The Influence of Protean Attitude for Women in STEM Careers: Coping-Self Efficacy as Foundational and Strong Career Identity as Outcome

Abstract

Purpose: The under-representation of women working in Science, Technology, Engineering and Mathematics (STEM) careers is a persistent problem worldwide. This dilemma is exacerbated by the fact that an insufficient number of women enroll in STEM studies and a significant proportion who do join then opt out of their STEM careers at different points in their lives. The protean attitude emphasizes agentic individual control over one's career, and thus offers women substantial potential for developing and enhancing career outcomes. Therefore, this study investigates coping self-efficacy as antecedent and career identity as consequent of protean attitude for women working in STEM.

Design: Using a questionnaire survey, data were collected from 482 women working in STEM in the Middle East region. Multiple regression and bootstrapping methods were employed in the analysis of the data.

Findings: The findings indicate that coping self-efficacy positively affects both protean attitude and career identity. The results also show that protean attitude mediates the relationship between coping self-efficacy and career identity.

Originality: The study addresses some of the main challenges related to identifying antecedents and outcomes of protean attitude.

Implications: This research presents organizational management and government policy recommendations aimed to increase the recruitment and retainment of women in STEM careers.

KEYWORDS: Coping Self-efficacy, Protean Attitude, Career Identity, Social Cognitive Career Theory, Women in STEM.

Introduction

The under-representation of women working in Science, Technology, Engineering and Mathematics (STEM) careers is a persistent issue worldwide (Schmitt, Lauer, and Wilkesmann, 2021). This problem is exacerbated by the fact that fewer women enroll in STEM studies and others drop out of STEM careers at different points in their lives (Fouad, Fitzpatrick and Liu, 2011). For several decades, many governments in the Middle East (ME) region have implemented policies to enhance gender equality in the workplace, even so women continue to experience discrimination and gender segregation in STEM careers (Blaique and Pinnington, 2021; Islam, 2019; Patterson, Varadarajan and Salim, 2020).

Research has identified several factors influencing the attrition of women employed in STEM fields including dissatisfaction and perceptions of limited career flexibility and opportunities, thus significantly compounding women's under-representation (Schmitt *et al.*, 2021). Research studies and reports worldwide refer to gender-specific barriers that hinder women from remaining long-term in STEM careers. These include male-dominated work cultures, difficulties experienced with networking, lack of mentors and role models, biased promotion practices, and substantial challenges in balancing work and life responsibilities (Fouad *et al*., 2011). Normative gender role expectations regarding women's careers, especially within Arabic cultures also influence in various ways women's individual beliefs (Metcalfe 2008). Consequently, when compared to men, women may demonstrate lower self-confidence in pursuing and studying STEM subjects, weaker

career self-efficacies, and less career motivation to choose and persist with a STEM career (Buse *et al.*, 2013; Blaique, Pinnington and Aldabbas, 2022). Such challenging career conditions can also negatively affect women's career identities.

Career identity is considered a major element in an individual's career journey. People with strong career identities are predicted to have a clear understanding of their own interests, talents, and goals (Holland, Daiger and Power, 1980). These individuals also tend to possess high degrees of confidence in their ability to make sound career-related decisions (Scott and Cianni, 2008). Considering these challenging career conditions, a protean attitude, characterized by values-driven, self-managed individual approaches (Hall, 2004), is seen as increasingly important for career success. Similarly, women's work motivation and sense of autonomy are considered significant for attaining high levels of career persistence and effective career self-management (Fouad, Chang, Wan, and Singh, 2017). These factors substantially contribute to women's career success in STEM because they strengthen their abilities to navigate their career progress across many gender-related barriers (Buse *et al.*, 2013).

Scholars argue that individuals with protean attitudes tend to enjoy clearer career identity and higher self-efficacy and adaptability compared to others (Gubler, Arnold, and Coombs, 2014; Hall, 2004; Waters, Hall, Wang, and Briscoe, 2015). However, there remains some confusion over the extent that these and other career outcomes are influenced by protean attitude and whether they are antecedents or consequences of a person having a protean attitude (Gubler *et al.*, 2014). Most published studies have not yet directly addressed this research gap (Gubler *et al.*, 2014; Herrmann, Hirschi, and Baruch, 2015). Understanding more fully the relationship between protean attitude and other psychological constructs will contribute to theoretical explanations of why and how protean attitude is related to major career outcomes (Hirschi, Jaenschi, and Herrmann, 2016).

Whereas the concept of protean attitude has gained research attention in recent years, greater clarity on the roles and functions of the significant variables is necessary (Gubler *et al.,* 2014; Hirschi *et al.,* 2016). Research shows that protean attitude is related to emotional and behavioral factors such as identity and self-efficacy since these and other variables are important for developing protean careers (Hall, 2004; Waters *et al.,* 2015). In response to this research gap, our paper seeks to test coping self-efficacy as antecedent and career identity as an outcome of protean attitude. The study also tests the mediating effect of protean attitude on the relationship between coping self-efficacy and career identity.

The main theoretical framework informing this study is Social Cognitive Career Theory (SCCT) (Lent, Brown and Hackett, 1994; 2002). The theory has often been used to investigate and understand career choices and decisions especially among under-represented minorities (Lent *et al.,* 2008). Making informed career decisions tends to be the individual outcome of successful fulfillment of several developmental tasks in the presence of a clear career identity (Super, Savickas and Super, 1996). Within the SCCT, Lent et al. (2002) explain that self-efficacy plays a significant role in an individual's career choices and development (Bandura, 2001). Thus, SCCT serves as an appropriate theoretical framework for understanding the interplay of protean attitude, coping self-efficacy and career identity in enhancing the career persistence of women in STEM fields.

