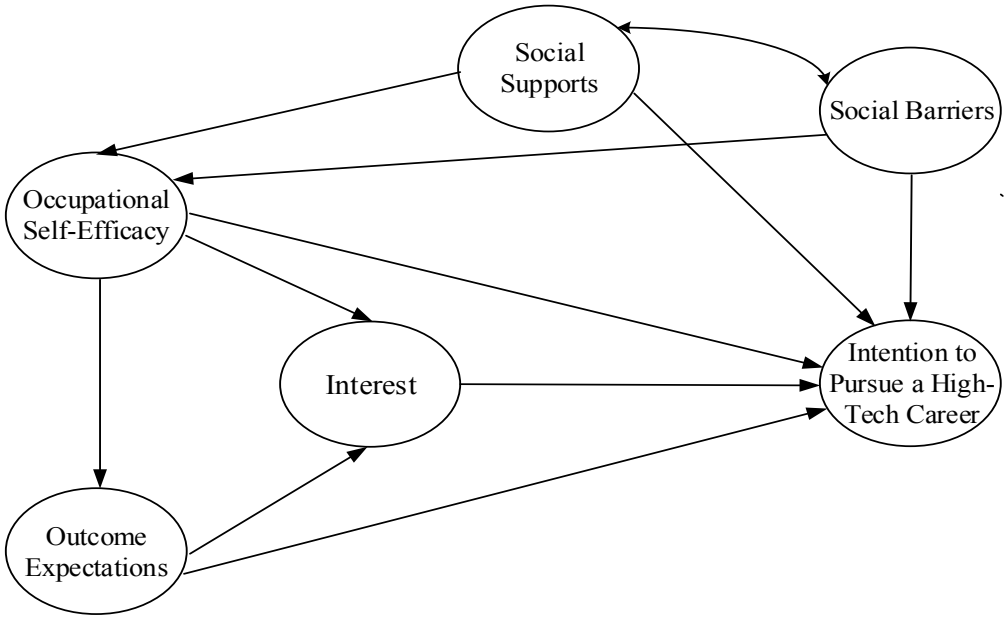


Table 6.14

Expanded SCCT's Interest and Choice Model

Model Steps	Predictors	Standardized Beta Coefficients	Sig.	Model Summary		Change Summary		Collinearity Statistics	
				Adjusted R^2	Sig.	R^2 Change	Sig.	Tolerance	VIF
1.	OSE	0.177	.000	.326	.000	.329	.000	.650	1.540
	SlfOE	0.175	.000					.533	1.875
	CarOE	0.089	.012					.557	1.797
	INT	0.281	.000					.674	1.485
2.	OSE	0.153	.000	.332	.004	.007	.004	.618	1.618
	SlfOE	0.178	.000					.509	1.963
	CarOE	0.098	.006					.552	1.812
	INT	0.258	.000					.640	1.563
	SocSup	0.083	.005					.786	1.272
	SocBar	0.052	.056					.916	1.092
Dependent Variable: Intention to Pursue a High-Tech Career									

Note. OSE refers to occupational self-efficacy, *SlfOE* and *CarOE* refer to self-evaluative and career outcome expectations, INT refers to interest, *SocSup* refers to social support, and *SocBar* refers to social barriers.

The model depicted in Figure 6.5 postulates that beyond the effects of social cognitive variables - occupational self-efficacy, outcome expectations, and interest – individuals' intentions can be influenced by the presence of high support and low barriers. The model was tested using hierarchical regression analysis with the core social cognitive variables entered in Step 1 and environmental variables entered in Step 2. The hierarchical regressions help to identify the impact made by social support and barriers, above and beyond the core predictors.

The Step 1 in Table 6.14 repeats the results of Step 3, Table 6.13, showing that the core social cognitive variables together explained 32.6% of the variance in the intention to pursue a high-tech career. In Step 2, the environmental variables of social support and barriers were added. The model was significant and explained 33.2% of the variance. The beta coefficients for all the independent variables were significant except for social barriers. The results are consistent with the correlation analysis results presented in Table 6.6. There too the relationship between social barriers and intention to pursue a high-tech career was not significant. In this model, no issue of multicollinearity was found as VIF values for the regression coefficients were below the value of 5 and the tolerance statistics were above 0.20.

According to SCCT's direct path hypotheses, social support and barriers should produce a significant direct path to choice goals. The regression results for this model supported SCCT's hypothesized direct path for social support but not for social barriers. Although, social support was found to be a significant predictor, it only explained 0.07 percent of the variance in intention to pursue a high-tech career, suggesting that social support is not a strong predictor for choice in this study.

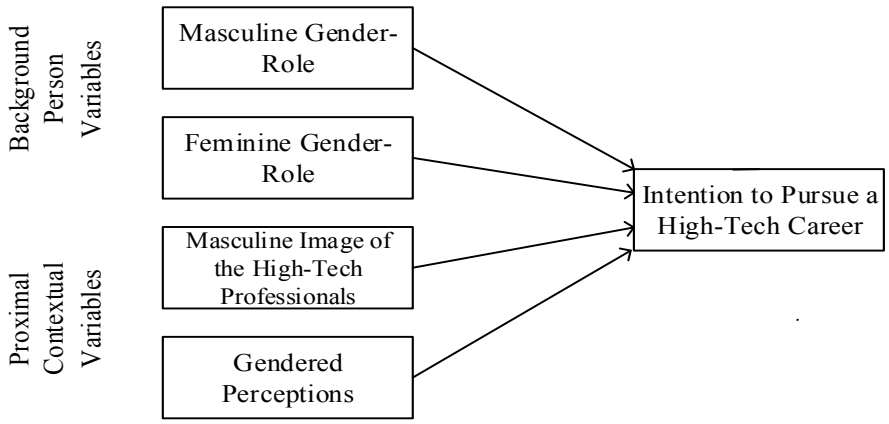
6.4.3 Gender-Related Variables and Intention to Pursue a High-Tech Career

Historically, high-tech has been identified as a male-dominated profession and studies have suggested that background person and contextual variables can influence individuals' intentions to pursue a male-dominated career like high-tech. Because, high-tech occupations are highly gendered, this study explored the effects of background person and contextual gender-related variables on participants' intentions to pursue a

high-tech career. Background person variables include masculine gender-role and feminine gender-role, whereas contextual variables include masculine image of high-tech professionals and gendered perceptions. Following analysis presented in Section 6.2, masculine image was measured by gender representation in the media and gendered perceptions were measured by beliefs about gender and professional choice. The model is depicted in Figure 6.6 and was tested using multiple regression analysis. The results are presented in Table 6.15.

Figure 6.6

Gender-Related Variables and Intention to Pursue a High-Tech Career



The results of multiple regression analysis presented in Table 6.15 show that the model was highly significant. All model variables predicted engineering students' intentions to pursue high-tech careers, except for gendered perceptions. The positive value of standardized beta coefficients for masculine gender-role (β =.15, p<.01), feminine gender-role (β =.15, p<.01), and masculine image of high-tech professionals (β =.31, p<.01) indicate that these variables strengthen students' intentions to pursue high-

Table 6.15

Gender-Related Variables and Intention to Pursue a High-Tech Career

Model	Predictors	Standardized β Coefficients	Sig.	Model Summary		Collinearity Statistics	
				Adjusted R^2	Sig.	Tolerance	VIF
	MAS	0.147	0.000	0.198	0.963	0.785	1.274
	FEM	0.151	0.000			0.830	1.205
	MasImg	0.314	0.000			0.919	1.088
	GenPer	0.008	0.797			0.891	1.122
Dependent Variable: Intention to Pursue a High-Tech Career							

Note. FEM and *MAS* refer to feminine gender-role and masculine gender-role; *MasImg* refers to masculine image of high-tech professionals; and *GenPer* refers to gendered perceptions.

tech careers. The model explained 19.8% variance in intention to pursue a high-tech career. In this model also, no issue of multicollinearity was detected as VIF values for the regression coefficients were below the value of 5 and the tolerance statistics were above 0.20. The regression results support the independent hypothesis testing results presented earlier in Section 6.3, except for gendered perceptions. Taken together, these results indicate that, by itself, gendered perceptions can predict intention but there are other more important predictors such as social cognitive and background person variables and when these other predictors are entered into the model, the effects of gendered perceptions become non-significant.

Interestingly the findings of this model suggest that masculine image of the high-tech professionals is the strongest predictor of intention behavior. The findings make sense because according to SCCT (Lent et al., 1994, 2000) person and contextual variables are divided into two categories depending on their relative proximity to career choice-making process. The first category is distal, background and the second category

is proximal. Gender-role is a background, person variable that affects individuals' learning experiences through which career relevant efficacy beliefs and outcome expectations develop. On the other hand, masculine image of high-tech professionals is a contextual, proximal variable that is expected to play an important role during active phases of educational or career decision making. Thus, in the absence of core social cognitive predictors, person and contextual variables behaved in a manner outlined by the theoretical framework of SCCT.

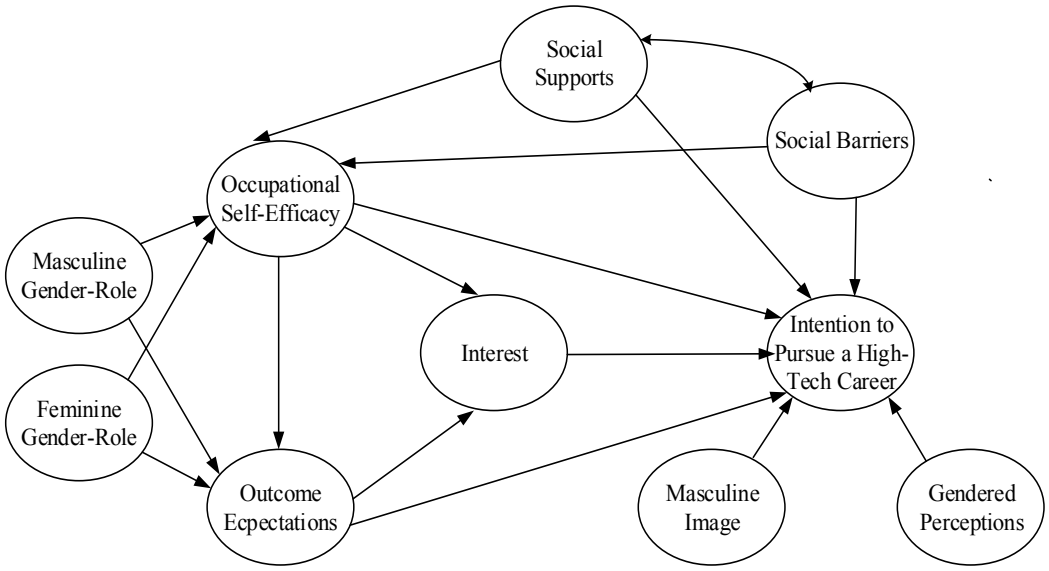
6.4.4 Testing of the Full Hypothesized Model

The final hypothesized model that expands the SCCT's interest and choice model, presented in Figure 6.7 was tested. The model includes two control variables: intention to pursue a career and attitude toward high-tech profession; five social cognitive variables - occupational self-efficacy, two dimensions of outcome expectations (career and self-evaluative expectations), interest, social support, and social barriers; two measures of background gender-role variable – masculine and feminine; and two measures of proximal gender-related contextual variables -masculine image and gendered perceptions. The model did not incorporate any interaction terms to test the moderating effect of gender because the main effects of gender, in association with proximal contextual variables, in previous analyses were found to be non-significant. This final model was tested using hierarchical regressions and results are presented below in Table 6.16.

The regression results presented in Table 6.16 indicate that the model is highly significant in all four steps. In the first step, the control variables of intention to pursue a career and attitudes toward high-tech profession were entered. The beta coefficients for

Figure 6.7

SCCT's Interest and Choice Model with Gender-Related Variables



Note. Control variables are not shown in the model.

intention to pursue a career (β =.25, p<.01) and attitude toward high-tech profession (β =.34, p<.01) indicated that both variables strengthen students' intention. The adjusted R^2 shows that the control variables together explained 23.9% of the variance in intention to pursue a high-tech career.

In Step 2, the background person variables of masculine gender-role orientation and feminine gender-role orientation were added to the model. The model was highly significant and both masculine (β = .10, p <.01) and feminine (β = .11, p <.01) gender-roles predicted intention behavior. The significant R^2 change in Step 2 shows that masculine and feminine gender-role added 2.6% variance to the prediction of intentions to pursue a high-tech career, above and beyond the variance explained by the control

Table 6.16

SCCT's Interest and Choice Model with Gender-Related Variables

Model Steps	Predictors*	Standardized Beta Coefficients	Sig.	Model Summary		Change Summary		Collinearity Statistics	
				Adjusted R^2	Sig.	R^2 Change	Sig.	Tolerance	VIF
1.	Car	0.245	.000	0.239	.000	0.240	.000	.844	1.185
	AHT	0.338	.000					.844	1.185
2.	Car	0.220	.000	0.263	.000	0.026	.000	.827	1.210
	AHT	0.288	.000					.779	1.284
	MAS	0.097	.002					.807	1.239
	FEM	0.113	.000					.816	1.226
3.	Car	0.127	.000	0.376	.000	0.116	.000	.769	1.300
	AHT	0.147	.000					.637	1.571
	MAS	0.016	.592					.751	1.331
	FEM	0.080	.005					.793	1.262
	OSE	0.141	.000					.605	1.654
	SlfOE	0.113	.002					.485	2.062
	CarOE	0.067	.052					.538	1.858
	INT	0.190	.000					.589	1.698
	SocSup	0.045	.123					.751	1.331
	SocBar	0.068	.011					.901	1.110
4.	Car	0.136	.000	0.376	.000	0.000	.000	.752	.1329
	AHT	0.150	.000					.634	1.577
	MAS	0.020	.509					.717	1.394
	FEM	0.082	.004					.791	1.264
	OSE	0.148	.000					594	1.685
	SlfOE	0.114	.002					.483	2.069
	CarOE	0.059	.090					.526	1.902
	INT	0.195	.000					.585	1.711
	Soc_Sup	0.053	.079					.708	1.411
	Soc_Bar	0.084	.003					.809	1.235
	MasImg**							.000	
	GenPer	-0.033	.231					.854	1.170
Dependent Variable: Intention to Pursue a High-Tech Career									

Note. CAR, AHT, OSE, SlfOE, CarOE, INT, SocSup, SocBar FEM, MAS, MasImg, and GenPer refer to intention to pursue a career, attitudes toward high-tech, occupational self-efficacy, self-evaluative expectations, career expectations, interest, social support, social barriers, feminine gender-role, masculine gender-role, masculine image of the high-tech professionals, and gendered perceptions respectively.

**SPSS in Step 4 automatically excluded masculine image because of tolerance statistics reaching 0.0.

variables. The positive values of the betas for both gender-roles show that individuals with either a stronger masculine or feminine orientation will be more likely to choose a high-tech career. This finding is contradictory to the hypothesis and previous research which found that people with a masculine gender-role are more likely to pursue a high-tech career whereas; people with a feminine gender-role will likely avoid such career.

In Step 3, the social cognitive measures of occupational self-efficacy, two measures of outcome expectations (self-evaluative and career), and interest, social support, and social barriers were added to the model. The model was highly significant explaining an additional 11.6% of the variance in intention to pursue a high-tech career. In this step also, feminine gender-role was significant (β = .08, p <.01). Masculine gender-role, however, became non-significant (β = .02, p >.05). With respect to social cognitive predictors, occupational self-efficacy (β = .14, p <.01), career outcome expectations (β = .07, $p \leq$.05), self-evaluative outcome expectations (β = .11, p <.01), interest (β = .19, p <.01), and social barriers (β = .08, p <.01), were all significant in predicting intention to pursue a high-tech career. Social support (β = .05 p >.05) was, however, not significant. Contrary to SCCT's hypothesized path, the positive sign of the beta coefficient for social barriers indicated a positive relationship between social barriers and intention to pursue high-tech career. Social barriers do not weaken but rather strengthen students' intentions to pursue a high-tech career. Thus, the Step 3 results do not support SCCT's hypothesized paths for social support and social barriers. Also the results did not support earlier findings with respect to the background person variable, gender-role orientation. Feminine gender-role instead, of masculine gender-role, was found to positively predict intention to pursue a high-tech career. Overall in this step,

support was found for SCCT's core predictors of occupational self-efficacy, self-evaluative outcome expectations, career outcome expectations, and interest; the background variable feminine gender-role; and the environmental variable social barriers.

In Step 4, gender-related proximal contextual variables - masculine image of high-tech professionals and gendered perceptions - were added to the model. The model was highly significant but the addition of these variables did not explain any additional variance in the dependent variable and therefore the adjusted *R square* change for this step was non-significant. Further, examining the standardized beta coefficients revealed that the proximal contextual variable of gendered perceptions was not significant. Additionally, SPSS in this step automatically excluded masculine image of high-tech professionals from the output because tolerance (collinearity statistics) for this predictor had reached the limit of 0.00. With gendered perceptions non-significant and masculine image dropped from the regression output, the effects of proximal contextual variables on intention behavior could not be supported.

6.4.5 Summary

In Section 6.4, the hypothesized model was tested in segments using hierarchical regression analysis. The first segment tested the base model of SCCT that posits that individuals will pursue a career in a field that is consistent with their occupational self-efficacy, outcome expectations, and interests. The model was significant and supported the hypothesized relationships.

The second segment tested the expanded SCCT model as proposed by Lent et al. (2000) by adding social support and social barriers to the core SCCT model. According

to SCCT's hypothesized paths, supports should strengthen intentions whereas barriers should weaken intentions. The model was significant; however, social barriers were not significant. Social support was significant but added only 0.07% variance in explaining intention to pursue a high-tech career.

The third segment tested the gender-related variables that were hypothesized to influence intention to pursue a high-tech career: masculine gender-role, feminine gender-role, masculine image of high-tech professionals, and gendered perceptions. The results presented in Table 6.15 indicated that masculine gender-role, feminine gender-role, and masculine image positively predicted the intentions to pursue a high-tech career; however, gendered perceptions were not significant. Thus, the model findings indicated that background person variables of masculine and feminine gender-role orientation and the proximal contextual variable of masculine image of high-tech professionals are important predictors that can influence intentions to pursue a high-tech career in the absence of SCCT variables.

Finally, the full hypothesized model was tested that included both SCCT's interest and choice model variables and the gender-related variables. The results of this model indicated that the addition of gender-related proximal contextual variables - masculine image and gendered perceptions – did not add significantly to the model's predictive power.

The results include contradictory findings with respect to social support and social barriers. When the expanded SCCT's interest and choice model was tested in Section 6.4.2, social support, and not social barriers, predicted students' intentions. In Section 6.4.4 when the model was tested incorporating both SCCT predictors and gender-related

predictors, it was social barriers, and not social support, that became significant. As social support and social barriers are major constructs in social cognitive theory, they were both retained for further analysis using Structural Equation Modeling.

With respect to gender-related variables that were added to the SCCT framework for this study, further pruning was undertaken. Considering the results of Section 6.3 and 6.4, it was evident that gender-role had some influence as a background contextual variable but the proximal contextual variable of gendered perceptions did not add much value to the hypothesized model. Also, when gender-related variables were run independently of the SCCT interest and choice model predictors (see Table 6.15), gendered perceptions was not significant. In the light of these findings, gendered perceptions were eliminated from all further analysis using Structural Equation Modeling.

Chapter 7: Testing the Model using Structural Equation Modeling

This chapter presents the results of the analyses undertaken to test the hypothesized model using Structural Equation Modeling. The hypothesized model is tested in increments: At first, the base model of SCCT that includes core person variables is tested. This model posits that individuals will intend to pursue a career in a field that is consistent with their interest, occupational self-efficacy, and outcome expectations. Next, the model is tested by adding contextual variables as proposed by Lent et al. (2000). This expanded model added contextual variables to the core person variables in the model. The expanded SCCT model suggests that perceived social support and social barriers will relate to intentions directly and indirectly via occupational self-efficacy. The authors argue that adding support and barriers to the base model helps in determining the environmental effect beyond an individual's own self. Finally, the gender-related variables: gender-role orientation and the masculine image of the high-tech professionals are added to understand the impact of gender-related personality and contextual variables outside SCCT model's predictors. Masculine and feminine gender-roles are added as background person variables that are posited to influence development of occupational self-efficacy and outcome expectations. Through self-efficacy and outcome expectations, gender-roles are expected to impact interest and outcome variable - intention to pursue a high-tech career; whereas the masculine image of high-tech is added as a proximal contextual variable that is expected to influence only the outcome variable. The results of the final model provide an alternate multivariate test of the hypotheses presented in Chapter 3.