This research contributes to the academic literature in several ways. First, theoretically and empirically, we offer an explanation of the relationship between protean attitude and two salient, related variables, coping self-efficacy and career identity. Second, we present new statistical findings and give a theoretically informed explanation of the functions of protean attitude in relation to these two variables by testing protean attitude as a mediator of the relationship. Finally,

we contribute to knowledge by emphasizing the important role that protean attitude plays in shaping and enhancing career outcomes for women in STEM.

Literature Review

Middle East Context:

Since 2000, the Middle East region has successfully increased the number of women completing post-secondary education which enhances women's literacy and life expectancy and reduces infant mortality rates. Despite some progress, Arab women are still under-represented overall in Science, Technology and Mathematics majors (World Bank, 2012). Unlike studies that indicate that women in countries with less gender equality are paradoxically more represented in STEM compared to countries with more gender equality (Stoet and Geary, 2018), women represented 57% of total students enrolled and graduated from STEM majors between 2016-2017 in several countries in the Middle East, however, their labor participation in STEM occupations is less than 30% (UNESCO, 2019). In 2015, empowering women and girls became one of the seventeen Sustainable Development Goals (SDGs) of the United Nations. Common explanations for the under-representation of women in both the Western and Arab world include a "chilly climate" where women are faced with explicit and subtle forms of discrimination (Walton et al., 2015), lack of mentorship, and insufficient support and networking (Blaique et al., 2022). Moreover, women in the Middle East face additional barriers. Scholars explain that women's under-representation in STEM careers in the Middle East is exacerbated by gendered cultural practices that encourage women to choose more traditional majors such as arts and humanities (Islam, 2019). Gendered education policy and practice ultimately becomes reflected in the workplace too where many STEM careers are male-dominated. Raising female participation in STEM careers hence could offer more opportunity for meaningfully empowering women through greater female incomes and

quality of life, and better career development and advancement of professional work opportunities (Momani, 2016).

In contrast to women's workplace participation in other developed countries, in the Middle East region increases in women's education rate combined with declining birth rates have not resulted in equivalent growth in female labor force participation (World Bank, 2014). In fact, female unemployment in the Middle East region has been on the rise, from 18% in early 2000 to around 22% in 2020, and is expected to keep soaring due to the economic disruptions resulting from the COVID-19 pandemic and the political unrest that the region has been witnessing (Asi, 2022). According to the World Bank, the gap between the Middle East and North African (MENA) region and other developed countries has widened where female labor participation is more than 50% (El Swais, 2016). Several reasons can be attributed to this low rate of participation. First, the mandatory retirement age of both men and women in developed countries is above that set in emerging countries, exceeding by five or even ten years, and for women in the MENA region retirement can be as low as 50-55 years of age. While women within this age group remain in the workforce in many other countries, by contrast in the Middle East, they must retire. Second, married women due to family responsibilities tend to have lower labor participation rates in the Middle East compared to women in other countries and, in more cases, they end their careers completely. The main explanation for this phenomenon is the social and cultural norms assuming children's upbringing is solely women's responsibility (Karshenas et al., 2016; Ross, 2008; Moghadam, 1995).

Third, social and cultural norms still prevalent in the region tend to favor hiring men over women since men are viewed as the main breadwinners of the family. Therefore, young women who are seeking work are faced with almost double the unemployment rate (43%) compared to young men

at 23% (Jalbout, 2015). Women's employment in the Middle East region results in almost a 25% increase in household income (World Bank, 2009). By closing the gender gap, the gross domestic product of MENA countries would grow significantly, for example, potentially rising by 12% in United Arab Emirates and 34% in Egypt (Elborgh-Woytek et al., 2013). Hiring more women, especially into the high paying jobs often available in STEM could lead to reduction of dependency benefits in households, thus enhancing national output, expanding national savings and allowing for more investment and productivity therefore creating a more affluent national economy (Morrison et al., 2007).

Theoretical Framework:

Social Cognitive Career Theory (SCCT) (Lent *et al.*, 1994) draws researchers' attention to the significance of personal agency in career-related decision-making. SCCT concentrates on the role of individual factors such as self-efficacy and various external factors in influencing career goals, processes and outcomes. The model explains that self-efficacy, outcome expectations and goal orientation are three person-related mechanisms that affect an individual's career interests, choices, and development. SCCT is considered an insightful and valuable framework commonly used to understand career choices and decisions (Lent *et al*., 1994; 2002; Lent *et al.*, 2008). Education research has demonstrated the central role that self-efficacy plays in shaping women's career choices and decisions in STEM fields (Falco and Summers, 2019). Making a decision regarding one's career is argued to be the result of several developmental tasks, including the formation of a specific career identity (Super *et al.*, 1996). This research study therefore adopts SCCT as the theoretical basis for investigating coping self-efficacy as an antecedent and career identity as an outcome of protean attitude.

Protean Attitude

The topic of career dynamics has been attractive to researchers for many decades (Tlais, 2014). Career theory defines the traditional career as an established, organizationally-oriented career that is based on assumptions about secure, long-run patterns of employment (Hall, 2004) and maintains a unidimensional perspective on the careers of women and men alike (Rosenbaum, 1979). Major economic and social changes occurring in the 1980s and 1990s, such as economic and technological developments, globalization, organizational restructuring, greater workforce diversity, and extensive flattening of hierarchies (Sullivan and Baruch, 2009) have necessitated departure from the policies and values of the traditional organization sharply reducing the availability of prolonged and secure employment contracts (Monaghan and Ritchie, 2014) and directing employers' and employees' attention instead to issues of employability (Baruch, 2006). These dramatic changes have precipitated the end of the traditional organizational career, initially in Western developed economies and later more broadly in other countries (Clarke, 2013; Herriot and Pemberton, 1995). This move has paved the way for the emergence of contemporary concepts of careers emphasizing multi-directionality, resourcefulness, marketability, and adaptability (Baruch, 2006). These more recent career concepts have generated new perspectives on how to understand and evaluate careers (Clarke, 2013). The protean career articulates self-directed approaches to career management (Briscoe and Hall, 2006) even claiming that the individual rather than the organization is in control of his or her career (Hall, 2004). A protean career path is guided by personally identified goals during one's life, personal values, and subjective rather than objective ideas of career success (Briscoe and Hall, 2006). Therefore, the protean career tends to promote a holistic approach to career by considering work within the context of one's whole life and it involves continuous learning and remodelling of one's career aspirations by stepping outside

and beyond organizational boundaries (Clarke, 2013). A protean individual is characterized by her ability to adapt to changing work conditions, manage the practices, challenges and opportunities of employability, and focus on intrinsic rewards and continuous learning goals (Sullivan and Baruch, 2009). The contemporary career concept has been highly received by researchers and practitioners who have for several decades criticized the traditional career model for portraying careers from a gender-neutral stance. With women's increasing workplace participation worldwide, contemporary career theories address the experiences of women more directly and informatively than traditional career models. This change in understanding of careers addresses more actively the long stream of published literature on women's careers and the biases and barriers they face in the workplace (Kottke and Agars, 2005). These new approaches are more accommodating to critique and analysis on how women balance their work and life responsibilities (Mainiero and Sullivan, 2006). Nevertheless, women's life experiences, values, contexts, and attitudes have not yet been fully integrated into the literature on careers (McDonald, Brown, and Bradley, 2005) due to the residual dominance of the traditional male career model which continues to be the normative standard for evaluating career decisions and progress (Omair, 2010; Patterson, Damaske, and Sheroff, 2017). Therefore, in this study, we argue that attempting to understand the protean attitudes of women towards their careers may offer additional insights on their employment and level of representation in STEM careers.

Change is an inevitable part of careers and organizational life. Rapid change occurring worldwide coupled with globalization and advancements in technology, have resulted in what is known as the gig economy which is characterized by more frequent career transitions and multiple work modes (Barley et al., 2017). Major change has similarly occurred in the Middle East region, which is the context of this study. Reports show an increasing number of women graduating from higher

education than in previous years (UNESCO, 2019). Based on the United Nation's advocacy of the Millennium Development Goals (MDGs), several MENA countries have started championing programs to empower women in the workplace (Metcalf, 2008). Recognizing the need for empowerment, new formal and informal networks have been created to contribute to this process. In addition, scholars argue that some of the contextual barriers are changing such as the centrality of the Arab family which may result in more married women participating in the workforce (Haj-Yahia, 2000). Yet, it is not clear as to what extent these socio-cultural changes will increase the representation of women in STEM especially given the fact the region is witnessing continuing political and economic insecurity and turmoil (Al-Waqfi and Al-Faki, 2015).

It is argued further that traditional employment relationships worldwide are becoming obsolete and exchanged for alternative work arrangements (Katz and Krueger, 2017). If this trend continues, it will require higher levels of self-direction and adaptability for both job seekers and employers (Hill et al., 2018). The concept of protean attitude towards careers espouses a highly agentic role for individuals, which contrasts with previous career perspectives such as Holland's model of person-occupation fit (Holland, 1997) and Super's (1957) focus on self-image and occupational role. The protean attitude is novel in presenting more compellingly than do other careers concepts the idea of internal motivation based on individuals' intrinsic values stimulating active agency. A versatile attitude is considered the "engine" for individual's career decisions (Hall et al., 2018). Protean career attitude includes two aspects, self-directedness and values-driven. Self-directedness is the appeal to be agentic and in control of one's career. Values-driven is the desire to make career decisions based on intrinsic orientations (Briscoe et al., 2006). It is not by default that a person is self-directed and values-driven and such resolve becomes more challenging in the contemporary work environment typified by constant change, uncertainty, and complexity

as discussed earlier (Bennet and Lemoine, 2014). A number of the critical factors leading to gender equality in any country, do not operate at a level which can be controlled by individuals. These include macroeconomic and institutional forces such as globalization, cultural and societal norms, political and environmental forces (Metcalfe, Makarem and Afiouni, 2020; Pinnington, Al-Shamsi, Özbilgin, Tatli, and Vassilopoulou, 2018). Evidence from the literature indicates that individuals with protean attitudes tend to cope and adapt to change and uncertainty more effectively (Briscoe et al., 2012; Waters et al., 2014). Protean attitude is not though an additional capability that women in STEM might choose to add to their career identity, rather we argue it is a necessity, being central to career survival in a changing world.

To-date, the specific situational, cognitive, emotional, attitudinal and behavioral factors influencing protean attitude have not been sufficiently clearly identified, which constitutes a major gap in the literature (Hirschi *et al.,* 2016). In this research, we therefore focus on coping self-efficacy and career identity due to their conceptual importance for protean attitude and protean careers.

Coping Self-Efficacy:

Self-efficacy can be defined as a person's judgment of her ability to perform a certain task under specific circumstances. It has also been defined as the perceived degree of confidence in one's ability to execute a number of actions related to career planning and development (Lent *et al.,* 1994). Self-efficacy can be measured in many ways. Within SCCT models, it is commonly assigned as content or task-specific self-efficacy or process-efficacy (Brown and Lent 2006). Coping self-efficacy, a form of self-efficacy, pertains to a person's confidence to cope adequately with stressful events (Chesney *et al.,* 2006). Coping self-efficacy decreases a person's stress reactions by encouraging favourable self-evaluations of one's ability to cope with upsetting

incidents and their consequences (Bosmans, van der Knaap, and van der Velden, 2016). Lazarus and Folkman (1984) consider stress as an interchangeable process between an individual and her surroundings whereby the physiological and psychological effects of a stressful situation on well-being are determined by her coping skills. Based on this widely accepted transactional approach, coping can be defined as cognitive and behavioral efforts in reacting to internal or external demands that the person believes could threaten her well-being (Freire et al., 2020). Building on Bandura's initial work (1986), coping self-efficacy is summarized as an individual's beliefs about her ability to take the action necessary to achieve certain tasks. Therefore, it is a major psychological resource for maintaining control over situations occurring during a person's life (Wood and Bandura, 1989).