Structural equation modeling (SEM) uses covariance matrices and robust maximum likelihood (ML) estimation procedures to test the simultaneous relationships. The SEM process involved two steps. In Step 1, a confirmatory factor analysis (CFA) was conducted on all the observed variables in the hypothesized model in order to validate the measurement model. The CFA was modeled with correlations among each of the latent factors, and tested with the covariance matrices and ML estimation. For each of these factors, one observed variable loading was fixed to 1.0 and the loadings of other variables were freely estimated. This step helped to determine that each observed variable loaded significantly on their hypothetical latent constructs and that the latent constructs covaried among them as expected. In Step 2, the significance of the relationship between latent variables as hypothesized by the theoretical model was measured using primarily path analysis (Hoyle, 1995; Kaplan, 2000). This two-step approach is a common practice in testing structural equation modeling (Carvalho & Chima, 2014) and will serve multiple purposes for the current study. First, the measurement model will validate the composition and the structure of the latent constructs. Second, the structural models will allow an examination of the degree to which the proposed structural equation model provides a good fit to the data; the degree to which the relation of particular predictor variables to intention to pursue a high-tech career are mediated by other variables; and the degree to which latent constructs predict unique variance in the dependent variable.

All structural equation modeling analyses in this study (i.e., measurement model and the structural model) were tested with the following goodness of fit indices: root mean square error of approximation (RMSEA), non-normed fit index (NNFI), comparative fit index (CFI), and standardized root mean square residual (SRMR). The

RMSEA assesses the degree of complexity in the model and whether or not a simpler solution is warranted. Values closer to 0.0 indicate a better fit; however, RMSEA values ≤.08 are generally considered acceptable (Browne & Cudeck, 1992). The NNFI compares the hypothesized model to the null model. The fit index uses degree of freedom in its calculation and hence is relatively independent of sample size. Values closer to 1.0 indicate a better fit, however, values ≥ .90 are acceptable and ≥ .95 is considered good (e.g., Hu & Bentler, 1999). The CFI test determines if the hypothesized model is a better fit to the data than a null model, where no relations among the constructs are expected. Values of CFI range from 0.0 to 1.0, and a cutoff of 0.90 (e.g., Hoyle & Panter, 1995), or 0.95 (e.g., Hu & Bentler, 1999) are widely used. Finally, the SRMR is an absolute measure of fit and is based on the standardized difference between the observed correlation and the predicted correlation. Unlike RMSEA, SRMR does not impose a penalty for model complexity. Values closer to 0.0 indicate a better fit; however, SRMR values ≤.08 are generally considered a good fit (Hu & Bentler, 1999).

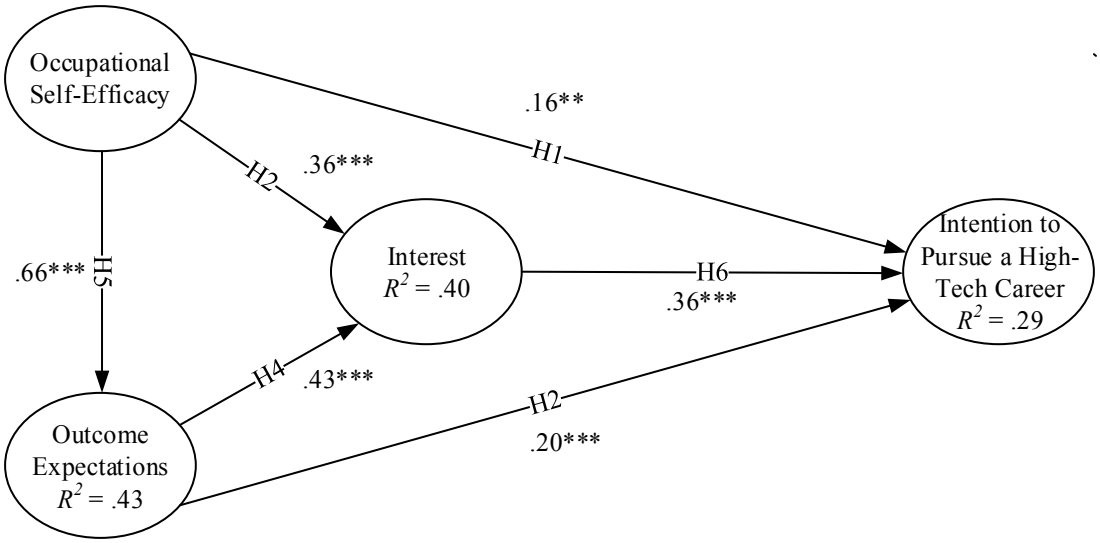
7.1 Core SCCT's Interest and Choice Model

The first model that is tested is the core or base SCCT's interest and choice model. According to the hypothesized paths of this model, individuals who perceive themselves as efficacious in a future occupation will likely to expect favorable outcomes from pursuing the occupation. Together occupational self-efficacy and outcome expectations will predict interest and finally, all three core person variables will influence the outcome variable, an individual's intention to pursue a high-tech career. Besides joint influence, occupational self-efficacy, outcome expectations, and interest all will relate to

the intention to pursue a high-tech career directly. In other words, occupational self-efficacy will relate to intention behavior directly and indirectly through interest and through outcome expectations and interest. Likewise, outcome expectations will relate to the intention to pursue a high-tech career directly and indirectly through interest. Figure 7.1 depicts the model.

Figure 7.1

Structural Model of Core SCCT's Interest and Choice Model



Note. The standardized direct path coefficients are reported in the figure. Significant at: *p < 0.05, **p < 0.01 and ***p < 0.001.

Then measurement analysis of Chapter 5 showed that outcome expectations had two dimensions, career outcome expectations and self-evaluative outcome expectation, yet in the hypothesized model outcome expectation is represented as one latent construct. Treating the two dimensions as two latent factor, the five-factor CFA ensured the measurement model was an acceptable fit to the data (RMSEA=.054, NNFI = .972,

CFI=.976, and SRMR=.0418). But when the structural model was tested where paths from these two sub-dimensions were fixed to 1.0 to outcome expectations in order to treat them as one measure, the model output showed errors in model specification with respect to endogenous measures. Therefore, the model had to be respecified by combining two sub-dimensions of outcome expectations into one factor of outcome expectations. This is consistent with most of the SCCT research that treats outcome expectations as a single construct (e.g., Lent et al., 2003; Lent et al., 2008; Lent et al., 2011). Subsequent sections present the model fit for the four-factor measurement model and structural model.

A four factor CFA was conducted where all items loaded on the factors as expected. The details of the factor loadings are given in Appendix 7.1. The fit indices imply a good fit of the measurement model to the data (RMSEA=.055, NNFI = .971, CFI=.975, and SRMR=.042), suggesting support for the hypothesized four-factor representation of the latent variables.

Next, to test the structural model, factor loadings were treated as in the measurement model, and only paths among the factors that were hypothesized by the theoretical model were estimated. The structural model also yielded a good fit (RMSEA=.055, NNFI = .971, CFI=.975, and SRMR=.0426). Support was found for the hypothesized direct path from occupational self-efficacy to outcome expectations (γ=.66, $p \leq .01$) as well as to interest (γ=.36, $p \leq .01$) and to intention to pursue a high-tech career (γ=.16, $p \leq .01$). Support was found for the hypothesized direct path from outcome expectations to interest (β =.43, $p \leq .01$) and to intention to pursue a high-tech career (β =.20, $p \leq .01$). Finally, interest also produced a significant direct path to the outcome

variable, intention to pursue a high-tech career (β =.36, $p \leq .01$). Figure7.1 depicts all the model hypothesized paths along with the standardized direct path coefficients.

Regarding the indirect paths, all the indirect paths for this model were also found to be significant as predicted by Lent et al. (1994, 2000). Occupational self-efficacy produced an indirect path to interest through outcome expectations (β =.27) and to intention to pursue a high-tech career through outcome expectations and interest (β =.38). Outcome expectations also produced significant indirect path to intention to pursue a high-tech career through interest (β =.16). Finally, the model accounted for 43% of the variance in outcome expectations, 40% of the variance in interests, and 29% of the variance in intention to pursue a high-tech career. The results for direct, indirect, and total effects are presented in Appendix 7.2, 7.3, and 7.4. Overall the results supported the regression results presented in Chapter 6.

7.2 Expanded SCCT's Interest and Choice Model

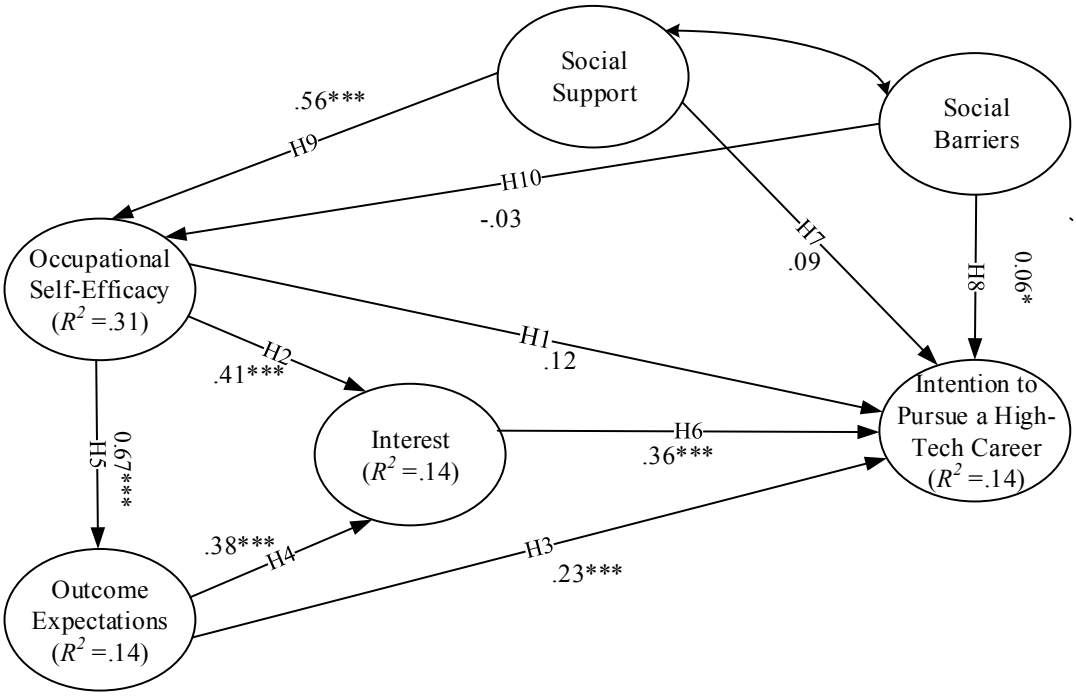
In the expanded SCCT's interest and choice model, the environmental variables of social support and social barriers were added (Figure 7.2). This hypothesized six factor model retained all the paths from the base model and additionally hypothesized that perceived social support and social barriers would relate to the outcome variable, intention to pursue a high-tech career, directly and indirectly via occupational self-efficacy. A six factor CFA was conducted according to the hypothesized model and all items loaded as expected (Appendix 7.5). The fit indices indicate a good fit of the measurement model to the data (RMSEA=.052, NNFI = .961, CFI=.965, and

SRMR=.0478), suggesting support for the hypothesized six-factor representation of the latent variables.

Next, the structural model was tested and that also yielded a good fit (RMSEA=.055, NNFI = .948, CFI=.961, and SRMR=.0559). Support was found for the direct hypothesized path from occupational self-efficacy to outcome expectations (β=.67, $p \leq .01$) and to interest (β=.41, $p \leq .01$). Support, however, was not found for the hypothesized direct path from occupational self-efficacy to intention to pursue a high-tech career (β=.12, $p \geq .05$). On the other hand, outcome expectations (β =.23, $p \leq .01$) and interest (β =.36, $p \leq .01$) both produced significant direct paths to intention to pursue

Figure 7.2

Structural Model of SCCT's Interest and Choice Model



Note. The standardized direct path coefficients are reported in the figure. Significant at: *p < 0.05, **p < 0.01 and ***p < 0.001.

a high-tech career. Outcome expectations also produced a significant direct path to interest (β =.38, $p \leq .01$). With respect to social support and social barriers, social support produced a significant direct path to occupational self-efficacy (γ=.56, $p \leq .01$) and social barriers produced a significant, but very small direct positive path to intention to pursue a high-tech career (γ=.06, $p \leq .05$).

Although occupational self-efficacy did not directly predict intention to pursue a high-tech career, it did predict intention to pursue a high-tech career indirectly through outcome expectations and interests (β =.39; $p \leq .01$). Also, occupational self-efficacy produced a significant indirect path to interest through outcome expectations (β =.25; $p \leq .01$) and outcomes expectations produced a significant indirect path to intentions through interest (β =.14; $p \leq .01$). The significant direct and indirect effects suggest that interest mediates the relations of both occupational self-efficacy and outcome expectations to intention to pursue a high-tech career, but the extent of this mediation may differ for these two predictors. Further, social support indirectly produced a significant path to intention to pursue a high-tech career (β =.28; $p \leq .01$), to interest (β =.37; $p \leq .01$), and to outcome expectations (β =.37; $p \leq .01$) through occupational self-efficacy. The results show social support had a positive impact as hypothesized. In contrast social barriers were found to behave in the opposite direction to the hypothesized path. That is, the results indicated that the presence of social barriers did not weaken one's intention to pursue a high-tech career, rather it strengthened the pursuit. While this was a weak effect, it may indicate the potential of barriers to strengthen resolve.

In totality, the model explained 31% of the variance in occupational self-efficacy, 14% of the variance in outcome expectations, 14% of the variance in interests, and 14%

of the variance in intention to pursue a high-tech career. Detailed reporting on direct effects, indirect effects, and total effects are presented in Appendices 7.6, 7.7, and 7.8 respectively.

7.3 SCCT Interest and Choice Model and Gender-Related Variables

In addition to the expanded SCCT factors, this study hypothesized that intention to pursue a high-tech career will be influenced by the presence of other gender-related background person and proximal contextual variables: masculine gender-role, feminine gender-role, masculine image of the high-tech professionals (as reflected by gender representation in the media), and gendered perceptions. Based on the results presented in Chapter 6, gendered perceptions were eliminated as they were a non-significant predictor of intention behavior throughout various analyses. Consequently, the model integrated three gender-related variables – masculine gender-role and feminine gender-role as background person variables that would influence the development of occupational self-efficacy and outcome expectations, and masculine image of the high-tech professionals as a proximal contextual variable that would have a direct impact on the outcome variable, intention to pursue a high-tech career.

When the measurement model was run with the nine factors, the model failed to converge. The factor loadings (See Appendix 7.9) revealed that one of the indicators of a masculine image of the high-tech was not significant. As masculine image only had two indicators, reducing it to one indicator would further compromise the validity of the measure, therefore the model was re-specified and the masculine image of the high-tech professionals was eliminated from the model. This is consistent with the final hierarchical

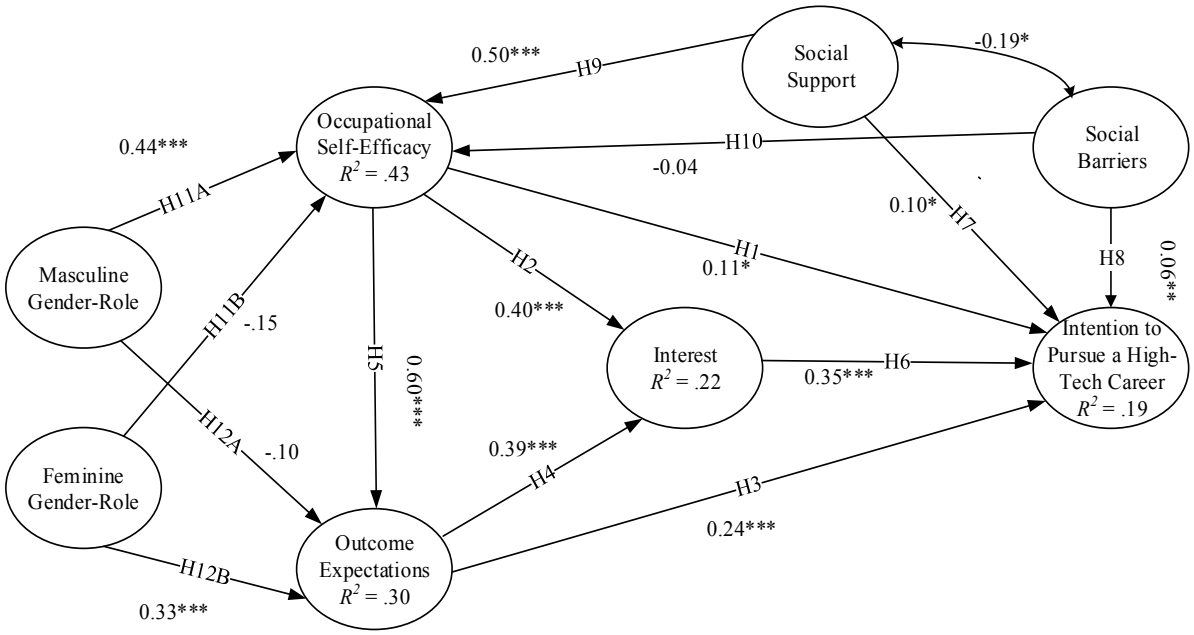
regression model in Chapter 6, where masculine image of high-tech had to be dropped due to multicollinearity.

The final model incorporated the background person variable of masculine and feminine gender-role orientation in addition to the SCCT's interest and choice model predictors. An eight-factor CFA was conducted according to the respecified model. As shown in Appendix 7.10, all items loaded as expected. The fit indices indicate a good fit of the measurement model to the data (RMSEA=.046, NNFI = 0.952, CFI=0.956, and SRMR=.0462), suggesting support for the eight-factor model.

Next, the structural model was tested. It also yielded a very good fit (RMSEA=.047, NNFI = 0.949, CFI=0.963, and SRMR=.0507). As shown in Figure 7.3 support was found for the direct hypothesized path from occupational self-efficacy to outcome expectations (H5; β=.60, $p \leq .01$) as well as for the expectation that occupational self-efficacy would contribute to the prediction of interest (H2; β=.40, $p \leq .01$) and intention to pursue a high-tech career (H1; β=.11, $p \leq .05$). Outcome expectations (H3; β=.24, $p \leq .01$) and interest (H6; β=.35, $p \leq .01$) both produced significant direct paths to intention to pursue a high-tech career. Outcome expectations also had a significant direct path to interest (H4; β=.39, $p \leq .01$). Support was also found for the indirect path from occupational self-efficacy to intention to pursue a high-tech career (β =.37, $p \leq .01$) through outcome expectations and interest, as well as an indirect path from outcome expectations to intention to pursue a high-tech career (β =.14, $p \leq .01$) through interest. Finally occupational self-efficacy was found to influence interests (β =.24, $p \leq .01$) through outcome expectations.

Figure7.3

Structural Model of SCCT's Interest and Choice Model with Gender-Related Variables



Note. The significant direct path coefficients are reported in the figure. Significant at: *p < 0.05, **p < 0.01 and ***p < 0.001.

With respect to social support and social barriers, there was a significant positive relationship between social support and intention to pursue a high-tech career (H7; γ=.10, p ≤ .05) but contrary to the hypothesis (H8), social barriers again produced a significant positive path to intention to pursue a high-tech career (γ=.06; p ≤.05). Support could not be found, however, for the mediated relationship between social barriers and intention to pursue a high-tech career via self-efficacy (H10). Support was found for the indirect relationship between social support and outcome expectations as well as its relationship to interest and intention to pursue a high-tech career.

Support was found for the indirect relationship between social support and intention to pursue a high-tech career through occupational self-efficacy (H9). Sobel's test, which was used for significance testing of indirect effects, was significant ($p \leq .05$). The results for indirect effects significance testing are presented in Appendix 7.14. An indirect relationship between social barriers and intention to pursue a high-tech career through occupational self-efficacy (H10) could not be tested for mediation because the direct relationship between the independent variable (social barriers) and the mediator (occupational self-efficacy) was non-significant, which is one of the necessary conditions for mediation to occur (Baron & Kenny, 1986).