Previous studies explain the significant role that self-efficacy plays in terms of women's career and educational choices in STEM. Results from many studies show gender differences in self-efficacy and outcome expectations for jobs where women are under-represented (Eccles, 2009; Else-Quest, Mineo and Higgins, 2013). Some empirical studies indicate that boys tend to have stronger self-efficacy than girls in mathematics and science subjects (Sadler, Sonnert, Hazari and Tai, 2012; Wang, 2012). This confidence gap emerges during school years and remains constant over time according to a number of research studies (Herbert and Stipek, 2005; Jacobs, Lanza, Osgood *et al*., 2002). Furthermore, previous studies have found evidence supporting the relationship between self-efficacy and several career development and performance attitudes (Burnette, Pollack, Forsyth, *et al.*, 2020; Duyar, Ras and Pearson, 2015; Fayolle, 2013; Mumtaz and Parahoo, 2019).

Self-efficacy is argued to be an important factor in the development of protean attitude (Waters *et al.*, 2015) and is thought to be a significant aspect of human agency since it motivates effort and

persistence to achieve goals (Bandura, 2001). Women who have a sense of competence regarding their careers in STEM are or could become more receptive to protean attitudes because their self-efficacy boosts effort and persistence directed towards task achievement (Bandura, 2001). The literature explains that women in STEM often work in challenging and difficult masculine work environments (Van Veelen, Derks, and Endedijk, 2019). Their ability to cope under such stressful situations may improve their resolve to take control of their careers in a more self-directed way. Feelings of competence also related to subjective success may lead to a virtuous cycle of increasing success where favorable career experiences strengthen self-directed protean attitudes (Hall, 2004). In addition, women who believe they are capable of overcoming challenges in their work will feel more confident to direct their careers based on their own values rather than their organization's particular preferences (Bandura, 2001). Therefore, we propose the following hypothesis:

H1: Coping self-efficacy positively enhances a protean attitude for women working in STEM fields.

Career Identity:

Career identity can be explained as an individual ability to direct oneself and advance in changing environments. It pertains to understanding oneself and knowing what to seek in the future. It is the ability to identify and accomplish one's career goals (Fugate et al., 2004). Identity represents a central element in career development. It is affected by several career preparation activities such as exploration and planning (Stringer et al., 2011), and is linked to career-related and well-being outcomes (Skorikov & Vondracek, 2011). Career identity has been related to better reasoning about future career opportunities (Klaczynski & Lavallee, 2005), less career self-doubt (Porfeli, Lee, Vondracek, & Weigold, 2011), and future occupational attainment (Schiller, 1998).

Research indicates that career identity is acquired through a process of social learning that takes place when a person interacts with others (LaPointe, 2010). Meijers (1998) explains that personal cognitive acts and encounters in the workplace create new meanings that help to crystalize individual career identity and encourage greater reflection on the experiences of attaining beneficial outcomes. Career identity is based on an individual's reconstruction of past experiences of complicated situations, and offers a platform for adopting a critical perspective on one's professional beliefs (Fugate et al., 2004). Career identity is a major factor in self-directed career management that is dependent on individual values (Briscoe, 2006). Career identity is a key construct related to career development and for a considerable period of time has been a primary area of research interest in vocational psychology (Hirschi, 2011). The advancement and employment of a clear understanding of one's career identity is considered a principal developmental task that arises during adolescence and continues throughout adulthood (Super, 1990). Fugate, Kinicki, and Ashforth (2004) categorized career identity as affecting a person's ability to attain career opportunities and is a core element of employability. Several studies have also discussed the positive impact of career identity on people's career transitions, well-being, and career interests (e.g. Diemer and Blustein, 2007; Gushue *et al*., 2006). Career identity is assumed to be linked to selecting a career and subsequently making ongoing career decisions, and such activities are thought especially important for women (Dunlap and Barth, 2019). A large amount of published research is available on problems of stereotypes in STEM occupations and work environments, however, the studies investigating gender, career development and career identity are somewhat more inconclusive (Smeding, 2012; Nosek and Smyth, 2011; Smyth and Nosek, 2015).

SCCT draws from Bandura's self-efficacy theory (1986) and highlights relationships between personal and contextual factors that enhance the formation of career choice. Previous literature on career development confirms the effect of self-efficacy on career decision-making processes as proposed by SCCT (Lent *et al.,* 2013). SCCT explains that personal inputs such as gender and race may impact a person's self-efficacy and outcome expectations which ultimately will influence an individual's career interests, goals and actions (Lent *et al.*, 1994; 2002). Self-efficacy has been investigated in relation to problems of career exploration (Rogers *et al.,* 2008), career indecision (Gianakos, 2001), and career identity (Gushue *et al.*, 2006). Low self-efficacy, it is asserted, hinders individuals from engaging in productive career processes that lead to the creation of distinct career identities (Hirschi, 2011). Therefore, we argue that strong coping self-efficacy assists women working in STEM to develop a clear sense of their own career identity by promoting exploration and commitment to a particular individual career identity. Therefore, we propose the following:

H2: Coping self-efficacy has a positive impact on the career identities of women in STEM.