The relationship between masculine gender-role and self-efficacy was significant (H11 A; γ=.44, $p \leq$.05) but the relationship between masculine gender-role and outcome expectations was non-significant (H12A; γ= -.10, $p \geq$.05). That is, a person with a more masculine gender-role is likely to feel more efficacious in pursuing their future occupation; however it does not increase their expectations of receiving favorable outcomes. The relationship between feminine gender-role and self-efficacy was not-significant (H11B; γ= -.15, $p \geq$.05), but contrary to the hypothesized direction (H12B), the relationship between feminine gender-role and outcome expectations was significant and positive (γ=.33, $p \leq$.01). That is, a person with a more feminine gender-role is not likely to feel less efficacious in pursuing their future occupation, though it is likely to increase their expectations of receiving favorable outcomes.

Together, the model explained 43% variance in self-efficacy, 30% variance in outcome expectations, 22% variance in interests, and 19% variance in intention to pursue

a high-tech career. Detailed reporting on direct effects, indirect effects, and total effects are presented in Appendices 7.11, 7.12, and 7.13.

7.4 Chapter Summary

The hypothesized model was tested in increments and the chapter presents the specifics on all three models. The hypothesis testing, however, for this thesis is based on the results of the final model that integrates background person variables, core person variables, and environmental variables. Gendered contextual variables were eliminated from the model due to negligent predictive power of these constructs and/or the lack of valid measures. Table 7.1 presents a summary result for all the hypotheses and Table 7.2 presents a list of hypotheses that could not be tested.

Table 7.1

Hypotheses Testing for SCCT's Interest and Choice Model with Gender-Related Variables

Hypothesis		**Support-ed**	**Sig. opp**
H1	*Self-efficacy will be positively related to intention to pursue a high-tech career.*	√	
H2	*Self-efficacy will be positively related to interest for intention to pursue a high-tech career.*	√	
H3	*Outcome expectations will be positively related to intention to pursue a high-tech career.*	√	
H4	*Outcome expectations will be positively related to interest in a high-tech career.*	√	
H5	*Self-efficacy will be positively related to outcome expectations.*	√	
H6	*Interest will be positively related to intention to pursue a high-tech career.*	√	
H7	*Social Support will be positively related to intention to pursue a high-tech career.*	√	
H8	*Social Barriers will be negatively related to intention to pursue a high-tech career.*		√
H9	*Self-efficacy will mediate the relationship between social support and intention to pursue a high-tech career.*	√	
H10	*Self-efficacy will mediate the relationship between social barriers and intention to pursue a high-tech career.*	*X*	
H11A	*Masculine gender-role will be positively related to self-efficacy for intention to pursue a high-tech career.*	√	
H11B	*Feminine gender-role will be negatively related to self-efficacy for intention to pursue a high-tech career.*	*X*	
H12A	*Masculine gender-role will be positively related to outcome-expectations for intention to pursue a high-tech career.*	*X*	
H12B	*Feminine gender-role will be negatively related to outcome-expectations for intention to pursue a high-tech career.*		√

Note. √ refers to supported and *X* refers to not supported. Sig. Opp refers to significant opposite.

Table 7.2 Gender-Related Hypotheses and Intention to Pursue a High-Tech Career (Not Tested)

	Hypothesis	***Rationale for not Testing***
H13 A	A masculine image of high-tech professionals will be negatively related to intention to pursue a high-tech career for female students.	Masculine image of high-tech and gendered perceptions were eliminated from the final model due to negligent predictive power of these construct and/or the lack of valid measures.
H13 B	A masculine image of high-tech professionals will be positively related to intention to pursue a high-tech career for male students.	
H14 A	Gendered perceptions about the high-tech sector and intention to pursue a high-tech career will be negatively related for female students	
H14 B	Gendered perceptions about the high-tech sector and intention to pursue a high-tech career will be unrelated for male students.	

Chapter 8: Alternative Approach to Gender Analysis

The purpose of this thesis was twofold - one was to test the SCCT's interest and choice model in a new, untested context, and the other was to identify the influence of contextual gender-related variables on intentions of men and women. The contextual variables of masculine image of the high-tech professionals and gendered perceptions could not be tested in the final hypothesized model (Chapter 7) due to the absence of a valid measure for masculine image of the high-tech professionals and non-significant predictive power for gendered perceptions. These difficulties in model testing do not mean, however, that there were no gender differences evident in the data. This Chapter presents an alternative approach to determining the degree to which the model predictors and relationships varied with respect to gender.

First, *t* tests were used to determine if there were differences in the mean levels of model variables. The *t* test is an assessment of differences between the means of two independent samples. A significant *t* test indicates that the variable means differ between the two groups. Different mean scores between groups suggest that one group may be at advantage relative to the other on that measure.

Next, bivariate correlation analysis was conducted separately for male and female students. Correlation is the measure of size and direction of relationship between two variables, and the squared correlation is a measure of the strength of that association (Tabachnick & Fidell, 1983). A comparison of correlations between women and men was conducted to determine the differential validity of the predictors i.e., "does X account for as much of the variance in Y for female students as for male students?" Fisher's *z* test

was used to examine the significance of this difference. A significant result indicates that the degree of relationship differs between the two groups (Arnold, 1982).

Finally to test the overall predictability of the model independently for male and female students, hierarchical regressions were carried out separately for women and men. The hierarchical regressions provided further insight into which predictors were more important for male and female students' intention to pursue a high-tech career. Significant adjusted R^2 assesses explained variance, and change in R^2 indicates the variance added in each step by the additional variables (Tabachnick & Fidell, 1983).

8.1 Gender Differences in Variable Mean

Means for all study variables are shown separately for women and men in Table 8.1. Male and female engineering students showed similarly high intentions to pursue a high-tech career ($\bar{x}_{male}$= 5.5 & $\bar{x}_{female}$= 5.6 out of 7). With respect to the control variables intention to pursue a career ($\bar{x}_{male}$= 5.5 & $\bar{x}_{female}$= 5.8 out of 7) and attitude toward the high-tech profession ($\bar{x}_{male}$= 5.5 & $\bar{x}_{female}$= 5.8 out of 7), female students reported significantly higher score. Men and women reported similar masculine ($\bar{x}_{male}$= 3.78 & $\bar{x}_{female}$= 3.79 out of 5) and feminine ($\bar{x}_{male}$= 3.85 & $\bar{x}_{female}$= 3.89 out of 5) gender role orientation scores and equal levels of occupational self-efficacy ($\bar{x}_{male}$= 5.39 & $\bar{x}_{female}$= 5.43 out of 7). Significant mean difference was found in all other social cognitive predictors – women reported higher outcome expectations ($\bar{x}_{male}$= 5.70 & $\bar{x}_{female}$= 5.86 out of 7), higher interest ($\bar{x}_{male}$= 5.31 & $\bar{x}_{female}$= 5.56 out of 7), higher social support ($\bar{x}_{male}$= 5.16 & $\bar{x}_{female}$= 5.31 out of 7) and lower social barriers ($\bar{x}_{male}$= 3.78 & $\bar{x}_{female}$= 3.53 out of 7).

Table 8.1

Gender Differences in Means (t-Test)

Variables	Male	Female	Significance
Intentions to pursue a high-tech career	5.48	5.58	0.108
Intentions to pursue a career ***	5.47	5.83	0.000
Attitude toward the high-tech profession ***	5.54	5.77	0.000
Masculine gender-role orientation	3.78	3.79	0.745
Feminine gender-role orientation	3.85	3.89	0.289
Occupational self-efficacy	5.39	5.43	0.432
Outcome expectations **	5.70	5.86	0.010
Interest***	5.31	5.56	0.000
Social support *	5.16	5.31	0.021
Social barriers **	3.78	3.53	0.008

Note. Significant at: *$p < 0.05$, **$p < 0.01$ and ***$p < 0.001$.

8.2 Gender Differences in the Degree of Relationship

Correlations of all study variables are reported separately for men (Table 8.2) and women (Table 8.3). For both male and female students, all predictors (including the control variables: intention to pursue a career, attitude toward the high-tech profession), masculine gender-role, feminine gender-role, occupational self-efficacy, outcome expectations, interest, social support, and social barriers were significantly related to intention to pursue a high-tech career. However, social barriers were negatively related to intention to pursue a high-tech career for male students but positively related for female students. The relationship between social barriers and intention to pursue a high-tech career was contrary to the hypothesized direction for female students. Next, differences in the degree of relationship were assessed by examining differences in the

Table 8.2

Correlation Analysis for Male Sample (*n*=628)

	$\bar{x}$	α	HTC	CAR	AHT	MAS	FEM	OSE	OE	INT	SocSup	SocBar
HTC	5.48	1.05	1.00									
CAR	5.47	1.10	0.37***	1.00								
AHT	5.54	1.07	0.48***	0.36***	1.00							
MAS	3.78	0.55	0.33***	0.23***	0.36***	1.00						
FEM	3.85	0.56	0.29***	0.26***	0.30***	0.36***	1.00					
OSE	5.39	0.89	0.43***	0.27***	0.37***	0.33***	0.23***	1.00				
OE	5.70	0.94	0.48***	0.40***	0.48***	0.31***	0.27***	0.58***	1.00			
INT	5.31	1.12	0.50***	0.33***	0.47***	0.38***	0.24***	0.53***	0.51***	1.00		
SocSup	5.16	1.04	0.31***	0.21***	0.37***	0.23***	0.21***	0.42***	0.40***	0.41***	1.00	
SocBar	3.78	1.45	-0.14**	-0.06	-0.27***	-0.14***	-0.17***	-0.12**	-0.30***	-0.11**	-0.17***	1.00

Note. Significant at: *p < 0.05, **p < 0.01 and ***p < 0.001. Due to space limitations, abbreviated forms of the variable names are used. *HTC* refers to intention to pursue a high-tech career; *CAR* refers intention to pursue a career; *AHT* refers to attitudes toward the high-tech profession; *FEM* and *MAS* refer to feminine gender-role and masculine gender-role; *OSE* refers to occupational self-efficacy; *OE* refers to outcome expectations; *INT* refers to interest; *SocSup* and *SocBar* refer to social support and social barriers respectively.

Table 8.3

Correlation Analysis for Female Sample (*n*=348)

	$\bar{x}$	α	HTC	CAR	AHT	MAS	FEM	OSE	OE	INT	SocSup	SocBar
HTC	5.58	0.88	1.00									
CAR	5.83	0.85	0.40***	1.00								
AHT	5.77	0.87	0.40***	0.49***	1.00							
MAS	3.79	0.55	0.17**	0.17**	0.10**	1.00						
FEM	3.89	0.52	0.25***	0.12*	0.21***	0.43***	1.00					
OSE	5.43	0.70	0.49***	0.33***	0.26***	0.30***	0.21***	1.00				
OE	5.86	0.82	0.46***	0.36***	0.37***	0.25***	0.22***	0.44***	1.00			
INT	5.56	0.88	0.50***	0.35***	0.32***	0.24***	0.26***	0.42***	0.48***	1.00		
SocSup	5.31	0.94	0.34***	0.27***	0.26***	-0.08	0.21***	0.31***	0.11*	0.36***	1.00	
SocBar	3.53	1.4	0.16**	-0.09	-0.04	0.14**	0.08	0.12*	-0.14**	0.08	0.03	1.00

Note. Significant at: *p < 0.05, **p < 0.01 and ***p < 0.001. Due to space limitations, abbreviated forms of the variable names are used. *HTC* refers to intention to pursue a high-tech career; *CAR* refers intention to pursue a career; *AHT* refers to attitudes toward the high-tech profession; *FEM* and *MAS* refer to feminine gender-role and masculine gender-role; *OSE* refers to occupational self-efficacy; *OE* refers to outcome expectations; *INT* refers to interest; *SocSup* and *SocBar* refer to social support and social barriers respectively.

Table 8.4

Differences in the Degree of Relationship Correlations with Intention to Pursue a High-Tech Career

Independent Variables	Cor. (Male)	Cor. (Female)	Z-score (Male)	Z-score (Female)	Probability
Intentions to pursue a career	0.374	0.400	0.393	0.424	0.162
Attitudes toward the high-tech profession*	0.482	0.396	0.526	0.419	0.028
Masculine gender-role orientation**	0.330	0.172	0.343	0.174	0.003
Feminine gender-role orientation	0.290	0.251	0.299	0.256	0.133
Occupational self-efficacy	0.432	0.489	0.462	0.535	0.070
Outcome expectations	0.483	0.456	0.527	0.492	0.151
Interest	0.501	0.498	0.551	0.547	0.238
Social support	0.310	0.343	0.321	0.357	0.145
Social barriers***	-0.136	0.155	-0.137	0.156	0.000

Note. Significant at: *$p < 0.05$, **$p < 0.01$ and ***$p < 0.001$.

correlations for the two groups (Arnold, 1982). The results presented in Table 8.4 revealed that intention to pursue a career, feminine gender-role, occupational self-efficacy, outcome expectations, interest, and social support did not have differential impacts for women and men. Attitudes toward the high-tech profession and masculine gender role orientation had significantly stronger impact on men's intentions compared to women's. In contrast, social barriers significantly impacted intentions negatively for men

and positively for women. Taken together, the results suggest that female students are likely to be motivated to pursue a high-tech career by defying socially prescribed gender-roles, are less concerned about attitudes toward the high-tech profession, and are more willing to a pursue high-tech career in the face of barriers, whereas men's intentions are as predicted, influenced by a higher masculine gender-role orientation, positive attitudes toward the high-tech profession, and lower social barriers.

8.3 Best Predictors of Intention to Pursue a High-Tech Career for Women and Men

Given the gender differences in the degree of relationship between some of the predictors and intention to pursue a career, separate hierarchical regression analyses were run for men and women (see Table 8.5 and Table 8.6 for the results). The purpose of these analyses was to examine the relative contribution of the predictors to intention separately for women and men. In Step 1, intention to pursue a career and attitudes toward the high-tech profession were entered into the model as control variables. Masculine and feminine gender role orientation were added to the model in Step 2 and the social cognitive career predictors of occupational self-efficacy, outcome expectations, interest, social support, and social barriers were added in step 3.

The regression for male students (presented in Table 8.5) indicates that intention to pursue a career and attitudes toward the high-tech profession (Step 1) contributes significantly and explained 28% variance in intention to pursue a high-tech career. These predictors were found significant even when other variables were included in Step 2 and Step 3 of the model. Gender-role orientation accounted for 2.8% of the variance in intention to pursue a career ($p \leq .05$); however, masculine gender role was not significant

once other variables were included in the later step of the analysis. Social support and social barriers (Step 3) did not contribute significantly to the explanation of intentions to pursue a high-tech career, indicating that men's intentions are not swayed by perceived support or barriers. Occupational self-efficacy, outcome expectations, and interest added another 8.8% of the variance in the dependent variable ($p \leq .05$), thus providing support to core social cognitive predictors (Bandura, 1997; Lent et al., 1994). The final model for male students explained 39.3% variance in the dependent variable. Among the significant social cognitive predictors, interest ($\beta_{male} = .20$, $p < .01$) was found to be the most

Table 8.5

Hierarchical Regression Results – Male Sample

Model Steps	Predictor	Std. β Coeffs.	Sig.	Model Summary		Change Summary	
				Adj. R^2	Sig.	ΔR^2	Sig.
1.	Intention to Pursue a Career	0.23***	0.000	0.278	0.000	0.278	0.000
	Attitudes toward the high-	0.40***	0.000				
2.	Intentions to pursue a career	0.20***	0.000	0.305	0.000	0.028	0.000
	Attitudes toward the high-	0.34***	0.000				
	Masculine gender-role	0.13**	0.001				
	Feminine gender-role	0.09**	0.014				
3.	Intentions to pursue a career	0.12***	0.001	0.393	0.000	0.088	0.000
	Attitudes toward the high-	0.20***	0.000				
	Masculine gender-role	0 .05	0.173				
	Feminine gender-role	0.07*	0.034				
	Occupational self-efficacy	0.10*	0.013				
	Outcome expectations	0.15**	0.001				
	Interest	0.20**	0.000				
	Social support	0.01	0.880				
	Social barriers	0.02	0.499				
Dependent Variable: Intention to Pursue a High-Tech Career							

Note. Significant at: *p < 0.05, **p < 0.01 and ***p < 0.001.

important, followed by outcome expectations (β_{male} = .15, p<.01) and occupational self-efficacy (β_{male} = .10, p<.01). Also, feminine gender-role orientation (β_{male} = .07, p<.05) was found to be a small, but a significant, predictor for male students. These results are interesting and contradict some previous findings which suggested that self-efficacy was a stronger predictor than interest. Further, the finding that feminine gender-role, and not masculine gender-role was significant for men warrants further explanation.

Similar to the regression results for male students, the regression results for female students (see Table 8.6 for details) indicated that the control variables (Step 1) contributed significantly and explained 20.8% variance in intention to pursue a high-tech

Table 8.6

Hierarchical Regression Results – Female Sample

Model Steps	Predictor	Std. β Coeffs.	Sig.	Model Summary		Change Summary	
				Adj. R^2	Sig.	ΔR^2	Sig.
1.	Intention to Pursue a Career	0.26***	0.000	0.208	0.000	0.213	0.000
	Attitudes toward the high-	0.27**	0.000				
2.	Intentions to pursue a career	0.23**	0.000	0.233	0.002	0.029	0.002
	Attitudes toward the high-	0.26**	0.000				
	Masculine gender-role	0.04	0.488				
	Feminine gender-role	0.16**	0.003				
3.	Intentions to pursue a career	0.10*	0.037	0.429	0.000	0.202	0.000
	Attitudes toward the high-	0.13**	0.010				
	Masculine gender-role	-0.06	0.242				
	Feminine gender-role	0.07	0.138				
	Occupational self-efficacy	0.20**	0.000				
	Outcome expectations	0.20**	0.000				
	Interest	0.18**	0.000				
	Social support	0.11*	0.028				
	Social barriers	0.15**	0.000				
Dependent Variable: Intention to Pursue a High-Tech Career							

Note. Significant at: *p < 0.05, **p < 0.01 and ***p < 0.001.

career. The predictors were found significant even when other variables were included in Step 2 and Step 3 of the model. However, the variance explained by the control variables was lower in the female sample compared to the male sample (ΔR^2_{male}=.28 and ΔR^2_{female}=.21; p<.01). Gender-role orientation accounted for about the same amount of variance as in the male model (ΔR^2_{male}=.028 and ΔR^2_{female}=.029; p<.01); however, neither of the gender roles had a significant impact once social cognitive career variables were included in the last step of the analysis. All social cognitive career predictors - occupational self-efficacy (β_{female} = .20, p<.01), outcome expectations (β_{female} = .20, p<.01), interest (β_{female} = .18, p<.01), social support (β_{female} = .11, p<.05), and social barriers (β_{female} = .15, p<.01) were significant and accounted for additional variance in the dependent variable (ΔR^2_{female}=.20, p≤.01). These results provide strong support, not only for the core social cognitive predictors, but also for the environmental predictors of social support and social barriers. The final model explained 42.9% variance in the dependent variable for the female sample, which is substantial.

Among the significant predictors, occupational self-efficacy was found to be the most important predictor, followed by outcome expectations, interest, social barriers, and social support. Contrary to expectation, the positive sign of the beta coefficient for social barriers indicates that female engineering students may not be discouraged by the presence of social barriers; rather they seem to become more determined to pursue a high tech career. These results contradict earlier findings that suggest high support and low barriers influence women's intention to pursue a male-dominated career (Lent et al.,

2005). Neither of the gender-role orientations was found to impact female students' career intentions. These unexpected results suggest the need for further research.

8.4 Chapter Summary

The analysis revealed that male and female students do show differences in their intentions to pursue high-tech careers. Between male and female students, there was a significant mean difference in social cognitive predictors, except occupational self-efficacy. Female students' showed higher interest, higher outcome expectations, higher support, and lower barriers. The Fisher z tests comparing correlations in the male and female samples revealed that three variables were significantly different in the degree of relationship between men and women: attitudes toward the high-tech profession, masculine gender-role, and social barriers. From the data it is apparent that men with stronger attitudes toward high-tech profession and more masculine role orientations are likely to show stronger intentions to pursue high-tech careers. However, the same cannot be said for women. Social barriers had a negative impact on men's intention to pursue a high-tech career, but had a positive impact on women, although the correlation coefficient was low (r_{men} = - 0.136 and r_{women} =0.155). Next, hierarchical regression provided further insight into the best predictors of career intentions for men and women. For men, in order of importance, the best predictors of intention were interest, attitudes toward the high-tech profession, and outcome expectations. For women, all the social cognitive predictors were important; the best predictors in order of importance were occupational self-efficacy and outcome expectations, followed by interest, social barriers,

and social support. Chapter 9 will discuss the results in more detail along with some important implications.

Chapter 9: Discussion

The purpose of this study was twofold. The first objective was to test SCCT's interest and choice model in a non-Western context in order to validate the applicability of the theory in Bangladesh. The second objective was to expand beyond the core of the theory to incorporate background person and contextual gender-related variables. This chapter presents an overview of the approach taken to achieve these objectives. The chapter summarizes the findings, discusses the results obtained, and presents the theoretical and practical implications. Next contributions of this study are presented. The chapter also presents the limitations of this study, as well as possible areas for future research.

9.1 SCCT's Interest and Choice Model

The primary purpose of this thesis was to explore the utility of social cognitive career theory (Lent et al., 1994) in understanding career choice behavior in a non-Western context using a sample from Bangladesh. Two SCCT models were tested, the first one being a 'core model' that incorporated only the core person variables (self-efficacy, outcome expectations, and interest). The core model is built on the theory that core person variables represent a proximal set of influences on choice goals, and intentions to pursue a high-tech career for the present study. The second model, an expanded SCCT interest and choice model, incorporated core person variables (self-efficacy, outcome expectations, and interest) and contextual variables (support and

barriers). The expanded model suggests that, in addition to the person, context also exerts proximal influences on individuals' career intentions. The results of the base model demonstrated a good fit to the data and all the hypothesized relationships were found to be significant as presented in Chapter 7; however the discussion presented here is based on the results of the expanded model (see Figure 7.2 for the structural model of SCCT's interest and choice) due to its more complete representation of choice predictors. The discussion of the model is organized around three blocks of hypotheses – interest, choice, and contextual variables.

9.1.1 Interest Model Hypotheses

In accordance with the SCCT interest model, it was hypothesized that occupational self-efficacy would predict students' outcome expectations (H5) and that occupational self-efficacy and outcome expectations would predict interest (H2 and H4 respectively). Results (see Appendix 7.6) showed that occupational self-efficacy significantly and uniquely predicted outcome expectations (H5) and interest (H2) and outcome expectations also produced a significant path to interest (H4). The results provided support to H5, H2, and H4. Further as hypothesized by SCCT, occupational self-efficacy indirectly predicted interest through outcome expectations (β=0.25; Appendix 7.7). The study findings are consistent with other SCCT studies involving engineering (e.g., Byars-Winston et al., 2010; Lent et al., 2003a; Schaefers et al., 1997), computing (e.g., Lent et al., 2008; Lent et al., 2011), and STEM majors (e.g., Fouad & Smith, 1996; Fouad et al., 2002). These results highlight the importance of occupational self-efficacy in determining outcome expectations and interest.

9.1.2 Choice Model Hypotheses

Moving to the next block in the model, SCCT's choice model posits that occupational self-efficacy, outcome expectations, and interests are each directly and positively related to intention to pursue a high-tech career (H1, H3, and H6 respectively). Support was found for the hypothesized relationships between outcome expectations and intention to pursue a high-tech career (H3) and between interest and intention to pursue a high-tech career (H6). These findings are generally consistent with the earlier SCCT studies involving engineering and computing majors (e.g., Fouad et al., 2002; Lent et al., 2008; Lent et al., 2011) and with international samples (e.g., Blanco, 2011; Lent et al., 2003).

Although occupational self-efficacy produced a non-significant direct path to intention to pursue a high-tech career, it produced a significant indirect path to intentions through interests and outcome expectations (see Appendix 7.7). Occupational self-efficacy had a significant direct influence on interest, which in turn had a significant effect on intentions.

Outcome expectations also produced a significant indirect path to intentions, through interest. The significant direct and indirect effects for paths suggest that interest mediates the relations of both occupational self-efficacy and outcome expectations to intention to pursue a high-tech career. The results of the interplay among the core person variables – occupational self-efficacy, outcome expectations, and interest - and dependent variable, intentions, indicate that these relationships are complex (Lent et al., 1994).

Interestingly, when total effects (see Appendix 7.8) for occupational self-efficacy and outcome expectations were compared, occupational self-efficacy was found to

produce stronger total effects on interest (i.e., taking into account both its direct effects and indirect effects, through outcome expectations) and on intention to pursue a high-tech career (i.e., taking into account both its direct effects and indirect effects, through interest and through outcome expectations and interest). The results are consistent with Bandura's (1977) theorizing that the outcomes individuals expect are largely dependent on their judgement of what they are capable of achieving and thus it is likely that outcome expectations will make a smaller contribution once the effects of self-efficacy have been taken into account.

9.1.3 Effects of Supports and Barriers on Choice Consideration

Finally, moving to the last block involving contextual variables of social support and barriers, SCCT posits that contextual variables can be an important set of proximal influences during active phases of occupational or career decision making (Lent et al., 2000). Contextual variables include social support and barriers (Lent et al., 2003a). According to SCCT's interest and choice model, choice goals are hypothesized to be influenced by the presence of support and absence of barriers (Lent et al., 2000). Bandura (1999), however, argued that rather than direct effects, contextual variables will affect choice behaviors indirectly through their impact on self-efficacy.

The present study examined both theoretical paths (Bandura, 1999; Lent et al., 2000) and hypothesized that social support and barriers would relate to intention to pursue a high-tech career directly (H7 and H8) and indirectly through occupational self-efficacy (H9 and H10). The hypothesized direction of the relationship for support was positive whereas for barriers, it was negative.

The direct path between social support and intention to pursue a high-tech career was not significant (H7). The direct path between social barriers and intention to pursue a high-tech career was significant, though the effect was very small (H8). Contrary to the hypothesized direction of H8, the path was found to be positive, rather than negative. The results for the direct paths between social support and barriers are similar to some other studies involving engineering and international students (Lent et al., 2003a; Lent et al., 2003). Overall, these results provide no support for Lent et al.'s hypothesis that social support directly enhances career intentions or that social barrier directly undermine intentions.

Although support could not be established for the hypothesized direct and indirect relationships, the path from social support to occupational self-efficacy was large and significant (β=.56; $p \leq .01$), whereas the path from social barriers to occupational self-efficacy was very small and non-significant (β=-.03; $p \geq .10$). The same dynamics were observed when indirect (Appendix 7.7) and total effects (Appendix 7.8) were considered. All the indirect paths from support to outcome expectations, interest, and intention to pursue a high-tech career were significant. The indirect paths, however, from barriers to outcome expectations, interest, and intention to pursue a high-tech career were non-significant. The same trend was observed for total effects. Thus, support could be found for the mediating role of occupational self-efficacy in its relation between social support and intention to pursue a high-tech career (H9) but not for social barriers and intention to pursue a high-tech career (H10). Consequently Bandura's indirect hypothesis that support can affect choice goals through self-efficacy was supported, but the same cannot be said for barriers.

Social support had a strong direct effect on occupational self-efficacy and significant indirect effects, through occupational self-efficacy, to outcome expectations, interest, and intention to pursue a high-tech career. These findings indicate that social support played a significant role in the development of outcome expectations, interest, and intentions to pursue a high-tech career for these engineering students, but it appeared to do so primarily through its relationship to occupational self-efficacy rather than in a direct way. Hence the finding suggests that support played a more important role in building self-efficacy than in directly influencing the pursuit of choice goal.

9.1.4 Integration of Interest Model, Choice Model, and Support and Barriers on Choice Consideration

Congruent with SCCT propositions the findings revealed that occupational self-efficacy and outcome expectations were strongly related to interest. Findings also revealed that occupational self-efficacy positively predicted outcome expectations and indirectly predicted interest through outcome expectations. Previous research has established strong evidence for these relationships within engineering and computing, and other domains such as mathematics, science, arts, and social-sciences (e.g., Betz & Hackett, 1983; Byars-Winston et al., 2010; Fouad & Smith, 1996; Fouad et al., 2002; Lent et al., 2005; Lent et al., 2011). The present study lends further support to SCCT's hypotheses and shows that these effects hold in a new context - South Asia.

Consistent with previous research, outcome expectations were found to be directly predictive of engineering students' intentions to pursue a high-tech career. The significant relationship from outcome expectations to interest and to intentions to pursue

a high-tech career may also reflect students' attitudes toward high-tech occupations, which are seen as high paying and prestigious compared to other fields (Srinivasan et al., 2013). Occupational self-efficacy, however, was not found to be directly predictive; rather it was found to be indirectly predictive, of engineering students' intentions to pursue high-tech careers through outcome expectations and interest. It is possible that the use of a measure of occupational self-efficacy, instead of domain specific self-efficacy may have resulted in such a finding; however, the technology self-efficacy measure included in this study had significantly weaker relationships with the variables of interest.

A significant indirect path indicates that self-efficacy plays an important role in the prediction of intentions for these engineering students, but it does so through interest and outcome expectations. Although the absence of a direct relationship between self-efficacy and choice goal is at odds with some prior research on SCCT's interest and choice model (e.g., Lent et al., 2005; Lent et al., 2008; Lent et al., 2011), it is supported by a small number of studies such as Flores and O'Brien (2002), and Fouad and Smith (1996). What these other non-supportive studies share in common with the present study is a focus on largely ethnic samples (e.g. Hispanic Americans). It is possible that there are other cultural or contextual factors that may be influencing the relationship between self-efficacy and intentions to pursue a high-tech career. For example, Bangladesh and other South Asian countries are primarily patriarchal collectivist cultures. In such contexts, students' may see themselves as efficacious, but their career choices may be heavily influenced by approval or disapproval from influential elders such as parents or the patriarch of the family. More research is needed to assess whether contextual factors may play a more important role in individual's career intentions than self-efficacy.

Some research on ethnic groups with a collectivist orientation has found that interest is not a significant predictor of career choice (Flores & O'Brien, 2002; Tang et al., 1999). This is in contrast to SCCT's hypothesized path that interest predicts choice goals. Based on ethnic American samples (e.g., Hispanic Americans, Black Americans, and Asian Americans), Leong and Gupta (2008) argued that in more collectivist cultures, collective interests, rather than individual interests, play a role in an individual's career choice. Yet, for this study, interest positively predicted engineering students' intentions, lending support to SCCT's hypothesized path and prior research findings (e.g., Betz & Hackett, 1983; Fouad & Smith, 1996; Fouad et al., 2002; Lent et al., 2005, Lent et al., 2011). Leong and Gupta's (2008) collectivist interests argument was based on ethnic samples from North America, however, when samples are collected from collectivist societies like China (Song & Chathoth, 2008) and, as in the present case, Bangladesh, individual interest was found to be predictive of intentions. Although, the present study with South Asian engineering students suggests that interest plays an important role in career intentions, more research is required to explore the role of collectivist interests on individual career choices.

Lastly, regarding contextual variables, the present study's findings did not support the direct path hypothesis (Lent et al., 2000) , but supported Bandura's (1999, 2000) indirect path hypothesis. No relationship was found between social support and intention to pursue a high-tech career but social support indirectly influenced intentions through occupational self-efficacy. This is consistent with earlier findings (Lent et al., 2001; Lent et al., 2003; and Lent et al., 2003a), where studies have reported that environmental support related to choice outcomes only through self-efficacy. As these studies suggest,

individuals take support for granted, unless support is excessively low or they are confronted with significant barriers, and therefore it may not affect their career intentions. Support, however, does play an important role in developing self-efficacy beliefs. A person with stronger efficacy expects better outcomes in performing tasks as s/he feels competent. Together efficacy and expectations lead to greater interest and greater desire to pursue a career (Lent et al., 1994, 2000). Contrary to the hypothesized path, social barriers positively predicted intention to pursue a high-tech career. One possible explanation is that the presence of barriers may make an individual more determined to fight against the odds, resulting in a positive relationship between barriers and intentions. This possibilities warrant further investigation.

Overall, most of the results of this study fit well with prior research. All paths except one in the core section of the SCCT model (self-efficacy, outcome expectations, interests, and goals) were significant. Some of the previous studies have also found that one path - from self-efficacy to choice - was non-significant. With regard to contextual variables, social support played an important role in enhancing self-efficacy. Collectively, the model accounted for 31% of the variance in occupational self-efficacy, 14% of the variance in outcome expectations, 14% of the variance in interest, and 14% of the variance in intention to pursue a high-tech career. In general, the model offered a good fit to the data and lends support to the applicability of the SCCT framework in a South Asian context.

9.2 SCCT's Interest and Choice Model and Gender-Role Orientation

Lent (2005) emphasized on the interplay of personal agency, person, and contextual variables, and their influences on career outcomes. According to the author,

> "Self-efficacy and outcome expectations do not arise in a social vacuum; neither do they operate alone in shaping vocational interest, choice, or performance processes. Rather, they are forged and function in the context of other important qualities of persons and their environments, such as gender, race/ethnicity, genetic endowment, physical health or disability status, and socioeconomic conditions, all of which can play important roles within the career development process" (2005:107).

Further elaborating on the role of gender, the author states, SCCT is more concerned with the psychological and social effects of gender than the view of sex as a biological factor. One of the objectives of this thesis was to understand how gender impacts engineering students' intentions to pursue the male-dominated career of high-tech. Consequently, gender-role orientation was added to SCCT's interest and choice model as a background person variable. Masculine and feminine gender-role orientations tap into the socio-psychological dimension of gender and thus align with the theoretical premise of SCCT (Lent et al., 1994). South Asian countries are mainly traditional patriarchal societies where men and women are expected to behave in a gender-congruent manner (Chowdhury, 2010). The final hypothesized model for this thesis therefore expanded SCCT's interest and choice model and incorporated background person (masculine and feminine gender-role), basic core person (occupational self-efficacy, outcome expectations, and interest), and proximal contextual variables (social support and barriers).

This model is based on the theory that gender-role orientation helps individuals develop occupational self-efficacy and outcome expectations. Previous research on

gender-role orientation has shown that gender-role tends to shape individuals' career beliefs. Individuals with a masculine role orientation are more likely to develop strong efficacy beliefs and outcome expectations for male-typed jobs and those with a more feminine role orientation are more likely to develop strong efficacy beliefs and outcome expectations for female-typed jobs (Hackett & Betz, 1981). The discussion of this model (see Figure 7.2 for the structural model of SCCT's interest and choice with gender-related variables) is organized around four blocks of hypotheses: gender-role orientation, interest, choice, and contextual variables.

9.2.1. Effects of Gender-Role on Self-Efficacy and Outcome Expectations

As understood by SCCT researchers, gender-role can be an important background person variable that influences the development of self-efficacy beliefs and outcome expectations (Lent et al., 1994). Considering the potential effects of gender-role and the male-dominated context of high-tech, I hypothesized that masculine gender-role would be positively related to occupational self-efficacy and outcome expectations (H11A and H12A) and feminine gender-role would be negatively related to occupational self-efficacy and outcome expectations (H11B and H12B).

In accordance with the hypothesized path, results (see Appendix 7.12) indicated a significant positive relationship between masculine gender-role and occupational self-efficacy (H11A). This finding is consistent with previous studies that suggest that individuals with higher masculine gender-role orientation are more likely to develop the efficacy beliefs that are necessary to pursue male-typed occupations such as entrepreneurship or high-tech (e.g., Adams & Sherer, 1985; Gushue & Whitson, 2006;

Hackett & Betz, 1981; Nwankwo, Kanu, Marire, Balogun & Uhiara, 2012). The relationship between masculine gender-role and outcome expectations, however, was not significant (H12A). Taken together these results suggest that a person with a more masculine gender-role is likely to feel more efficacious in pursuing their future occupation; however, this does not seem to enhance their expectations of favorable outcomes. On the other hand, the relationship between feminine gender-role and self-efficacy was non-significant (H11B). This is in contrast with earlier studies that have found femininity was related to lower self-efficacy (e.g., Betz & Hackett, 1981; Long, 1989). Also, contrary to expectations, the relationship between feminine gender-role and outcome expectations was significant and positive (H12B). The findings with regard to femininity suggest a person with a more feminine gender-role would not necessarily feel less efficacious in pursuing their future occupation, but it may increase their expectations of favorable outcomes. One explanation for these results may be the potential conceptual overlap between the abbreviated measure of femininity (5-item instead of 8-item measure used in this study) and outcome expectations. This issue warrants further study.

Interestingly, when the indirect effects (see Appendix 7.13) for masculinity and femininity were compared, all the indirect paths between masculine gender-role and outcome expectations, interest, and intention to pursue a high-tech career were significant, whereas all the indirect paths between feminine gender-role and outcome expectations, interest, and intention to pursue a high-tech career were non-significant. Likewise, except outcome expectations, all the total effects between masculine gender-role and occupational self-efficacy, interest, and intention to pursue a high-tech career were significant, whereas, for feminine gender-role the only significant total effect was

for outcome expectations (see Appendix 7.14). The addition of gender-role orientation to the model explained 13% more variance in occupational self-efficacy above and beyond social supports and barriers and 16% more variance in outcome expectations. Overall, these results suggest that gender-role orientation as a background person variable explained additional variance in self-efficacy and outcome expectations.

9.2.2. Interest Model Hypotheses

Consistent with the earlier model (Section 9.1.1), all the hypothesized paths for the interest model, including gender-role orientation, were found to be significant. Results (see Appendix 7.12) showed that occupational self-efficacy significantly and uniquely predicted outcome expectations (H5) and interest (H2). Outcome expectations also produced a significant path to interest (H4). Further, occupational self-efficacy indirectly predicted interest through outcome expectations (see Appendix 7.13). The addition of gender-role orientation helped to explain 8% more variance in interest compared to the previous model (Section 9.1).

9.2.3. Choice Model Hypotheses

Moving to the choice block in the model, all the hypothesized paths were significant when gender-role orientation was added to the model. Support was found for the direct paths between occupational self-efficacy and intention to pursue a high-tech career (H1), between outcome expectations and intention to pursue a high-tech career (H3), and between interest and intention to pursue a high-tech career (H6).

Support was also found for indirect paths (see Appendix 7.13). Occupational self-efficacy and outcome expectations both produced significant indirect effects on intention to pursue a high-tech career through interest. When total effects (see Appendix 7.14) for these two predictors were compared, occupational self-efficacy was again found to produce stronger total effects on interest and on intention to pursue a high-tech career compared to outcome expectations.

The inclusion of gender-role transformed the relationship between occupational self-efficacy and intention behavior into a significant one (it was previously reported not significant) as reported in Section 9.1. This lends support to Lent and colleagues' assertion that person variables such as gender-role orientation can significantly impact one's career development process. Moreover, inclusion of this variable helped in explaining 5% more variance in the outcome variable, intention to pursue a high-tech career.

9.2.4. Effects of Support and Barriers on Choice Consideration

In the final block, hypotheses related to social supports and barriers were tested with gender-role orientation included in the model. The study findings again suggested that inclusion of gender-role helped in predicting the hypothesized relationships. The paths between social support and intention to pursue a high-tech career, and between social barriers and intention behavior, were positive and significant. The results supported the hypothesized direction for social support (H7); however, like the earlier findings on social barriers presented in Section 9.1.3, the result was contrary to the hypothesized direction for social barriers (H8). Support was also found for Bandura's

(1977) indirect relationship between social supports and intention to pursue a high-tech career (H9), but not for an indirect relationship between social barriers and intentions to pursue a high-tech career (H10).

Similar to the findings of earlier models, all the direct, indirect, and total effects for social supports on other variables were significant (Appendix 7.12, 7.13, and 7.14); whereas (except for a small, significant path between social barriers and intentions), all other direct, indirect and total effects for social barriers were non-significant. The results once again suggest social support plays a more dominant role than social barriers in individuals' career choices.