The current state of knowledge in academic research falls short of giving clear explanation of the precise relationship between protean attitude and career identity. However, the results of empirical studies indicate that elements related to career identity such as career insight (De Vos and Soens, 2008), career decidedness (Creed, Macpherson, and Hood, 2011) and identity awareness behaviours (Briscoe *et al.*, 2012) are each positively associated with protean attitude. Conflicting accounts still exist in the literature with some researchers indicating that career identity functions as a facilitator of protean attitude (Hall, 2002; Waters *et al.,* 2015) whereas others contend that career identity is a result of protean attitude (Greenhaus, Callanan, and DiRenzo, 2008). This study attempts to empirically test the antecedent influence of protean attitude on career identity, thus

contributing to knowledge on the idea that career identity is a consequence of protean attitude. We also contribute to knowledge by attempting to offer more ideas on how to reduce the under-representation of women in STEM careers. We argue that when women possess strong self-directedness and are driven by their own personal values it heightens their sense of career identity which should ultimately enable them to persist and commit more to their careers in STEM. Our research assumes that a protean attitude can increase women's sense of career identity when working in STEM since protean careerists have a high desire to learn and are eager to engage in processes of identity change and adaptation (Hall, 2004). As mentioned earlier, protean attitude consists of values-driven components to career development. Therefore, women with a strong protean attitude are expected to be more active in identity reflection and clarification of personal values that will enable them to enhance their career identity and as a result direct their career more efficiently and effectively (Briscoe *et al.*, 2012). Careers researchers argue that a protean attitude involves self-directed approaches to careers. Women with strong protean attitude can be expected to be more proactive in gathering information on job opportunities, obtaining feedback on their career plans and reviewing information regarding career development that will support and strengthen their career identities. Therefore, we propose the following hypotheses:

H3: Protean attitude has a positive impact on the career identities of women working in STEM fields.

H4: Protean attitude mediates the relationship between coping self-efficacy and career identity of women working in STEM fields.

(Insert Figure 1_about here)

Method:

Procedure and Participants

The data were collected using a survey. The first section of the survey collected demographic data on the respondents. The second section contained measures of the three constructs in the theoretical framework, namely, coping self-efficacy, protean attitude and career identity. The survey targeted women who have worked in STEM industries for at least two years. Several universities were contacted for approval to administer the survey among their female alumni in the UAE and Lebanon. The survey was also shared on several professional platforms aimed at empowering women in STEM in the MENA region.

G*Power (3.1.9.4) (Faul et al., 2009) was used to assess sample size adequacy in the dataset.The results were computed using multiple regression analysis with a significance threshold of 0.05, an effect size (f^2) of 0.05, and power set of 0.95. According to the findings, 312 total respondents were necessary for our model to produce reliable results. However, the total number of respondents were 488 employees. Six records were removed from the dataset because they were extreme outliers (± 3) based on z-score cutoffs for each construct **(**Thompson, 2006). Demographic information about the respondents is provided in Table I.

(Insert Table I about here)

Measures

Coping Self-Efficacy

Coping self-efficacy was measured using the scale developed by Chesney *et al.* (2006). It contains 26 items on a ten-point Likert scale (0= Cannot do at all, 5= Moderately certain can do,

10= Certain can do). The scale contains 3 dimensions. An example item from the first dimension, Problem-focused coping is, “Sort out what can be changed, and what cannot be changed”. An item from the second dimension, Stop unpleasant emotions and thoughts is, “Talk positively to yourself”. An item from the third dimension, Get support from friends and family, is, “Get friends to help you with the things you need”. The Cronbach’s alpha for the scale is .924

Protean Attitude

The protean attitude scale measures both values-driven and self-directedness and is adopted from Briscoe and Hall (2006). It contains 14 items measured on a five-point Likert scale with 1= to little or no extent and 5= to a great extent. An example of a self-directedness item is “Overall, I have a very independent, self-directed career”. An example of a values-driven item is “What I think about what is right in my career is more important to me than what my company thinks”. The Cronbach’s alpha for the scale is .836

Career Identity

The seven items measuring career identity were adopted from Day and Allen’s (2004) Career Motivation Scale. Day and Allen’s scale was originally adopted from two other scales, Noe et al’s (1990) and London’s (1993) Career Motivation scales. Day and Allen (2004) supported the content adequacy of the revised measures in a pilot study. The Cronbach’s alpha for the scale is .791. Examples of items that measure career identity are “I have volunteered for important assignments with the intent of helping to further my advancement possibilities” and “I have requested to be considered for promotions”.

Control variable

Since all samples are women, we controlled for the following variables, age, marital status, field of work, and professional level.

Results

Descriptive Statistics

The mean, standard deviation, skewness, kurtosis, and Pearson correlations (r) of the study variables are presented in Table II. Protean attitude was the highest positive correlation with career identity ($r = .470$, $p < .001$), followed by coping self-efficacy and protean attitude ($r = .406$, $p < .001$), and finally coping self-efficacy and career identity ($r = .378$, $p < .001$). The correlation results show initial support for our proposed framework. We assessed the normality test (skewness and kurtosis), values for the main constructs (coping self-efficacy, protean attitude, and career identity), were between ±1.96 ranges which are considered compatible with a normal distribution (Gravetter *et al*., 2016).

(Insert Table II about here)

Common method variance

Common method variance (CMV) is well recognized as an interactive approach (Malhotra *et al.*, 2017). Following Harman's single-factor test, the total variance was extracted with the unrotated factor method indicating that CMV is 24.925% of variation which is below the 50% cut-off. Therefore, we assert that CMV is not a problem in this study.