9.2.5. Integration of Gender-Role Orientation into the Interest and Choice Model

Congruent with SCCT's (Lent et al., 1994) second layer of theoretical analysis, the integration of gender-role orientation helped to provide a more comprehensive understanding of how important individual differences can be in shaping dynamic aspects of people (e.g., self-efficacy, future expectations) in their career choice process.

Consistent with the findings of past research, support was found for a direct positive relationship between masculine gender-role and occupational self-efficacy. With respect to indirect relationships, masculine gender-role significantly impacted interest and intentions to pursue a high-tech career for these engineering students, but did so primarily through its relationship to occupational self-efficacy. Hence the finding lends support to the influence of gender-role and confirms Betz and Hackett's (1981) assertion that stronger masculine gender-role orientation is associated with the pursuit of male-typed jobs like high-tech.

The direct relationship between masculine gender-role and outcome expectations, however, was not supported. One explanation for the result may be the predictive validity of the outcome expectations measure. According to Bandura (1986) outcome expectations usually include three types of expectations: social (e.g., respect from family), material (e.g., attractive salary), and self-evaluative (e.g., self-satisfaction). In the present study, the confirmatory factor analysis on the outcome expectations items captured only two dimensions: career (good job offer, attractive salary, and ability-work fit) and self-evaluative (do satisfying work, do interesting work, and make a contribution to society) as opposed to three dimensions. Although an attempt to incorporate social expectations was made in the present study, inadequate measurement may have influenced the findings. It may be useful, therefore, to examine separately the effect of masculinity on each dimension of outcome expectations in future research.

Another possible explanation for the lack of a linkage between masculine gender-role orientation and expectations may be the general perceptions of high tech in Bangladesh. High-tech occupations are viewed as high-prestige in the collectivist societies of South Asia (Dyke et al., 2012; Saifuddin et al., 2013; Srinivasan et al., 2013), and consequently many Asians - regardless of gender-role orientation – will view them as providing positive outcomes.

The findings with respect to femininity were somewhat unexpected and contradictory. No significant direct link was found between femininity and occupational self-efficacy; contradicting previous findings that feminine gender-orientation was associated with lower self-efficacy for male-typed jobs (e.g., Betz & Hackett, 1981). Nevertheless, femininity was found to be significantly and positively related to outcome

expectations. One possible explanation for these unexpected findings may be that the measure of feminine gender-role used in this study may not have captured traditional feminine traits. Following the factor analysis on this data, three items from the original eight-item scale were dropped. These items focus on emotionally expressive behaviors and selflessness which are some of the least agentic feminine qualities. The remaining five items - gentle, helpful, kind, aware of other's feelings, and understanding of others - captured more of the supportive dimension combined with interpersonal sensitivities (Spence & Heilmreich, 1978). The exclusion of the least agentic items from the femininity measure may explain why femininity did not undermine occupational self-efficacy. The significant positive relationship between femininity and outcome expectations may be due to the conceptual overlap between the two measures. The femininity measure included items such as helpful and understanding of others, and outcome expectations included items such as making a contribution to society. These possibilities warrant further investigation.

Congruent with SCCT propositions, occupational self-efficacy and outcome expectations were strongly related to interest in this model. The findings also revealed that occupational self-efficacy positively predicted outcome expectations and indirectly predicted interest through outcome expectations. Interestingly, the addition of gender-role as a precursor of occupational self-efficacy and outcome expectations helped to explain 16% more variance in outcome expectations (30% compared to 14%) and 8% more variance in interest (22% compared to 14%) confirming that gender-role can influence self-efficacy and outcome expectations which then can impact career interest.

The findings regarding the choice model were also consistent with SCCT propositions. Outcome expectations were found to be directly predictive of engineering students' intentions to pursue high-tech careers. Additionally, occupational self-efficacy, which had no significant direct effects on the earlier choice model (Section 9.1), also was directly predictive of engineering students' intentions to pursue high-tech careers once gender-role orientation was added to the model. This finding lends further support to the body of research that found self-efficacy to be an important predictor of choice goals among engineering and computing students (e.g., Lent et al., 2005; Lent et al., 2008; Lent et al., 2011). The transformation of a non-significant relationship to a significant one can be attributed to the addition of gender-role to the model. Further, this is consistent with earlier research that a high masculine orientation is associated with higher efficacy beliefs in male-typed jobs that subsequently strengthen one's intention to pursue a male-dominated occupation (e.g., Cejka and Eagly; Long, 1989). It is also possible that individuals with a more masculine orientation gain such confidence in their own ability that despite living in a collectivist culture they dare to make career choices independent of influential elders. However, further research is needed to determine which predictor - gender-role or patriarchal norms - plays a more important role in influencing students' career choices in a collectivist society. Once again, this model explained more variance in the dependent variable, intention to pursue a high-tech career, than the earlier model (19% compared to 14%). The merit of adding gender-role as a precursor of occupational self-efficacy and outcome expectation is reflected in these results.

Finally, with respect to social support, this model found support for Lent et al.'s (2000) direct path hypothesis, that is, social support directly influenced intention to

pursue a high-tech career. This relationship was not significant in the earlier model (Section 9.1) but became significant with the addition of gender-role. As no direct or indirect path connects gender-role and social support in the SCCT theoretical framework, the findings of the present study offer another avenue for theoretical dialogue. This result suggests not only that background variables inform self-efficacy and outcome expectations, they may also alter the impact of social support and barriers. More research, however, is needed to confirm this theoretical direction as well as the finding. With respect to social barriers, the results are consistent with earlier model findings. Social barriers positively predicted intention to pursue a high-tech career. Together, masculine and feminine gender-roles, and social support and barriers explained 43% of variance in occupational self-efficacy, 12% more than the earlier model without gender-role orientation.

Overall, most of the results of this analysis incorporating gender-role orientation fit very well with prior research. All paths in the core section of the SCCT model (self-efficacy, outcome expectations, interest, and goals) were significant. With regard to the contextual variables of social support and barriers, both were found to significantly predict intention to pursue a high-tech carer. The merit of adding gender-role was reflected through the improved explanatory power. Collectively, the model accounted for 43% of the variance in occupational self-efficacy, 30% of the variance in outcome expectations, 22% of the variance in interest, and 19% of the variance in intention to pursue a high-tech career. The model offered overall good fit to the data and lends strong support to the applicability of the SCCT framework and the value of accounting for gender-role orientation.

9.3 Additional Gender-Related Analyses

The purpose of this thesis was twofold - one was to test the SCCT model in a new, untested context and the other was to identify the influence of contextual gendered predictors on the career intentions of men and women. However, the contextual variables of masculine image of high-tech professionals and gendered perceptions could not be tested in the final hypothesized model due to the lack of fit in the measurement model for masculine image (see Chapter 7) and low predictive power for gendered perceptions (see Chapter 6). In the absence of contextual gendered variables, an alternative approach was taken to examine gender-related variables for their unique and collective association with intentions. Gender differences were investigated for all model predictors and the two control variables. Particular attention was paid to women's intentions because of their low representation in such careers and to help assess interventions designed to increase their participation in the high-tech sector.

9.3.1 Mean Differences in Model Variables

The male and female engineering students did not differ in their intentions to pursue a high-tech career. The finding is consistent with earlier studies involving South Asian engineering students (Dyke et al., 2012; Saifuddin et al., 2013) and other research involving social cognitive variables (e.g., Lent et al. . 2005; Lent et al., 2011, Schaefers et al., 1997). The prestige of the high-tech occupation coupled with good employment opportunities may have influenced men and women equally to aspire, to enter into, and to persist, in such occupations.

Women showed higher intentions to pursue a career, in general, and held more positive attitudes toward high-tech. A possible explanation for these findings may be that, in the traditional male-dominated society of Bangladesh, a woman who wishes to break away from her traditional role and pursue a career may require strong intentions to have a career. Similarly, for women to pursue a male-dominated occupation such as high-tech may require strongly positive attitudes toward the profession. Or this can be evidence of self-selection bias (e.g. only women who have positive attitudes go into engineering in the first place). Further research is needed to explore these hypotheses.

In comparing the mean differences for the theoretically relevant variables, perhaps the most notable are the similar scores of women and men on masculine role orientation ($\bar{x}_{male}$= 3.78 & $\bar{x}_{female}$= 3.79 out of 5) and feminine role orientation ($\bar{x}_{male}$= 3.85 & $\bar{x}_{female}$= 3.89 out of 5). In a traditional, patriarchal South Asian society, where men and women are expected to display gender congruent behaviors (Chowdhury, 2009), it was expected that women and men would differ with respect to gender-role orientation. One possible explanation is that women who intend to pursue a professional career in this context may need to possess a personality profile that is similar to that of their male peers. It is also possible that South-Asian women intending to pursue male-dominated careers are defying societal and gender norms and constructing a 'new identity' for themselves and becoming more independent and assertive, like women in Western, egalitarian societies. Both hypotheses require further investigation.

The similarity in the gender-role orientation for men and women also dovetails with other research that has been conducted in Western developed contexts. A review of the extant literature indicates that women are adopting more masculine traits with the

passage of time (Diekman & Eagly, 2000; Prescott & Bogg, 2013). Twenge (1997) in her meta-analysis found that masculine scores for men and women are increasing; however feminine scores are increasing slightly for men but not for women. These findings may reflect that, due to socio-economic changes such as the increased participation of women in the paid labor force, the lines between masculine and feminine gender-roles are becoming more blurred and weaker (Diekman & Eagly, 2000; Holt & Ellis, 1998) and therefore gender differences are not evident in individuals pursuing the engineering and technology domains. More research, however, is needed before such a hypothesis can be supported.

Next, mean differences were compared between the two groups for core person variables in the model. Women differed significantly from men across most of the social cognitive variables except occupational self-efficacy. Male and female engineering students in this study reported similar mean scores on occupational self-efficacy. This is congruent with earlier findings involving engineering student samples from North-America and South Asia (e.g., Lent et al., 1984 and 1986; Lent et al., 2005; Saifuddin et al., 2013). Men and women who enter and pursue engineering careers generally score higher on related ability measures (e.g., Nauta et al., 1998; Schaefers et al. 1997). With respect to other core person variables, women's mean scores were higher than men's for outcome expectations and interest. This finding is at odds with earlier findings involving SCCT variables where women did not differ significantly from men with regard to interests and outcome expectations (Hackett et al., 1992; Lent et al., 2005). These other studies, however, were based on North American samples where the society as a whole scores more highly on indices of gender equality than South Asian countries (Hausmann

et al., 2012) and therefore gender differences may not be as evident. In a traditional, patriarchal South Asian society it may be the case that if a woman wishes to break away from her traditional feminine role to pursue a male-dominated career like high-tech, she needs to have a stronger belief that her efforts will bring favorable outcomes, as well as stronger interest to keep her motivated and focused in her intentions. Future research needs to investigate the influence of egalitarian versus patriarchal societal values on men and women's career intentions and choice process within an SCCT framework.

With respect to the contextual variables of social support and barriers, findings replicated earlier studies (e.g., Lent et al., 2005). Women in this study perceived more social support and fewer barriers than did the men, lending support to Lent et al.'s (2005) assertion that the social support provided by friends and family is particularly helpful at neutralizing the impact of barriers for women. The mean differences in the contextual variables of support and barriers should be viewed with caution because both the difference for social support and barriers were small in magnitude.

9.3.2 Differences in Degree of Relationships

Correlations between the model predictors and the dependent variable were examined separately for male and female respondents. Significance testing was then conducted on the differences between the correlation coefficients to determine whether the degree of relationship among variables in the model differed between the two groups or not (see Table 8.2 for details). Differential predictive validity for men and women was observed in three relationships only, the relationships between intentions and attitudes

toward the high-tech profession, masculine gender-role, and social barriers. All other relations were invariant across gender.

Intention to pursue a high-tech career was more strongly related to attitudes toward high-tech for men than women. High-tech professions are considered high prestige and have good employment opportunities (Srinivasan et al., 2013). Thus, it is likely that men are attracted to occupations that offer high salaries and social status (Cejka & Eagly, 1999) and help them to conform to the socially ascribed role of breadwinner (Eagly et al., 2000). This argument, however, may not hold for women in a traditional, patriarchal society such as Bangladesh. Next, masculinity was more strongly related to intention to pursue a high-tech career for men than for women. This lends support to Cejka and Eagly's (1999) finding that male-dominated occupations require personal characteristics typical of that sex. For women, other factors such as ability and interest played a more important role than masculinity in their intentions. Another possible explanation is that there may be an attenuation effect for women. For women, it may not matter how masculine they are, they are never going to fit in the male-dominated work environment and so they do not factor their masculinity into their career intentions. Additionally, social barriers were negatively related to intention for men, but positively related for women. This implies that men are more likely to be demotivated by others' negative opinions of their career choices. On the other hand, negative opinions only harden the resolve of women. This may reflect the fact that choosing a high tech career is a non-stereotypical choice for women which may require more resolve in the first place (this argument is also true for women in engineering generally). The findings suggest that men are confirming to gendered norms while women are defying stereotypes and

possibly constructing a ‘new identity’ for themselves within the patriarchal ideology. The findings lend further support to some other research on South Asian women that argues that these women are the face of ‘new women’ (Chowdhury, 2010) or ‘empowered women’ who are likely to challenge social norms and renegotiate gender relations in the high-tech sector (Clark & Sekher, 2007; Saifuddin, Dyke, & Hossain, 2014). One caveat is that these other studies on women high-tech professionals in South Asia (Clark & Sekher, 2007; Saifuddin, et al. 2014) were based on interview data and small samples. Additional research is required to validate these findings.

9.3.3 Differences in the Predictors of Intention to Pursue a High-Tech Career

Given the gender differences in the degree of relationship between some of the predictors and intention to pursue a high-tech career, separate hierarchical regression analyses were run for men and women (see Table 8.5 and Table 8.6 for the results). In the first block, the control variables - intention to pursue a career and attitude toward the high-tech profession - were entered into the model. In the next block masculinity and femininity were added, and in the final block, social cognitive predictors - occupational self-efficacy, outcome expectations, interest, social support and social barriers - were added.

Women reported higher mean scores for intentions to pursue a career and for attitudes toward the high-tech profession compared to men; however, these control variables had a greater impact on men’s intention, than women’s. The first block explained 28% of variance for men, whereas for women control variables accounted for 21% of the variance. For both groups the control variables were significant in all three

blocks of the model. With respect to gender-role orientation, masculinity and femininity explained about the same variance in intentions for men (R^2= 2.8%) and women (R^2= 2.9%).

In the final block social cognitive predictors were added. Consistent with the earlier research, social cognitive predictors added explanatory power to the model for both men and women. The predictors however added 11% more variance for women compared to men. The explanatory power added to the women's model confirms the body of research that claims SCCT to be a dominant theory in understanding women's career choices in gendered occupations in science, engineering, and technology (Prescott & Bogg, 2013).

For the female sample, occupational self-efficacy and outcome expectations were the most important predictors, followed by interest, social barriers, and attitudes toward the high-tech profession, intention to pursue a career and social support. For the male sample, interest and attitudes toward the high-tech profession were the most important predictors, followed by outcome expectations, intentions to pursue a career, and femininity.

Taken together, these results indicate women's career intentions are impacted not only by core person beliefs but also by proximal contextual variables (social support and barriers) in their intention to pursue a career whereas for men, contextual influences played no role. This contradicts the earlier correlation results where social barriers negatively impacted men's intention to pursue a high-tech career, however, the correlation coefficient was quite low. It is possible that after other more important

predictors were entered into the model, the effect of barriers became non-significant for men.

Overall, the model predicted 39% variance for men and 43% variance for women in intention to pursue a high-tech career. The strong explanatory power of the model validates the importance of SCCT in understanding men's and women's career choices and lends support to the generalizability of the theory across contexts as diverse as North America and South Asia.

9.3.4 Integration of Gender Difference Results.

The gender differences tell a contrasting and compelling story of men's and women's career choice process in a patriarchal, traditional South-Asian society. While there is no debate that SCCT offered a strong theoretical framework to understand men's and women's career choice pursuits in a South-Asian context, beyond the core person predictors of self-efficacy, outcome expectations, and interests, other predictors – attitudes toward the high-tech profession, social support, and barriers offered further insight into the process.

For men, favorable attitudes toward the high-tech profession played almost as important a role as interest in the domain. In this traditional society men are interested in entering occupations held in high regard because it will help them to obtain higher status in the society as well as establish their position as a patriarch or head of the family. This stereotypical male model is further confirmed by the non-significant impact of social support on intentions. The findings suggest that men enjoy a privileged status and feel entitled to make their career choices independently. The only caveat is the small but

positive impact of femininity on men's intention behavior. This finding can be due to the shortened feminine gender-role measure used, which had lower reliability alpha (0.55) than the original measure (0.82).

On the other hand for women, all core person variables: occupational self-efficacy, outcome expectations, and interest, were found to be important and had similar impacts in predicting intentions to pursue a high-tech career. The next most important set of predictors included social barriers and attitudes toward the high-tech profession. And finally social supports and intentions to pursue a career had a similar modest impact on intentions. Both gender-roles, masculinity and femininity, were of non-significance to women.

The finding that is thought provoking here is the positive impact of social barriers on intention to pursue a high-tech career for women. This is consistent with the structural model results presented in Section 9.1 and Section 9.2, where a small but significant direct positive effect was found between social barriers and intention to pursue a high-tech career. This finding is also consistent with Lindley (2005) who found a positive impact of barriers on career choice using SCCT. Lindley suggested that women may idealize male-dominated careers and therefore, instead of getting dispirited, they go the extra mile in their career pursuit. In the context of Bangladesh, this may apply but an alternate perspective can be that women strategize in the face of barriers to earn them independence from patriarchal subordination. Such an assertion requires further investigations.

Gender-role orientation did not come out as strongly in the split-group models as in the structural model. In the full sample SEM models, gender-role orientation may

serve as a proxy for the gendered differences in career choice processes. In the split-group regression models, these differences do not exist because of gender homogeneity in these samples.

9.3.5 Explanation of Gender Difference in Different Contexts

Although this study suggests that SCCT's interest and choice model is generalizable across diverse cultures, this gender analysis offers possible insight into why opposing trends are observed in women's participation in high-tech related fields in different countries. Women's participation in high-tech sectors (e.g., computer science, information, communication, and technology) are on the rise in India and Bangladesh (BANBEIS, 2000; Clark & Sekhar, 2007) while there is a drop in women's participation in these sectors across the USA and Canada (Engineers Canada, 2011; National Science Foundation, 2011).

One possible explanation for these differences may be women's desire to have freedom in their career choices. Despite the traditional and patriarchal societal norms, more women in South Asia are entering or pursuing high-tech careers. The attractive pay package and prestige associated with high-tech occupations may help capable women to gain independence from patriarchal subordination and construct a new identity for themselves (Saifuddin et al., 2014). Within the more egalitarian and liberated societal norms of North America, women are not as subject to patriarchal subordination and therefore they may not feel the urge to enter and pursue a career that is labelled masculine or goes against their identity (Stets & Burke, 2000) in order to gain independence.

Finally the popular image of the domain may also have influenced women differently in different cultures. Perhaps people in South Asia do not focus on the male-dominated nature of high tech as much because most professions in South Asia are male-dominated. Consequently high tech does not stand out as particularly gendered. In contrast, in North America, fewer occupations are male-dominated so high tech is unusual in that regard, which makes the gendering of the profession more salient. In the North American context, high-tech occupations are often viewed as male-dominated with an image that high-tech professionals are geeks and boring people (e.g., von Hellens et al., 2000; von Hellens et al., 2004). In contast, Srinivasan et al. (2013) argues that in South Asia, high tech professionals are viewed as intelligent. Thus, the image of the occupation may have played a role in women's intentions across cultures.

This is the first study that has looked at the career intentions of men and women using the full SCCT interest and choice framework in South-Asia. Although the present findings indicate gender differences, more research in non-Western contexts is needed to fully comprehend gender differences in career intentions - particularly in gendered occupations. As well, more cross-cultural research is required to understand and compare the impact of traditional norms versus egalitarian norms using the SCCT framework.

9.4 Contributions

This study has made several contributions. The first of these is a demonstration of the utility of SCCT in understanding career intentions for the male-dominated occupation of high-tech in an Asian context. The validation of the SCCT model in a non-Western developing country context demonstrates that SCCT is a culturally sensitive, effective,

and appropriate framework "to explain central, dynamic processes and mechanisms through which (a) career and academic interests develop, (b) career related choices are forged and enacted, and (c) performance outcomes are achieved" (Lent et al., 1994: 80). By providing this validation, the present study also addressed the concern raised by many researchers (e.g., Fitzgerald & Betz, 1994; Hackett et al., 1991; Leong & Brown, 1995; Leung, 1995; Leung, 2008) who argue that most career theories and models are developed using a Western lens and ignore the role cultural context can play in individuals' career choices. The applicability of key career theories across culture and context is important, because in an era of greater labour mobility and more international careers (Mahroum, 2000; Stahl et al., 2002), companies are constantly struggling to mitigate their global talent challenges (Schuler, Jackson, & Tarique, 2011). The utility of SCCT across contexts can help companies with strategic opportunities to attract and retain their global talent better.

Second, this is also the first study to use all the model predictors of SCCT's interest and choice and test the model's hypothesized paths using structural equation modeling with South Asian data. Previous studies that had used the SCCT framework in an Asian context fell short on two grounds: (a) they did not use all of the model predictors and/or (b) the studies employed linear statistical techniques in model testing. For example, Ku and Watt (2009) used the SCCT interest and choice model without the environmental variables of social support and social barriers in a sample of 109 students drawn from Hong Kong to investigate intention to pursue a teaching career and employed paired sample t-tests and one-way MANOVA technique for analyses. Song and Chathoth (2008) used vocational interests, support, and barriers to examine career intentions

among 310 tourism and hospitality students in China and employed hierarchical regression techniques. Saifuddin et al. (2013) used hierarchical regression to predict students' persistence in engineering programs for a sample of 849 engineering students from Bangladesh; the model predictors included only engineering self-efficacy, career aspirations, and social supports (parent, teacher, and peer) along with a supportive learning environment. Although all the aforementioned studies were useful in validating some of SCCT's predictors in an understudied context, the present study goes a step further and authenticates the full model and captures some of the interplay between model predictors by employing structural equation modeling and examining both direct and indirect effects. This study advances knowledge regarding the explanatory power and limitations of SCCT (Lent et al., 1994) in modeling the career choices of Asian students. The study also adds to the small body of research that has examined the predictors of career choice among science and engineering students in non-Western cultures (Adams et al., 2006; Dyke et al., 2012; Ecevit et al., 2003; Eidelman & Hazzan, 2005, 2006; Gokuladas, 2009; Küskü et al., 2007; Saifuddin et al., 2013; Trauth et al., 2008).

Third, this is the first study that have incorporated gender-role orientation as background person variable and tested it within the SCCT interest and choice model framework. The study helped to confirm the importance of gender-role orientation - a socially/culturally constructed personality trait - in career choice related to gendered occupations. Beyond the core SCCT interest and choice model, the study also lent support to the second layer of theoretical analysis identified by Lent et al. (1994), who suggested that socially constructed gender would help in understanding the development of self-efficacy and outcome expectations, and consequently career choice. In the present

analysis, adding masculine and feminine gender-role orientation to the SCCT interest and choice model increased the explanatory power of the model for all of its dependent variables: occupational self-efficacy ($\Delta R^2_{M2\text{-}M1}$= 12%), outcome expectations ($\Delta R^2_{M2\text{-}M1}$= 16%), and interest ($\Delta R^2_{M2\text{-}M1}$= 8%), and the outcome variable, intention to pursue a high-tech career ($\Delta R^2_{M2\text{-}M1}$= 5%).

Fourth, the results provided evidence of strong interest in, and intention to pursue, a career in high-tech among female engineering students in one South Asian country. Understanding the motivation of these women can help us to understand cross-cultural differences in women's participation in technology careers. The results provide insights into the interplay between societal gender-role expectations and an individual's gender-role orientation. One potential explanation for these differences which has been identified in this study is the image of the high tech industry. The explanation put forward touches upon an important, but often neglected, issue in studies of gendered occupations conducted in a Western context. These studies typically focus on structural issues such as a hostile environment, inflexible work practices, a lack of role models, lower pay and promotion opportunities, etc. (e.g., Adya & Kaiser, 2005; Ahuja, 2002, Simard, 2007). This research is useful to establish gender equality in the workplace, but in order to increase women's participation it may be important to move beyond the structural issues and address contextual issues that can have an impact on women's participation. For example, the Western image of high-tech would benefit from a makeover; with efforts directed toward emphasizing the gender neutral aspects of the occupation. Such a portrayal may play a role in attracting more women to the field and thereby eliminating the structural differences.

9.5 Limitations

The present study is subject to a number of limitations due to methodological constraints. The first and foremost limitations of this study relate to the measures used. Other career theories (e.g., Holland, 1997) can be assessed using all-purpose global measures to explain relatively global criteria, for example, examining the impact of vocational interests in the choice of an occupation. As noted by Lent and Brown (2006), SCCT is more focused on explaining dynamic and situation specific outcomes that require domain specific predictors. For example, intention to pursue a "high-tech" career would require measures related to the high-tech domain. Lent and Brown (2006) also acknowledge the difficulty of creating appropriate measures as they argue it is important to strike a balance between theoretical rigour and practical relevance and to use measures with a moderate level of specificity.

The SCCT interest and choice model was being tested for the first time in the high-tech domain in South-Asia and a lack of domain specific, validated scales for some measures was a major concern for the present study. Even when validated measures were adopted, some of the measures did not perform as predicted. In instances where measures were developed, some of them did not converge as expected. For example, in the present study data were collected on two measures of self-efficacy: technology self-efficacy (domain specific) and occupational self-efficacy (moderate level of specificity). Both scales originated in research from Western developed contexts and were untested in South Asian contexts. During factor analysis, the domain specific technology self-efficacy resulted in two sub-dimensions that compromised the validity of the measure but

the occupational self-efficacy remained as a one dimensional measure and offered stronger predictive utility. As occupational self-efficacy is an established measure with a moderate level of specificity (Rigotti et al., 2008) and had been used in studies on technology careers (e.g. Michie & Nelson, 2006), the analyses was conducted with the occupational self-efficacy scale. However, using this scale may have resulted in the non-significant direct path between occupational self-efficacy and intention to pursue a high-tech career in the interest and choice model presented in Section 9.1 of this chapter. This relationship later became significant when gender role orientation was added to the model in Section 9.2. Perhaps a stronger direct relationship between self-efficacy and intention to pursue a high-tech career would have been found had it been possible to use a uni-dimensional measure of technology self-efficacy.

Second, some of the interesting and unexpected findings in the present study revolved around gender-role orientation. The validated measures from the personal attributes questionnaire (PAQ: Spence and Helmereich, 1978) were used to measure masculinity and femininity. These measures have been used many times since they were developed over 30 years ago. Recently Fernández and Coello (2010) provided evidence that existing measures of masculinity and femininity are multi-dimensional constructs and therefore researchers should use caution while performing confirmatory factor analysis on the measures, as the extracted items can vary depending on the domain of interest and context. While the reliability and validity of the masculinity and femininity measures have been called into question by a number of authors (e.g., Choi & Fugua, 2003; Choi, Fugua, & Newman, 2007; Feather 1983; Prescott & Bogg, 2013), no preferable alternative has been identified. These studies cast doubt on the predictive

validity of the measures, particularly feminine gender-role orientation which leads us to be cautious about some of the unexpected results, such as the positive relationship between femininity and outcome expectations. Alternatively, it may be possible that the line between masculine and feminine gender-roles is becoming less distinct as suggested by Diekman and Eagly (2000) or that traditional gender-roles are weakening (Holt & Ellis, 1998). Beyond concerns about the validity of the gender-role orientation measures, it is possible that there is conceptual overlap between the measures of outcome expectations and femininity. This finding should be treated with caution.

Third, one of the objectives of this study was to test the impact of gendered contextual variables on men and women's intention to pursue a high-tech career in order to see the moderating effect of gender on such variables. The gender-related contextual variables included two variables: (1) masculine image of high-tech professionals and (2) gendered perceptions. However, none of the gendered contextual variables could be tested. After running correlation and regression analyses, the decision was made not to include gendered perceptions in the final model due to very low explanatory power. These results were surprising because the scale developers (Küskü et al., 2007) claimed that 65% of the variance in women's disadvantaged position in Turkey can be explained by their measure. They argue that it captures the social, cultural, psychological, and economic layers of life that perpetuate barriers for women engineers and ultimately impact their career choice. It is possible that the gendered perceptions disadvantaging women are different for Bangladesh and Turkey. Women's progress in gendered occupations and other spheres of life in modern day Turkey has been made possible by state level policy implementation and therefore, although women are getting

opportunities and moving forward, they are still tied to the stereotypical norms of the society (Küskü et al., 2007). In Bangladesh, however, no such state level policy has been implemented and women have taken it upon themselves to tackle the stereotypes and empower themselves (Saifuddin et al., 2014). This may explain why the impact of perceptions about gender and the high-tech profession was negligible in the present study.

Likewise, the other contextual measure – masculine image-could not be used in the final model because one of its measures resulted in two dimensions - negative perceptions and positive perceptions - which compromised the validity of the measure. The second image measure - media representation, a two item measure – was included initially; however, while running the hierarchical regressions, the measure was dropped from the model due to collinearity statistics (tolerance = 0.00). Another attempt was made to integrate the construct in the measurement model in Chapter 7 using LISREL; however, here too the model did not converge due to non-significant loading of one of the indicators. SEM requires each latent factor to have at least three indicators. The masculine image measure was compromised as it had retained two indicators from factor analysis (Chapter 5), and foregoing another indicator would have further compromised the measure and raised concerns about the validity of the predictor. Therefore, masculine image had to be dropped from the model. It is unfortunate that neither of the proximal gender-related variables could be integrated and tested in the final theoretical model. Exploration of the impact of gendered contextual factors will have to await the development of better validated measures of these constructs.

Another limitation is related to the sample. This study included engineering students from a number of well reputed universities from three different locations – Dhaka, Sylhet, and Khulna. Although the sample was large, diverse, and representative of the engineering student population in Bangladesh, the students were not randomly selected. Faculty members from different universities were contacted and, upon approval by the faculty members, survey packets were distributed in their classrooms. This resulted in a convenience sample where students volunteered to participate in the study. The response rate of 50% from this captive student audience indicates a potential self-selection bias. It is likely that students who were more interested in technology related careers completed the survey. In addition, the survey instrument was eleven pages long and students may not have answered the self-report survey packet in an honest and accurate manner, thereby possibly impacting the validity of findings. Data screening was employed, however, to identify and treat missing data and outliers.

Finally, based on the response to demographic variables (e.g. annual family income, father and mother's educational level), participants appear to belong mostly to the middle or upper class. While the sample is skewed toward the upper and middle strata, Bangladesh is a developing country, where students in tertiary education usually belong to middle and upper classes and therefore it may not have impacted the analysis. Together the potential limitations of the sample may impact the generalizability of the findings.

9.6 Future Research

The results of the present study suggest several interesting directions for future research. First and foremost, the technology self-efficacy construct needs to be explored further in order to investigate whether the measure is uni-dimensional or multi-dimensional as indicated by the present study. Future studies should attempt to use a validated domain specific self-efficacy measure. In the current study, the direct path between occupational self-efficacy and intention to pursue a high-tech career was non-significant and only after adding masculine gender-role to the model did the path became significant. On the other hand, the link between femininity and occupational self-efficacy was not significant, contradicting earlier studies about the negative impact of femininity on self-efficacy. Using a valid domain specific self-efficacy measure may help further our understanding not only of career intentions, but also of the role of background variables, in the development of self-efficacy.

Second, the outcome expectation measures used in this study captured only physical and self-evaluative dimensions as opposed to all three dimensions: physical, social, and self-evaluative (Bandura, 1977). Although the present study initially incorporated all three dimensions, and attempted to expand on the outcome expectations measure by adding two more dimensions – lack of work-life balance and generativity expectations -, the factor analysis results did not support the expanded scale. With only two dimensions, the study found all model hypothesized paths to be significant with moderate to strong effects except for the paths from gender-role orientation. The link between masculinity and outcome expectations was not significant and the link between femininity and outcome expectations was significant and positive – contrary to the

hypothesis. Adding a social dimension to the outcome expectations measure in future research may increase the predictive power of the construct.

Third, one important but unexpected finding of the present study is that the direct path between social support and intention to pursue a high-tech career was not significant in the core SCCT model. After adding gender-role orientation, however, the direct path between social support and intention became significant. This is a unique finding and suggests an additional layer of theoretical complexity. According to Lent et al. (1994), background variables such as gender-role orientation can contribute to the development of self-efficacy and outcome expectations and, through them, influence other core SCCT variables plus choice. The SCCT model does not hypothesize any direct or indirect path between the background variables and the contextual variables of social support and barriers. Future research should investigate the interplay between background variables and contextual variables.

Fourth, the positive impact of social barriers on intention behavior warrants more research. Does the presence of high perceived support dampen the effects of perceived barriers or does the presence of barriers act as intrinsic motivation that makes an individual more determined to fight against the odds and pursue her or his intentions? This could be an interesting avenue to probe, particularly for women's careers in gendered occupations.

Fifth, because several unexpected and interesting findings have emerged from adding gender-role orientation to the structural model, it would be helpful to conduct more research in this area starting by exploring the possibility of developing an improved version of gender-role orientation as suggested by Lippa (2005) and Fernández and

Coello (2010). Such a theoretical framework may help to understand the complex interplay between sex and gender and its impact on gendered occupations. Also more research with gender-role orientation within the SCCT framework may help to better explain the model predictors and their relationships.

Sixth, gender differences in the model predictors also told a contrasting and compelling story of men's and women's career choice process in a patriarchal, traditional South-Asian society. While SCCT offered a strong theoretical framework to understand men's and women's career choice in a new context, beyond the core person predictors of self-efficacy, outcome expectations, and interest, there were other predictors that may offer further insight into the process and warrant further research. For example, the most interesting and unexpected finding was the small but significant positive link between femininity and intention to pursue a high-tech career for male students. Beyond questioning the validity of present constructions of gender-role orientation, future research should investigate whether men are going through a re-orientation where they are trying to integrate more expressive attributes, as opposed to dominant and aggressive attributes. Alternatively, is it because the high-tech jobs are now looking for individuals who possess both instrumental and expressive attributes? Future research should investigate these possibilities.

Seventh, it is also important to conduct cross-cultural research to compare and contrast the impact of societal norms using the SCCT framework. As women's participation in gendered occupations varies according to culture, more research looking at the impact of social and cultural variables will be needed to fully comprehend the

differences in women's career choice behaviours in gendered occupations across different contexts.

Finally, the current study was cross-sectional. Longitudinal studies would help to better understand issues of causality. For example, this study's focus was intention to pursue a high-tech career. It is well-understood that intentions do not necessarily translate into actual behavior - although studies have indicated a strong link between intentions and actual behavior. Thus a longitudinal study with the students who responded to this survey would be useful to assess the validity of intent in predicting actual career choice behavior.

9.7 Conclusion

In summary, the results of this study provide support for the utility of SCCT's interest and choice model in understanding career choices in a previously understudied context in South Asia. The study also demonstrated that the background person variables of masculinity and femininity help increase the explanatory power of the SCCT model. Finally the study has offered some insight on how gender-differences are perpetuated in traditional societies and what possible strategies women are adopting to defy stereotypes and move ahead in gendered occupations. These insights may play a role in policy development that aims to increase women's participation in male-dominated occupations such as high-tech.

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Appendix 1: Verbal Script

Dear students,

My name is Md. Sajjad Hossain and I teach at East West University. Currently, I am here today to collect data on behalf of Samina M. Saifuddin, who taught in University of Dhaka for thirteen years and is currently a PhD student at the Sprott School of Business at Carleton University located in Ottawa, Canada. Her PhD dissertation is about investigating engineering students' career intentions and their perceptions about high-tech career.

I am requesting your help in conducting her research by having you respond to a survey. I would like to emphasize that participation in this study is voluntary and anonymous. The survey questions are easy to answer and will take approximately 35 minutes to complete.

I am going to distribute the survey packages to you. I have included an information sheet in the package which explains the details of the research. The information sheet also includes her contact information in case you would like to contact her and ask any questions about the study. Please answer the survey, put the survey in the envelope (included in the package), seal the envelope and give it to me. Even if you decide not to answer the survey, please put the blank survey in the envelope and return the sealed envelope to me.

Do you have any questions about this research?

I thank you for your time and appreciate your help.

Carleton UNIVERSITY
Canada's Capital University

Appendix 2: Information Sheet

MODELING INTENTION TO PURSUE A HIGH TECH CAREER USING SOCIAL COGNITIVE CAREER THEORY

A Survey Conducted by Samina Saifuddin and Dr. Lorraine Dyke
Carleton University, Ottawa, Canada

This consent form will inform you about the purpose of this study and what your participation involves. This summary will provide you with adequate information to decide whether you would like to participate in this study.

Purpose:
The objective of this research is to study engineering students' career intentions and their perceptions about gender and high-tech career.

Procedure:
Your participation in this research is completely voluntary. Your participation in this study will involve answering a survey questionnaire in the classroom.

Duration
The survey takes about 35 minutes to complete. Filling out the questionnaire is easy and mostly involves checking the box that corresponds to your response. You may take a break at any point during the survey.

Anonymity and confidentiality
Your name and contact information is not required. As you will see shortly all answers are anonymous and no information that can identify you has been asked in the questionnaire. In addition, all data collected during the study will remain confidential only being available to Samina Saifuddin and Dr. Dyke. The results of this study will be possibly published in professional journals in the future. However, only group responses will be reported, no individual responses will be identified.

Potential risk:
There will be no risk to you, either psychologically or physically.

Benefits:
The personal benefits for participation include your contribution to the understanding of Bangladeshi students' experience and having an opportunity to share your thoughts. In addition, a copy of the results will be given to you upon your request. Should you be interested, you may contact Samina Saifuddin in fall 2014 to inquire about the report.

Withdrawal:
Your participation in this research is completely voluntary. You may withdraw at any time during the survey and before you give the sealed envelope to me. You may also decline to answer any questions that you do not wish to answer. Note that once the researchers have received the completed survey, the responses cannot be withdrawn, because we cannot identify individuals from their responses.

For Further Information:
Should you have any questions about any aspect of the research at any time, you may contact the researcher Samina Saifuddin or Dr. Lorraine Dyke whose email addresses, and phone numbers appear below:

Samina Saifuddin: samina_saifuddin@carleton.ca Phone: (613) 216-1889
Dr. Lorraine Dyke: lorraine_dyke@carleton.ca Phone: (613) 520-2650

This research project was reviewed and received ethics clearance by the Carleton University Research Ethics Committee. If you have any ethical concerns about this study, you may contact
Dr. Antonio Gualtieri (Chair of the Carleton University Research Ethics Committee) at:

E-mail: ethics@carleton.caphone: (613) 520-2600 ext. 3591

To participate in the survey:
By completing and submitting the survey, you acknowledge that you read and understood what is required from you and agreed to participate in the survey. If you wish to participate in this survey, please complete the questionnaire and return it in a sealed envelope to me. You may also keep this letter for your future reference.

I look forward to receiving your completed questionnaire. I very much appreciate your time and support.

Warm regards,
Samina Saifuddin, Doctoral Student
Carleton University
Ottawa, Ontario

Appendix 3: Questionnaire

Name of the University _____

Section 1: Expectations about your Career

1. **We are interested in knowing how well you believe you could handle each of the following situations, in using technology and in pursuing a career. Please indicate your confidence in your ability to cope with, or solve, each of the following problem situations. The scale is from 1= 'no confidence at all' to 7 = 'complete confidence.'**

I am confident, I can complete the task/assignment using technology:

	No confidence at all						Complete confidence
a. When there is no one around to tell me what to do as I go	1	2	3	4	5	6	7
b. When I have never used a technology like this before	1	2	3	4	5	6	7
c. If I have only manuals for reference	1	2	3	4	5	6	7
d. If I have seen someone else using it before trying it myself	1	2	3	4	5	6	7
e. If I could call someone for help if I get stuck	1	2	3	4	5	6	7
f. If someone else helps me get started	1	2	3	4	5	6	7
g. If I have a lot of time to complete the task	1	2	3	4	5	6	7
h. If I have used similar technology before this to do the same job	1	2	3	4	5	6	7

In pursuing my future job:

a. I expect I will remain calm when facing difficulties in my job because I will rely on my abilities	1	2	3	4	5	6	7
b. Whatever comes my way in my job, usually I will be able to handle it	1	2	3	4	5	6	7
c. My past experiences will have prepared me well for my occupational future	1	2	3	4	5	6	7
d. When I will be confronted with a problem in my job, I will usually find several solutions	1	2	3	4	5	6	7

	No confidence at all						Complete confidence
e. I will meet the goals that I set for myself in my future job	1	2	3	4	5	6	7
f. I expect to feel prepared for most of the demands in my future job	1	2	3	4	5	6	7

2. Using the scale below, please indicate the extent to which you agree or disagree with each of the following statements. The scale is from 1= 'strongly disagree' to 7= 'strongly agree.'