Confirmatory factor analysis

The hypothesized model outperformed the two-factor and one-factor models in terms of goodness-of-fit (Table III). This suggests that the hypothesized model is fit, with $\chi 2$ (864) = 2538.805 and p value is < 0.001

(Insert Table III about here)

Discriminant validity

The square root of the average variance extracted of each construct was calculated with the following results: coping self-efficacy=0.607, protean attitude=0.514, and career identity=0.665. These results are greater than the correlations between the main constructs, hence, it can be concluded that discriminant validity is established for this study (Table II).

Hypotheses test

A regression coefficient was used (Model 4) (Hayes, 2018) to examine the mediation effect of protean attitude on the relationship between coping self-efficacy and career identity. For Hypothesis 1, we find that the effect of coping self-efficacy on protean attitude is positive and significant (B= 0.385, SE= 0.041, t= 9.435, p <0.001). Testing Hypothesis 2, we find that the direct relationship between coping self-efficacy and career identity is positive and significant (B= 0.219, SE= 0.043, t= 5.143, p <0.001). For Hypothesis 3, we find that the effect of protean attitude on career identity is positive and significant (B= 0.372, SE= 0.044, t= 8.453, p <0.001). Lastly, analyzing Hypothesis 4, we find that coping self-efficacy positively and significantly effects career identity through the mediator protean attitude (B= 0.143, SE= 0.022). Since zero does not fall between the confidence interval range [0.103, 0.188], we conclude that protean attitude mediates

the relationship between coping self-efficacy and career identity at the 5% level. The regression coefficients result of our model are shown in Table IV. Moreover, the total effects of coping self-efficacy on career identity are (B= 0.362, SE= 0.042, t= 8.641, $p < 0.001$) as indicated in Table V.

(Insert Table IV about here)

(Insert Table V about here)

Discussion

Main Findings and Interpretations

Briscoe and Hall (2006) explain that protean career attitudes are enacted differently in non-western cultures. The agentic and self-management aspects which are at the core of protean attitude indicate that the unique context of different countries or regions will result in protean attitude being manifested in culturally distinctive ways (Weir and Henry, 2013). The Middle East region is well known for emphasizing social position and family connections. Therefore, the structural context where careers are shaped will be highly sensitive to the degree to which individuals feel free to be individually flexible and able to adjust to changes in work conditions over a period of time. In addition, personal values which are a major dimension of protean attitude are influenced by cultural and societal norms and behaviors. A principal assertion of protean theory is that an individual is capable of adapting to different contexts. Based on this line of argument, our results indicate a positive effect of protean attitude on career identity. These findings reiterate results from

previous studies (e.g. Briscoe *et al.,* 2012; Hall, 2004; Hall, 2002; Waters *et al.,* 2015). The results also show that coping self-efficacy positively enhances a protean attitude (e.g. Blaique and Pinnington, 2021; Hall, 2004; Waters *et al.,* 2015) and career identities of women in STEM (Hirschi, 2011; Gushue *et al.,* 2006). The results also support the mediating effect of protean attitude on the relationship between coping self-efficacy and career identity. The new social movements and changes taking place in the Middle East region that some scholars refer to as the Arab Spring might be one possible explanation for the important role that protean attitude seems to play among the sample of this study. Governments across several countries within the region have introduced new initiatives, policies and regulations designed to advance more women in education and in the workplace. In addition to many new formal and informal networks aiming to support and empower women in the workplace have arisen. These changes could each have played some role contributing to stronger belief amongst women in the career efficacy of self-management. Our analyses indicated no effect between marital status of the respondents on any of the constructs under investigation. One possible explanation for this finding is that the traditional centrality of the Arab family is evolving and encouraging more married women to participate in employed work.

The results of the study also indicate a positive relationship between coping self-efficacy and protean attitude which is consistent with other previous studies (Nasta, 2007; Wong and Rasdi, 2015). Previous research on Arab women argues that self-efficacy is one of the main career facilitators and is more influential than is "lack of culture fit" a barrier to their labor force participation (Kauser and Tlaiss, 2011; Metcalf and Mutlag, 2011). In a study conducted by Islam (2019) on Arab women executives, she explains that self-efficacy was one of the primary factors that they believed was responsible for their career success. Women with high coping self-efficacy

are expected to show stronger protean attitude towards their careers, individual work performance and personal accomplishments. Due to their high coping self-efficacy, we interpret that women with protean attitudes will be more confident and proactive in managing their career development despite the challenges they may face as an under-represented group working in a male-dominated industry.

The results also indicate a positive relationship between coping self-efficacy and career identity. This is consistent with previous research (Lent *et al.*, 1994; 2003; Rogers *et al.*, 2008; Koumoundourou *et al.*, 2012). Women who perceive themselves as capable of coping with the challenges and barriers of working in STEM, will be able to build a clear and strong sense of their career identity.

The study also tests the relationship between protean attitude and career identity. The results show that protean attitude positively affects career identity. This result is consistent with several studies (Gubler *et al.*, 2014; Herrmann *et al*., 2015; Hirschi *et al.*, 2016; Waters *et al.*, 2014). Based on the idea that protean attitude is a values-driven approach to career management and development, protean attitude is expected to relate positively to proactive career behaviors such as identity reflection and self-exploration that aid in directing one's career. Self-exploration is embedded within "protean" and self-directed attitudes (Hall, 1976; 2002); thus, individuals who tend to be more self-directed are expected to exhibit a higher level of identity awareness (Hall et al., 1997). Having a protean career attitude entails that individuals possess a strong values-driven attitude, that is they are motivated by personal career standards which is also strongly related to self-directed attitudes (Briscoe et al., 2006). Career identity provides affective and cognitive resources enabling an individual to be continually proactive and adaptive to change. Accordingly, a protean attitude is expected to positively enhance career identity (Briscoe et al., 2012).