When I pursue a career, I expect to:

	Strongly disagree						Strongly agree
a. Receive a good job offer	1	2	3	4	5	6	7
b. Earn respect from other people	1	2	3	4	5	6	7
c. Get a job where I can use my talents and creativity	1	2	3	4	5	6	7
d. Do work that can make a difference in people's lives	1	2	3	4	5	6	7
e. Work long hours	1	2	3	4	5	6	7
f. Earn an attractive salary	1	2	3	4	5	6	7
g. Earn respect from family members	1	2	3	4	5	6	7
h. Do work that I find satisfying	1	2	3	4	5	6	7
i. Make a contribution to society	1	2	3	4	5	6	7
j. Spend more time on work and less time on family	1	2	3	4	5	6	7
k. Go into a field with high employment demand	1	2	3	4	5	6	7
l. Be valued by my family members	1	2	3	4	5	6	7
m. Increase my sense of self-worth	1	2	3	4	5	6	7
n. Help people	1	2	3	4	5	6	7

	Strongly disagree						Strongly Agree
o. Have an active family life	1	2	3	4	5	6	7
p. Supervise others	1	2	3	4	5	6	7
q. Be valued by other people	1	2	3	4	5	6	7
r. Do interesting work	1	2	3	4	5	6	7
s. Have a social life	1	2	3	4	5	6	7
t. Meet my financial goals	1	2	3	4	5	6	7
u. Do work that I would find challenging	1	2	3	4	5	6	7
v. Obtain a high-paying job	1	2	3	4	5	6	7

3. Many factors can either support or hinder your career plans. We are interested in learning about the types of situations that could help or hinder your plans. Using the scale below, indicate how likely you think it is that you will experience the following situations. The scale is from 1= 'not likely at all' to 7 = 'extremely likely.'

In pursuing your intended career, how likely is it that you will:

	Not likely at all						Extremely likely
a. Have access to a "role model" in the field (i.e., someone you can look up to and learn from by observing)	1	2	3	4	5	6	7
b. Worry that such a career path would require too much time or schooling	1	2	3	4	5	6	7
c. Feel support for pursuing this field from important people in your life	1	2	3	4	5	6	7
d. Receive negative comments or discouragement for choosing this field from family members	1	2	3	4	5	6	7
e. Feel that there are people "like you" in this field	1	2	3	4	5	6	7
f. Feel pressure from parents or other important people to pursue a different field	1	2	3	4	5	6	7

		Not likely at all						Extremely likely
g.	Feel that your family members support your decision	1	2	3	4	5	6	7
h.	Feel that you don't fit in socially with other people in this field	1	2	3	4	5	6	7
i.	Get encouragement from your friends for pursuing this field	1	2	3	4	5	6	7
j.	Feel that close friends or relatives would be proud of you for making this decision	1	2	3	4	5	6	7
k.	Have access to a "mentor" who could offer you advice and encouragement	1	2	3	4	5	6	7
l.	Receive negative comments or discouragement about this field from your friends	1	2	3	4	5	6	7

4. Please indicate your degree of interest in doing each of the following activities. Use the scale below to show how much interest you have in each activity. The scale is from 1= 'very low interest' to 7 = 'very high interest.'

How much interest do you have in each of the following activities?

		Very low interest						Very high interest
a.	Solving practical math problems	1	2	3	4	5	6	7
b.	Solving computer software/hardware problems	1	2	3	4	5	6	7
c.	Using technology to complete a task or an assignment	1	2	3	4	5	6	7
d.	Solving complicated technical problems	1	2	3	4	5	6	7
e.	Learning new computer applications	1	2	3	4	5	6	7

5. **Please indicate your intention to pursue a career. Use the scale below to show how likely it is that you will perform each of the following activity. The scale is from 1= 'not likely at all' to 7 = 'extremely likely.'**

After you graduate how likely is it that you will:

	Not likely at all						Extremely likely
a. Apply for a job	1	2	3	4	5	6	7
b. Work full time	1	2	3	4	5	6	7
c. Have a lifelong career	1	2	3	4	5	6	7

6. **We are interested in your intentions to work in the high-tech industry. For the purpose of this survey, high-tech refers to the computer and telecommunication sector. Using the scale below, indicate how likely it is that you will undertake the following actions. The scale is from 1= 'not likely at all' to 7 = 'extremely likely'.**

In your future career, how likely is it that you will:

	Not likely at all						Extremely likely
a. Pursue a career in high tech	1	2	3	4	5	6	7
b. Apply for high-tech related jobs	1	2	3	4	5	6	7
c. Receive a job offer in the high-tech industry	1	2	3	4	5	6	7
d. Work in the high-tech industry	1	2	3	4	5	6	7
e. Have the ability to become a high-tech professional	1	2	3	4	5	6	7
f. Become a high-tech professional	1	2	3	4	5	6	7
g. Be a successful high-tech professional	1	2	3	4	5	6	7
h. Have a lifelong career in high-tech	1	2	3	4	5	6	7

Section 2: Personality orientation

The items below inquire about what kind of a person you think you are. Each item consists of a pair of contradictory characteristics, with the letters A - E in between. Please circle the letter that describes where you fall on the scale.

a	Not at all independent	A	B	C	D	E	Very independent
b	Not at all emotional	A	B	C	D	E	Very emotional
c	Very passive	A	B	C	D	E	Very active
d	Not at all able to devote self completely to others	A	B	C	D	E	Devote self completely to others
e	Not at all competitive	A	B	C	D	E	Very competitive
f	Very rough	A	B	C	D	E	Very gentle
g	Can make decisions easily	A	B	C	D	E	Have difficulty making decisions
h	Not at all helpful to others	A	B	C	D	E	Very helpful to others
i	Gives up very easily	A	B	C	D	E	Never gives up easily
j	Not at all kind	A	B	C	D	E	Very kind
k	Not at all self-confident	A	B	C	D	E	Very self-confident
l	Not at all aware of others feelings	A	B	C	D	E	Very aware of others feelings
m	Feels very inferior	A	B	C	D	E	Feels very superior
n	Not at all understanding of others	A	B	C	D	E	Very understanding of others
o	Goes to pieces under pressure	A	B	C	D	E	Stands up well under pressure
p	Very cold in relations with others	A	B	C	D	E	Very warm in relations with others

Section 3: High tech Profession

The questions in this section pertain to high tech. For the purpose of this survey, high-tech refers to the computer and telecommunication sector.

1. **We are interested in knowing the attitudes of people in this country to the high tech profession. Using the scale below, please indicate the extent to which you agree or disagree with each of the following statements. The scale is from 1= 'strongly disagree' to 7= 'strongly agree'**

In this country, people view high tech:

	Strongly disagree						Strongly Agree
a. As a prestigious career	1	2	3	4	5	6	7
b. As a respected career	1	2	3	4	5	6	7
c. To be high in demand in the job market	1	2	3	4	5	6	7
d. As a high-profile career	1	2	3	4	5	6	7
e. As a better paying career	1	2	3	4	5	6	7

2. **We are interested in learning about your perceptions regarding high-tech professionals. Using the scale below, please indicate the extent to which you agree or disagree with each of the following statements.**

I think people who work in high-tech:

	Strongly disagree						Strongly agree
a. Are outgoing	1	2	3	4	5	6	7
b. Are nerds or geeks	1	2	3	4	5	6	7
c. Are effective communicators	1	2	3	4	5	6	7
d. Are boring	1	2	3	4	5	6	7
e. Are very intelligent	1	2	3	4	5	6	7
f. Are uncool	1	2	3	4	5	6	7

3. **We are also interested in your perceptions of gender exposure in media related to technology. Using the scale below, please indicate the extent to which you feel males or females are represented in the high-tech media. The scale is from 1= 'mostly female', to 4 = 'a balance of female and male', to 7 = 'mostly male'.**

		Mostly female			A balance of male and female			Mostly male
a.	Models in computer and technology related product advertisements in television, newspapers, magazines, and internet are:	1	2	3	4	5	6	7
b.	Anchors hosting high-tech related TV and radio shows are:	1	2	3	4	5	6	7
c.	Most of the high-tech experts featured in the media are:	1	2	3	4	5	6	7

4. **We are interested in learning about your perceptions regarding gender and career. Using the scale below, please indicate the extent to which you agree or disagree with each of the following statements. The scale is from 1= 'strongly disagree' to 7 = 'strongly agree'.**

		Strongly disagree						Strongly agree
a.	A person's gender is important in choosing a profession, as certain professions require certain physical capabilities	1	2	3	4	5	6	7
b.	Female students are not interested in the fields of high-tech, as they are not guided sufficiently during high school education	1	2	3	4	5	6	7
c.	I think female students are not interested in the fields of high-tech, as the job opportunities are limited for women in this profession	1	2	3	4	5	6	7
d.	I believe that male high-tech professionals get promoted more quickly than female high-tech professionals	1	2	3	4	5	6	7
e.	I believe women can be very successful in the high-tech industry	1	2	3	4	5	6	7
f.	A person's gender is important in choosing a profession because of the working conditions in certain professions	1	2	3	4	5	6	7
g.	Female students are not interested in the fields of high-tech, as they are not guided sufficiently by their families	1	2	3	4	5	6	7

		Strongly disagree						Strongly Agree
h.	Women are generally less interested in high-tech professions	1	2	3	4	5	6	7
i.	I believe male high-tech professionals have better access to mentoring opportunities than female high-tech professionals	1	2	3	4	5	6	7
j.	A person's gender is important in choosing a profession, as men and women have different interests	1	2	3	4	5	6	7
k.	Female students are not interested in the fields of high-tech as their physical capabilities do not fit this profession	1	2	3	4	5	6	7
l.	I believe that male high-tech professionals earn more than female high-tech professionals	1	2	3	4	5	6	7
m.	I believe high-tech is a suitable job for women	1	2	3	4	5	6	7
n.	In my opinion a person's gender is important in choosing a profession	1	2	3	4	5	6	7
o.	Female students are not interested in the high-tech because of low representation of successful female high-tech professionals	1	2	3	4	5	6	7
p.	I think that the working conditions make it difficult for women to work as a high-tech professional	1	2	3	4	5	6	7
q.	I believe male high-tech professionals have better access to networking opportunities than female high-tech professional	1	2	3	4	5	6	7
r.	I believe there are many successful female high-tech professionals	1	2	3	4	5	6	7
s.	A person's gender is important in choosing a profession because of socio-cultural expectations	1	2	3	4	5	6	7
t.	Female students are not interested in the fields of high-tech, as these fields do not match their interests	1	2	3	4	5	6	7

Section 4: Background Information

This section deals with background information. We are collecting this information to be able to describe the people who responded to this survey. Data collected will be used only in aggregate analysis ensuring anonymity and confidentiality of participants.

1. Gender:□ Male□ Female

2. Age: _____ years3. Approximate annual family income _____Tk.

4. Please indicate your: HSC / O' Level GPA _____
   Cumulative GPA at the end of the most recent academic semester/term_____

5. Your major:
   □ Aerospace □ Environmental
   □ Architecture□ Industrial
   □ Biological□ Information Technology
   □ Chemical□ Materials
   □ Civil□ Mechanical
   □ Computer□ Mining
   □ Computer Science□ Software
   □ Electrical and Electronics□ Systems
   □Other (please specify)_____

6. As of today, you are a
   □ 1st year student □ 2nd year student □ 3rd year student □ Final-year student

7. What is the highest level of education of your parents (Please √ the appropriate box for each parent)

	Level of Education	Father	Mother
a	Don't know		
b	Grade 8 or less		
c	SSC or O'Level		
d	Some college		
e	HSC or A'Level		
f	Bachelor's degree (pass course)		
g	Bachelor's degree (honours)		
h	Master's degree		
i	Ph.D., MBBS, or professionals such as Lawyer, Chartered Accountant, etc.		
j.	Other (please specify)		

8. What is/was the occupation of your parents (Please √ the appropriate box for each parent)

	Industry	Father	Mother
a	Finance, insurance, and real estate		
b	Public administration/Government		
c	Education		
d	Health care		
e	Manufacturing		
f	High technology		
g	Retail or wholesale trade		
h	Transportation, construction		
i	Agriculture, Forestry, Mining, Electricity, Gas		
j	Other services (including consulting)		
k.	Other (please specify)		

**Thank You Very Much for Completing the Survey **

Appendix 4: List of Participating Universities and Number of Respondents

University (Private = Pvt. and Public = Pub.)	Number of Final respondents	Percent
American International University of Bangladesh (Pvt.)	62	6.4
Ahsanullah University of Science and Technology (Pvt.)	71	7.3
BRAC University (Pvt.)	22	2.3
Bangladesh University of Engineering and Technology (Pub.)	316	32.4
Daffodil International University (Pvt.)	19	1.9
East West University (Pvt.)	113	11.6
Independent University of Bangladesh (Pvt.)	33	3.4
Islamic University of Technology (Pvt.)	21	2.2
Khulna University of Engineering and Technology (Pub.)	173	17.7
North South University (Pvt.)	85	8.7
Shahjalal University of Science and Technology (Pub.)	42	4.3
United International University (Pvt.)	19	1.9
Total	1,076	100.0

Appendix 5: Results from EFA and CFA

Appendix 5.1 Intention to Pursue a High-Tech Career: CFA Standardized Factor Loadings

Item #	Items	HTC (α =0.90)
HTC_a	Pursue a career in high tech	0.76
HTC_b	Apply for high-tech related jobs	0.78
HTC_c	Receive a job offer in the high-tech industry	0.77
HTC_d	Work in the high-tech industry	0.76
HTC_f	Become a high-tech professional	0.76
HTC_g	Be a successful high-tech professional	0.64

Note. HTC refers to intention to pursue a high-tech career.

Appendix 5.2 Technology Self-Efficacy: CFA Standardized Factor Loadings

Item #	Items	TSE 1 (α =0.65)	TSE 2 (α =0.68)
TSE_a	When there is no one around to tell me what to do as I go	0.73	
TSE_b	When I have never used a technology like this before	0.66	
TSE_c	If I have only manuals for reference	0.59	
TSE_e	If I could call someone for help if I get stuck		0.62
TSE_f	If someone else helps me get started		0.66
TSE_g	If I have a lot of time to complete the task		0.55
TSE_h	If I have used similar technology before this to do the same job		0.63

Note. TSE refers to technology self-efficacy

Appendix 5.3 Occupational Self-Efficacy: CFA Standardized Factor Loadings

Item #	Items	OSE (α= 0.80)
OSE_a	I expect I will remain calm when facing difficulties in my job because I will rely on my abilities	0.76
OSE_b	Whatever comes my way in my job, usually I will be able to handle it	0.75
OSE_c	My past experiences will have prepared me well for my occupational future	0.65
OSE_d	When I will be confronted with a problem in my job, I will usually find several solutions	0.61
OSE_e	I will meet the goals that I set for myself in my future job	0.49
OSE_f	I expect to feel prepared for most of the demands in my future job	0.54

Note. OSE refers to occupational self-efficacy.

Appendix 5.4 Outcome Expectations: EFA Rotated Solution on 22 Items

Item #	Items	Factor				
		1	2	3	4	5
OE_a	Receive a good job offer		0.54			
OE_f	Earn an attractive salary		0.52			
OE_k	Go into a field with high employment demand					0.50
OE_p	Supervise others					
OE_t	Meet my financial goals					
OE_v	Obtain a high-paying job					0.44
OE_b	Earn respect from other people	0.48	0.57			
OE_g	Earn respect from family members					
OE_l	Be valued by my family members	0.53				
OE_q	Be valued by other people	0.45				
OE_c	Get a job where I can use my talents and creativity		0.58			
OE_h	Do work that I find satisfying			0.51		
OE_m	Increase my sense of self-worth	0.53				
OE_r	Do interesting work			0.54		
OE_u	Do work that I would find challenging			0.42		
OE_d	Do work that can make a difference in people's lives					
OE_i	Make a contribution to society			0.53		
OE_n	Help people					
OE_e	Do not work long hour					
OE_j	Spend more time on family less on work				0.75	
OE_o	Have an active family life					
OE_s	Have a social life					

Note. OE refers to outcome expectations.

Appendix 5.5 Outcome Expectations: EFA Rotated Solution on 18 Items

Item #	Items	Factor			
		1	2	3	4
OE_a	Receive a good job offer	.415		.477	
OE_f	Earn an attractive salary			.430	.405
OE_k	Go into a field with high employment demand				
OE_p	Supervise others				
OE_t	Meet my financial goals				
OE_v	Obtain a high-paying job				.714
OE_b	Earn respect from other people	.573		.449	
OE_g	Earn respect from family members				
OE_l	Be valued by my family members	.565			
OE_q	Be valued by other people	.446	.425		
OE_c	Get a job where I can use my talents and creativity			.692	
OE_h	Do work that I find satisfying		.511		
OE_m	Increase my sense of self-worth	.473			
OE_r	Do interesting work		.598		
OE_u	Do work that I would find challenging		.409		
OE_d	Do work that can make a difference in people's lives				
OE_i	Make a contribution to society		.515		
OE_n	Help people				

Note. OE refers to outcome expectations.

Appendix 5.6 Outcome Expectations: CFA Standardized Factor Loadings

Item #	Items	Factor 1 (CarOE; α= 0.65)	Factor 2 (SlfOE; α= 0.74)
OE_h	Do work that I find satisfying		0.83
OE_r	Do interesting work		0.62
OE_i	Make a contribution to society		0.60
OE_a	Receive a good job offer	0.74	
OE_f	Earn an attractive salary	0.76	
OE_c	Get a job where I can use my talents and creativity	0.48	

Note. OE refers to outcome expectations. *CarOE* and *SlfOE* refer to career and self-evaluative outcome expectations respectively.

Appendix 5.7 Interest: CFA Standardized Factor Loadings

Item #	Items	INT (α= 0.75)
INT_a	Solving practical math problems	0.69
INT_b	Solving computer software/hardware problems	0.78
INT_c	Using technology to complete a task or an assignment	0.59
INT_d	Solving complicated technical problems	0.55

Note. INT refers to interest.

Appendix 5.8 Social Support and Barrier: EFA Rotated Solution on 12 Items

Item #	Items	Social Barrier (α= 0.74)	Proximal Support α= 0.65)	Distal Support (α = 0.65)
SocSup_a	Have access to a "role model" in the field			0.66
SocSup_c	Feel support for pursuing this field from important people in your life		0.61	
SocSup_e	Feel that there are people "like you" in this field		0.45	
SocSup_g	Feel that your family members support your decision		0.50	
SocSup_i	Get encouragement from your friends for pursuing this field		0.56	
SocSup_j	Feel that close friends or relatives would be proud of you for making this decision		0.49	
SocSup _k	Have access to a "mentor" who could offer you advice and encouragement			0.62
SocBar_b	Do not worry career path would require too much time			-0.54
SocBar_d	Do not receive negative comments or discouragement from family	0.64		
SocBar_f	Do not feel pressure from family	0.74		
SocBar_h	Feel that I socially fit with other people in this field	0.66		
SocBar_l	Do not receive negative comments or discouragement from friends	0.53		-0.43

Note. SocSup and *SocBar* refer to social support and barriers.