Finally, the results of the study also support H4 which tests the mediating effect of protean attitude on the relationship between coping self-efficacy and career identity. Self-efficacy is considered a crucial source of proactive motivation and agency (Bandura, 2001). Studies have shown that high efficacy stimulates action and strengthens persistence towards an identified goal (Locke and Latham, 2002). Therefore, coping self-efficacy will tend to support engagement in a proactive career attitude that could facilitate protean self-exploration and contribute to career identity.

Contribution of the Study:

The concept of protean attitude has been gaining popularity amongst academic researchers and careers and human resource management practitioners. However, there is still a need for additional advancement of theory and rigorous testing of relationships to address recent criticisms in the literature on new careers. More research is especially needed on women's careers in addition to developing research designs that respond to criticisms about the inconclusive results of new construct relations (Rodrigues and Guest, 2010). Therefore, we endeavoured to address some of the main challenges related to identifying antecedents and outcomes of the protean attitude. The study's results contribute to the careers literature by clarifying and examining existing relationships between protean attitude, coping self-efficacy and career identity. These findings also contribute to the literature on women working in STEM and protean career attitude by empirically demonstrating that cognitive factors such as coping self-efficacy is a significant predictor of protean attitude (Millar and Shevlin, 2007) and that career identity can function as a consequence of protean attitude. The empirical study also contributes to the SCCT by re-affirming the important role that self-efficacy plays in enhancing and shaping career identity (Lent *et al*., 1994; 2003). The contribution to theory is in two ways, first, it assesses the applicability of SCCT in a non-western

context, and second, it incorporates protean career theory in an empirical study using a wider range of constructs (Brown and Lent, 2019).

Finally, this research contributes to the gender and careers literature by identifying cognitive strategies salient to women working in STEM as they move through their careers and have to face many obstacles along the way. We also identify career-related attitudes critical to shaping a clear career identity. Therefore, we identify attitudes and strategies that strengthen women's approaches towards their careers and advance their persistence in STEM careers.

Implications for Practice:

Based on the findings of this study, self-efficacy remains an important construct that career counsellors could focus on more concertedly in career interventions. Career advisors might use the sources of self-efficacy namely mastery experiences, vicarious learning, social persuasion and emotions regulations (Bandura, 2001) to enhance and help shape career identity for women. Human resource managers and career counsellors are advised to offer opportunities for women that would help strengthen their self-efficacies since self-efficacy acts as a proximal antecedent for protean attitudes (Enache *et al*., 2011). Facilitating a learning culture within the organization can enhance employees' self-efficacies and advance empowerment (Blaique, Ismail and Aldabbas, 2022). Women who are driven by a set of clear values and who are able to manage their careers independently will be able to engage in worthwhile self-exploration and self-directed behaviours and clarify a sense of identity for themselves in terms of their careers.

In order to achieve better employment, equal opportunities and empowered women in the MENA region, political, legislative and regulatory reforms need to be implemented (OECD, 2014). An in-depth review and process of consultation on gendered norms and practices prevailing in the

country would be useful for researching and creating new government policies for change to cultural attitudes. Gendered norms, processes, practices and policies reinforce negative socio-cultural attitudes about women and work. In addition, education reforms can be made to adjust course curricula and introduce more secondary and higher education internship programs advancing gender parity in the workplace. Organizations would be well advised to offer a wider range of incentives and standards for eliminating barriers to women's equal pay and representation by advancing equal pay policies and fairly increasing women's salaries. Women aged between 35 and 65 constitute a sizeable proportion of the workforce in the Middle East and are disadvantaged by expectations of early career retirement. Legislative and regulatory bodies are encouraged to raise retirement ages since the current age limit is unrealistic, particularly taking into consideration the substantial improvements to life expectancies in the region. While many women, especially those working in STEM fields are at the risk of quitting their careers due to childcare and other family responsibilities, labor laws in the region can help to retain married women by offering them flexible working conditions and additional maternity benefits. A final recommendation is for governments to implement more quotas and affirmative action programs that lead to employing more women in STEM careers (Rutledge, 2011).

Finally, for HR, careers and training practitioners engaged in designing or facilitating career interventions, it would be worthwhile giving some attention to individual differences in attitudes and behaviours. If available, test assessment scores for coping self-efficacy, protean attitude and career identity will give one indication of women's individual preferences in approach to career development and achievement. Also, managers planning formal career interventions or who simply are responding informally should act flexibly, cognizant of the extent that groups of women of dissimilar ages are at different stages in their careers. While age and career stage are not

invariably linked, even so, age may be significantly associated with coping self-efficacy, protean attitude and career identity.

Females who work in STEM should be mindful of attitudes which enable them to continuously assess their own skills and knowledge, especially given the fact that STEM domains are dynamic and continuous learning and development is a key aspect for individual success. Individuals working in these domains are required to remain up-to-date with new advances in work practices, scientific and technical knowledge and applications. Consequently, women are required to seek learning opportunities autonomously if not offered by their organizations. This enables them to be flexible and employable without being highly dependent on a specific organization. They are encouraged to be alert and knowledgeable about new changes and advancements occurring in the industry. Proactivity is an important characteristic of the protean attitude. Females should also vigorously participate in their work environment and search for challenging opportunities that may facilitate career growth. Adaptability to changing environments enables them to succeed when facing unanticipated changes in their industries. Organizations should adopt some strategies to advance employees' autonomy which will eventually reflect positively on the organization in terms of maintaining individuals who are continuously building their skillset and knowledge. Senior management in organizations should recognize the role of protean attitude that helps employees to adapt in dynamic markets as they seek to define and find meaning in their careers and success.