Appendix 5.9 Social Support and Social Barrier: CFA Standardized Factor Loadings

Item #	Items	Factor 1 SocBar (α =.73)	Factor 2 ProSup (α =.68)	Factor 3 DisSup (α =.60)
SocSup_c	Feel support for pursuing this field from important people in your life		0.61	
SocSup_g	Feel that your family members support your decision		0.47	
SocSup_i	Get encouragement from your friends for pursuing this field		0.62	
SocSup_j	Feel that close friends or relatives would be proud of you for making this decision		0.69	
SocBar_d	Do not receive negative comments or discouragement from family	0.73		
SocBar_f	Do not feel pressure from family	0.77		
SocBar_h	Feel that I socially fit with other people in this field	0.61		
SocBar_l	Do not receive negative comments or discouragement from friends	0.57		
SocSup_a	Have access to a "role model" in the field			0.87
SocSup_k	Have access to a "mentor" who could offer you advice and encouragement			0.51

Note. SocSup and *SocBar* refer to social support and barriers. *ProSup* and *DisSup* refer to proximal and distal social support.

Appendix 5.10 Masculine Gender-Role: CFA Standardized Estimates

Item #	Items	MAS (α = 0.67)
MAS_a.	Independence	0.48
MAS_c.	Activeness	0.49
MAS_e.	Competitiveness	0.52
MAS_i.	Not giving up	0.42
MAS_k.	Self-confidence	0.56
MAS_m.	Inferior or superior	0.37
MAS_o.	Handle pressure	0.49

Note. MAS refers to masculine gender-role.

Appendix 5.11 Feminine Gender-Role: CFA Standardized Estimates

Item #	Items	FEM (α = 0.51)
FEM_f.	Rough or gentle	0.31
FEM_h.	Helpfulness	0.34
FEM_j.	Kindness	0.46
FEM_l.	Awareness of others	0.62
FEM_n.	Understanding of others	0.32

Note. FEM refers to feminine gender-role.

Appendix 5.12 Masculine Image: CFA Standardized Estimates

Item #	Items	NegPHT (α = 0.77)	PosPHT (α = 0.63)	MedRep (r = 0.64)
PosPHT_a	Are outgoing		0.72	
PosPHT_c	Are effective communicators		0.62	
PosPHT_e	Are very intelligent		0.47	
NegPHT_b	Are nerds or geeks	0.68		
NegPHT_d.	Are boring	0.77		
NegPHT_f.	Are uncool	0.73		
MedRep_a	Models in computer and technology related product advertisements in television, newspapers, magazines, and internet are			0.68
MedRep_b	Anchors hosting high-tech related TV and radio shows			0.68

Note. PostPHT and *NegPHT* refer to stereotypical positive and negative perceptions and *MedRep* refers to gender representation in the media.

Appendix 5.13 Gendered Perceptions: EFA Rotated Solution on 20 Items

Items	Factor				
	1	2	3	4	5
A person's gender is important as certain professions require certain physical capabilities		0.69			
Female students are not interested as they are not guided sufficiently during high school education	0.62				
Female students are not interested as the job opportunities are limited for women	0.58				
Male high-tech professionals get promoted more quickly than female professionals			0.72		
A person's gender is important because of the working conditions in certain professions		0.71			
Female students are not interested as they are not guided sufficiently by their families	0.61				
Women are generally less interested in high-tech professions	0.51				
Male high-tech professionals have better access to mentoring opportunities than female professionals					
A person's gender is important as men and women have different interests		0.58			
Female students are not interested as their physical capabilities do not fit this profession				0.56	
Male high-tech professionals earn more than female professionals	0.53				
In my opinion a person's gender is important in choosing a profession		0.79			
Female students are not interested because of low representation of successful female professionals	0.63				

Working conditions make it difficult for women to work as a professional					
Male high-tech professionals have better access to networking opportunities than female professionals			0.74		
A person's gender is important in choosing a profession because of socio-cultural expectations		0.51			
Female students are not interested as these fields do not match their interests				0.67	
Women cannot be very successful					0.50
HT is not suitable for women					0.62
There are not many successful female HT professionals					0.58

Appendix 5.14 Gendered Perceptions: CFA Standardized Estimates

Item #	Items	Factor			
		1 (α = 0.76)	2 (α = 0.76)	3 (α = 0.60)	4 (α = 0.69)
GenPer_b	Female students are not interested as they are not guided sufficiently during high school education		0.70		
GenPer_c	Female students are not interested as the job opportunities are limited for women c		0.63		
GenPer_g	Female students are not interested as they are not guided sufficiently by their families g		0.58		
GenPer_h	Women are generally less interested in high-tech professions h		0.59		
GenPer_o	Female students are not interested because of low representation of successful female professionals o		0.57		
GenPer_a	A person's gender is important as certain professions require certain physical capabilities a	0.71			
GenPer_f	A person's gender is important because of the working conditions in certain professions f	0.73			
GenPer_j	A person's gender is important as men and women have different interests j	0.53			
GenPer_n	In my opinion a person's gender is important in choosing a profession n	0.66			
GenPer_s	A person's gender is important in choosing a profession because of socio-cultural expectations s	0.52			
GenPer_d	Male high-tech professionals get promoted more quickly than female professionals d			0.72	
GenPer_q	Male high-tech professionals have better access to networking opportunities than female professionals q			0.59	
GenPer_k	Female students are not interested as their physical capabilities do not fit this profession k				0.74
GenPer_t	Female students are not interested as these fields do not match their interests t				0.71

Note. GenPer refers to gendered perceptions.

Appendix 5.15 Intention to Pursue a Career

Item #	Items	CAR ($\alpha = 0.72$)
CAR_a	Apply for a job	0.76
CAR_b	Work full time	0.58
CAR_c	Have a life long career	0.68

Note. CAR refers to intention to pursue a career.

Appendix 5.16 Attitudes toward the High-Tech Profession

Item #	Items	AHT ($\alpha = 0.78$)
AHT_a.	As a prestigious career	0.83
AHT_b	As a respected career	0.76
AHT_d	As a high-profile career	0.62

Note. AHT refers to attitudes toward a high-tech career.

Appendix 6: Mediation Analysis

Step 1: Social Support and Intention to Pursue a High-Tech Career

Predictor	Standardized βeta Coeffs.	Sig.	Model Summary	
			Adjusted R Square	Sig.
Social Support	0.32	0.00	0.10	0.00
Dependent Variable: Intention to Pursue a High-Tech Career				

Step 2: Social Support and Occupational Self-Efficacy

Predictor	Standardized βeta Coeffs.	Sig.	Model Summary	
			Adjusted R Square	Sig.
Social Support	0.39	0.00	0.15	0.00
Dependent Variable: Occupational Self-efficacy				

Step 3: Occupational Self-Efficacy and Intention to Pursue a High-Tech Career

Predictors	Standardized βeta Coeffs.	Sig.	Model Summary	
			Adjusted R Square	Sig.
Occupational Self-efficacy	0.44	0.00	.20	0.00
Dependent Variable: Intention to Pursue a High-Tech Career				

Step 4: Social Support and Intention to Pursue a High-Tech Career

Predictors	Standardized βeta Coeffs.	Sig.	Model Summary	
			Adjusted R Square	Sig.
Occupational Self-efficacy Social Support	0.37 0.18	0.00 0.00	0.22	0.00
Dependent Variable: Intention to Pursue a High-Tech Career				

Significance Testing for Indirect Effect*

Input		Type of Test	Test Statistics	Std. Error	p-value
	Value				
a	0.317	Sobel Test	8.658	0.019	0.02
b	0.532	Aroian Test	8.645	0.019	0.02
s_a	0.013	Goodman Test	8.670	0.019	0.02
s_b	0.035				

Note. *a* and *b* refers to the unstandardized beta coefficients for paths *a* and *b* respectively. S_a and S_b refers to the standard error of the respective unstandardized beta coefficients.

*Using Preacher and Leonardelli's (2003) interactive web calculation

Appendix 7: Results from Measurement Models and Structural Models

Appendix 7.1 Completely Standardized Solutions for Core SCCT' Interest and Choice Model

	HTC	OSE	OE	INT
HTC_a	0.814			
HTC_b	0.815			
HTC_c	0.744			
HTC_d	0.738			
HTC_f	0.741			
HTC_g	0.631			
OSE_a		0.744		
OSE_b		0.739		
OSE_c		0.619		
OSE_d		0.552		
OSE_e		0.507		
OSE_f		0.501		
CarOE_a			0.668	
CarOE_c			0.714	
CarOE_f			0.455	
SlfOE_h			0.778	
SlfOE_i			0.690	
SlfOE_r			0.612	
INT_a				0.716
INT_b				0.697
INT_c				0.638
INT_d				0.588

Note. Due to space limitations, abbreviated forms of the variable names are used. *HTC* refers to intention to pursue a high-tech career. *OSE* refers occupational self-efficacy, *OE* refers to outcome expectations (*CarOE* = career outcome expectations and *SlfOE* = self-evaluative outcome expectations), and *INT* refers to interest. The abbreviated names are same for the subsequent tables.

Appendix 7.2 Direct Path Effects for Core SCCT' Interest and Choice Model

Direct Effect	Unstandardized	Std. Error	Standardized
OSE - HTC	0.175***	0.055	0.159**
OSE - INT	0.405***	0.058	0.357***
OSE - OE	0.721***	0.042	0.655***
OE- INT	0.428***	0.053	0.415***
OE- HTC	0.205***	0.051	0.204***
INT - HTC	0.385***	0.052	0.395***

Note. Significant at: *p < 0.05, **p < 0.01 and ***p < 0.001.

Appendix 7.3 Indirect Path Effects for Core SCCT' Interest and Choice Model

Indirect Effect	Unstandardized	Std. Error	Standardized
OSE – INT	0.308***	0.040	0.272***
OSE – HTC	0.422***	0.044	0.383***
OE – HTC	0.165***	0.029	0.164***

Note. Significant at: *p < 0.05, **p < 0.01 and ***p < 0.001.

Appendix 7.4 Total Effects for Core SCCT' Interest and Choice Model

Total Effect	Unstandardized	Std. Error	Standardized
OSE - HTC	0.597***	0.041	0.541***
OSE - INT	0.713***	0.047	0.629***
OSE - OE	0.721***	0.042	0.655***
OE- HTC	0.369***	0.049	0.368***
OE - INT	0.428***	0.053	0.415***
INT - HTC	0.385***	0.052	0.395***

Note. Significant at: *p < 0.05, **p < 0.01 and ***p < 0.001.

Appendix 7.5 Completely Standardized Solutions for the Expanded SCCT Interest and Choice Model

	HTC	OSE	OE	INT	SocSup	SocBar
HTC_a	0.815					
HTC_b	0.815					
HTC_c	0.745					
HTC_d	0.739					
HTC_f	0.740					
HTC_g	0.631					
OSE_a		0.740				
OSE_b		0.733				
OSE_c		0.623				
OSE_d		0.559				
OSE_e		0.509				
OSE_f		0.502				
CarOE_a			0.670			
CarOE_c			0.711			
CarOE_f			0.448			
SlfOE_h			0.781			
SlfOE_i			0.687			
SlfOE_r			0.615			
INT_a				0.729		
INT_b				0.697		
INT_c				0.632		
INT_d				0.576		
SocSup_c					0.543	
SocSup_g					0.563	
SocSup_i					0.599	
SocSup_j					0.575	
SocBar_d						0.701
SocBar_f						0.721
SocBar_h						0.603
SocBar_l						0.565

Appendix 7.6 Direct Path Effects for the Expanded SCCT's Interest and Choice Model

Direct Effect	Unstandardized	Std. Error	Standardized
OSE - OE	0.744***	0.047	0.669***
OSE - INT	0.314***	0.042	0.406***
OSE - HTC	0.130	0.068	0.116
OE- INT	0.263**	0.037	0.378**
OE- HTC	0.231***	0.051	0.231***
INT - HTC	0.524***	0.080	0.364***
SocSup - OSE	0.716***	0.072	0.555***
SocSup - HTC	0.128*	0.065	0.089
SocBar - OSE	-0.025	0.029	- 0.033
SocBar - HTC	0.051	0.027	0.060*

Note. Significant at: *p < 0.05, **p < 0.01 and ***p < 0.001.

Appendix 7.7 Indirect Path Effects for the Expanded SCCT's Interest and Choice Model

Indirect Effect	Unstandardized	Std. Error	Standardized
OSE – INT	0.196***	0.028	0.253***
OSE – HTC	0.439***	0.048	0.394***
OE – HTC	0.138***	0.027	0.138***
SocSup-OE	0.533***	0.058	0.371***
SocSup - INT	0.365***	0.042	0.366***
SocSup-HTC	0.408***	0.052	0.283***
SocBar-OE	-0.019	0.022	-0.022
SocBar - INT	-0.013	0.015	-0.022
SocBar-HTC	-0.014	0.017	-0.017

Note. Significant at: *p < 0.05, **p < 0.01 and ***p < 0.001.

Appendix 7.8 Total Effects for the Expanded SCCT's Interest and Choice Model

Total Effect	Unstandardized	Std. Error	Standardized
OSE - HTC	0.569***	0.053	0.510***
OSE - INT	0.510***	0.037	0.659***
OSE - OE	0.744***	0.047	0.669***
OE- HTC	0.369***	0.049	0.368***
OE - INT	0.263***	0.037	0.378***
INT - HTC	0.524***	0.080	0.364***
SocSup - OSE	0.716***	0.072	0.555***
SocSup-OE	0.533***	0.058	0.371***
SocSup - INT	0.365***	0.042	0.366***
SocSup-HTC	0.535***	0.067	0.372***
SocBar - OSE	-0.025	0.029	-0.033
SocBar-OE	-0.019	0.022	-0.022
SocBar - INT	-0.013	0.015	-0.022
SocBar-HTC	0.037	0.032	0.043

Note. Significant at: *p < 0.05, **p < 0.01 and ***p < 0.001.

Appendix 7.9 Estimates for Nine-Factor Gender- SCCT Model

	HTC	MAS	FEM	OSE	OE	INT	SocSup	SocBar	MasImg
HTC_a	0.626								
HTC_b	0.492								
HTC_c	0.659								
HTC_d	0.644								
HTC_f	0.723								
HTC_g	0.934								
Mas_a		0.706							
Mas_c		0.512							
Mas_e		0.633							
Mas_i		0.873							
Mas_k		0.567							
Mas_m		0.590							
Mas_o		0.611							
Fem_f			0.578						
Fem_h			0.587						
Fem_j			0.532						
Fem_l			0.595						
Fem_n			0.590						
OSE_a				0.812					
OSE_b				0.814					
OSE_c				0.750					
OSE_d				0.690					
OSE_e				0.553					
OSE_f				0.582					
CarOE_a					0.669				
CarOE_c					0.670				
CarOE_f					0.584				
SlfOE_h					0.779				
SlfOE_i					0.779				
SlfOE_r					0.886				
INT_a						0.722			
INT_b						0.694			
INT_c						0.782			
INT_d						0.784			
SocSup_c							0.841		
SocSup_g							0.562		
SocSup_i							0.601		
SocSup_j							0.573		
SocBar_d								0. 568	
SocBar_f								0.720	
SocBar_h								0.802	
SocBar_l								0.786	
MasImg_a									**0.510^**
MasImg_b									0.965

Note. ^ p≥0.05. *MasImg* refers to masculine image of the high-tech professionals. All other abbreviated names are same as Appendix 7.1.

Appendix 7.10 Completely Standardized Solution SCCT's Interest and Choice Model with Gender-Related Variables

	HTC	MAS	FEM	OSE	OE	INT	SocSup	SocBar
HTC a	0.813							
HTC b	0.814							
HTC c	0.746							
HTC d	0.740							
HTC f	0.742							
HTC g	0.633							
Mas a		0.495						
Mas c		0.587						
Mas e		0.532						
Mas i		0.481						
Mas k		0.571						
Mas m		0.328						
Mas o		0.439						
Fem f			0.304					
Fem h			0.460					
Fem j			0.579					
Fem l			0.557					
Fem n			0.338					
OSE a				0.743				
OSE b				0.729				
OSE c				0.623				
OSE d				0.558				
OSE e				0.513				
OSE f				0.500				
CarOE a					0.669			
CarOE c					0.711			
CarOE f					0.448			
SlfOE h					0.780			
SlfOE i					0.688			
SlfOE r					0.617			
INT a						0.722		
INT b						0.694		
INT c						0.637		
INT d						0.585		
SocSup c							0.544	
SocSup g							0.562	
SocSup i							0.601	
SocSup j							0.573	
SocBar d								0.701
SocBar f								0.720
SocBar h								0.602
SocBar l								0.568

Note. All abbreviated names are same as Appendix 7.1.

Appendix 7.11 Direct Path Effects for SCCT's Interest and Choice Model with Gender-Related Variables

Direct Effect	Unstandardized	Std. Error	Standardized
MAS - OSE	0.836***	0.137	0.439***
MAS - OE	-0.145	0.088	-0.101
FEM - OSE	-0.303	0.155	-0.152
FEM - OE	0.495***	0.098	0.331***
OSE - OE	0.451***	0.037	0.601***
OSE - INT	0.399***	0.052	0.404***
OSE - HTC	0.105	0.054	0.111*
OE- INT	0.514***	0.070	0.391***
OE- HTC	0.306***	0.065	0.243***
INT - HTC	0.338***	0.053	0.353***
SocSup - OSE	0.559***	0.061	0.503***
SocSup - HTC	0.101*	0.047	0.096*
SocBar - OSE	-0.031	0.029	-0.043
SocBar - HTC	0.044*	0.022	0.061**

Note. Significant at: *p < 0.05, **p < 0.01 and ***p < 0.001.

Appendix 7.12 Indirect Path Effects for SCCT's Interest and Choice Model with Gender-Related Variables

Indirect Effect	Unstandardized	Std. Error	Standardized
MAS-OE	0.377***	0.071	0.264***
MAS-INT	0.523***	0.106	0.241**
MAS-HTC	0.312***	0.074	0.173**
FEM-OE	-0.137	0.072	-0.092
FEM-INT	0.073	0.123	0.032
FEM-HTC	0.099	0.083	0.053
OSE – INT	0.268***	0.038	0.235***
OSE – HTC	0.351***	0.040	0.372***
OE – HTC	0.174***	0.035	0.138***
SocSup-OE	0.252***	0.032	0.302***
SocSup - INT	0.408***	0.049	0.322***
SocSup-HTC	0.255***	0.035	0.243***
SocBar-OE	-0.015	0.014	-0.026
SocBar - INT	-0.024	0.022	-0.027
SocBar-HTC	-0.015	0.014	-0.021

Note. Significant at: *p < 0.05, **p < 0.01 and ***p < 0.001.

Appendix 7.13 Total Effects for SCCT's Interest and Choice Model with Gender-Related Variables

Total Effect	Unstandardized	Std. Error	Standardized
MAS - OSE	0.836***	0.137	0.439***
MAS - OE	0.232*	0.091	0.162
MAS - INT	0.523***	0.106	0.241**
MAS - HTC	0.312***	0.074	0.173**
FEM - OSE	-0.303	0.155	-0.152
FEM - OE	0.358***	0.109	0.240**
FEM - INT	0.073	0.123	0.032
FEM - HTC	0.099	0.83	0.053
OSE - OE	0.451***	0.071	0.601***
OSE - INT	0.729***	0.106	0.639***
OSE - HTC	0.312***	0.074	0.483***
OE- INT	0.595***	0.080	0.391***
OE - HTC	0.480***	0.064	0.381***
INT - HTC	0.292***	0.046	0.353***
SocSup - OSE	0.559***	0.061	0.503***
SocSup-OE	0.252***	0.032	0.302***
SocSup - INT	0.408***	0.049	0.322***
SocSup-HTC	0.356***	0.048	0.339***
SocBar - OSE	-0.033	0.031	-0.043
SocBar-OE	-0.015	0.014	-0.026
SocBar - INT	-0.024	0.022	-0.027
SocBar-HTC	0.029	0.027	0.040

Note. Significant at: *p < 0.05, **p < 0.01 and ***p < 0.001.

Appendix 7.14 Significance Testing for Indirect Effect

Input		Type of Test	Test Statistics	Std. Error	p-value
	Value				
a	0.56	Sobel Test	1.96	0.03	0.05
b	0.11	Aroian Test	1.94	0.03	0.05
S_a	0.06	Goodman Test	1.96	0.03	0.05
S_b	0.05				

Note. a and b refers to the unstandardized beta coefficients for paths a and b respectively. S_a and S_b refer to the standard errors for respective unstandardized beta coefficients.