Limitations and Future Research:

The study has several limitations. First, the sample is based on women employed in the UAE and Lebanon. Future studies could focus on wider geographical coverage for data collection and sampling. Our sample constituted exclusively women and future studies could include both men

and women as participants comparing the results based on gender variances. In addition, future studies can use qualitative methodologies to explore antecedents and consequents of protean attitude in a more exploratory and in-depth manner. Other limitations are the use of cross-sectional survey methods and self-report data. Future research could implement a longitudinal design based on more data sources and levels to identify more thoroughly and precisely developmental processes of coping self-efficacy and its impact on protean attitude and career identity during different career stages.

Future research could investigate the significant problem whether protean attitudes to career encourage women to persist with employment in organizations that disadvantage them, or conversely is high protean attitude more likely to encourage women to move away from unsatisfactory organizational circumstances into jobs that offer greater autonomy based on, for example, project-based working, consultancy, self-employment, part-time permanent jobs? And in either case, to what extent over time does protean attitude influence the extent of women's under-representation in STEM?

The variables assessed in this study can also be further explored as predictors of career outcomes. Future research should investigate self-efficacy as a predictor of engagement in career exploration and decision-making activities (Lent & Brown, 2013). It would also be interesting to research self-efficacy using different forms of organizational and occupational commitment, namely affective, normative and continuance (e.g. Blaique et al., 2022). Protean attitude is believed to be a predictor of employment intention and employability (Nimmi, 2020). Further studies examining this relationship could offer additional insight on women working in STEM fields. Finally, it would be useful to explore career identity as a predictor of STEM career choices (Godwin et al., 2016).

Conclusion:

In conclusion, the current study provides an explanation of the link between coping self-efficacy and protean attitude based on a sample of women employed in STEM. The study also examined the mediating effect of protean attitude on the relationship between coping self-efficacy and career identity. The findings support the importance of coping self-efficacy as a cognitive factor in shaping career identity. The results also support the importance of new career orientations and protean attitudes, among women working in STEM and indicate its predictive power for career identity. Theoretically, this study confirms the relevance of SCCT for explaining the implications of cognitive, affective and individual attitudes on career identity. It adds to protean career theory by empirically testing antecedent and consequent variables. The study supports the significance of having a protean attitude for defining career identity, which is known to be important for career success. We conclude that women who have a strong sense of their values and believe in their abilities to direct their careers, are more likely to achieve a clear and efficacious image of themselves working long-term in STEM.

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Table 1 Demographic information

Variables	Frequency	Percent
Field		
-Engineering	284	58.92%
-Technology	158	32.78%
-Science	35	7.26%
-Math	5	1.04%
Material status		
-Single	342	70.95%
-Married	127	26.35%
-Others	13	2.70%
Professional level		
-Coordinator	174	36.10%
-C Level	103	21.37%
-Manager	102	21.16%
-Administrativve	79	16.39%
-Director	24	4.98%
Ages		
- 20-30 years old	364	75.52%
- 31-40 years old	96	19.92%
- 41-50 years old	14	2.90%
-51-60 years old	8	1.66%
Gender		
- Female	482	100%

Table 2. Mean, Standard Deviation, Skewness, Kurtosis, and Person correlations (r)

Variables	CSE	PAT	CAI	Age	Status	Professional	Field
CSE	1						
PAT	.406**	1					
CAI	.378**	.470**	1				
Age	.096*	.163**	.177**	1			
Status	.015	.018	.040	.424**	1		
Professional	.019	-.015	.050	.221**	.092*	1	
Field	.003	-.008	-.012	.061	.070	.138**	1
Mean	7.293	4.024	3.924	28.425	1.317	2.328	1.504
Std. Deviation	1.296	0.559	0.665	5.992	0.521	1.254	0.677
Skewness	-.164	-.284	-.427	-	-	-	-
Kurtosis	-.302	-.460	-.269	-	-	-	-

Notes: *p<0.05; **p<0.001. CSE: Coping Self-Efficacy; PAT: Protean Attitude; CAI: Career Identity.

Table 3 Regression coefficients, standard errors and model summary information

Antecedents	Consequent											
	M (Protean Attitude (PAT))						Y (Career Identity (CAI))					
	B	**se**	**t**	**p**	**LLCI**	**ULCI**	**B**	**se**	**t**	**p**	**LLCI**	**ULCI**
CSE	0.385	0.041	9.435	0.000	[0.305,	0.465]	0.219	0.043	5.143	0.000	[0.135,	0.303]
PAT	_	_	_	_	_		0.372	0.044	8.453	0.000	[0.285,	0.458]
Age	0.025	0.007	3.363	0.001	[0.010,	0.040]	0.015	0.007	2.121	0.034	[0.001,	0.030]
Status	-0.090	0.084	-1.071	0.285	[-0.254,	0.075]	-0.022	0.080	-0.273	0.785	[-0.180,	0.136]
Profession	-0.039	0.033	-1.210	0.227	[-0.103,	0.025]	0.027	0.031	0.854	0.394	[-0.035,	0.088]
Field	-0.012	0.059	-0.204	0.838	[-0.128,	0.104]	-0.028	0.057	-0.494	0.621	[-0.139,	0.083]
constant	-0.464	0.209	-2.221	0.027	[-0.874,	-0.054]	-0.421	0.201	-2.089	0.037	[-0.816,	-0.025]
	$R^2 = 0.185$						$R^2 = 0.274$					
	$F(5,476) = 21.592, p < .001$						$F(6,475) = 29.851, p < .001$					

Notes: B: Beta Coefficient; CSE: Coping Self-Efficacy; CPA: Protean Attitude; CAI: Career Identity; M: Mediator; Y: Dependent Variable; SE: Standard Error; LL: Lower Level; UL: Upper Level; CI: Confidence Interval.