



How protean career orientation affects career decidedness: The mediating role of career adaptability and career decision self-efficacy

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Abstract

This study investigated the relationship between protean career orientation and career decidedness and the mediating roles of career adaptability and career decision self-efficacy in a sample of Iranian agriculture university students ($N = 210$). The results indicated that protean career orientation was positively related to career adaptability and career decision self-efficacy. The results also revealed that career decision self-efficacy played a mediating role in the relationship between protean career orientation and career decidedness, whereas no such mediation effect was observed for career adaptability. Additionally, career adaptability and career decision-making self-efficacy sequentially mediated the association between protean career orientation and career decidedness.

Keywords Career decidedness · Protean career orientation · University students

Résumé

Cette étude a examiné la relation entre l'orientation de carrière protéenne et la décision de carrière et les rôles de médiation de l'adaptabilité de carrière et de l'auto-efficacité de la décision de carrière dans un échantillon d'étudiants iraniens en agriculture universitaire ($N = 210$). Les résultats ont indiqué que l'orientation de carrière protéenne était positivement liée à l'adaptabilité de carrière et à l'auto-efficacité de la décision de carrière. Les résultats ont également révélé que l'auto-efficacité de la décision de carrière jouait un rôle de médiation dans la relation entre l'orientation de carrière protéenne et la décision de carrière, tandis qu'aucun effet de médiation n'a été observé pour l'adaptabilité de carrière. De plus, l'adaptabilité de carrière et l'auto-efficacité de la prise de décision de carrière ont séquentiellement médié l'association entre l'orientation de carrière protéenne et la décision de carrière.

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Zusammenfassung

Diese Studie untersuchte die Beziehung zwischen proteanischer Karriereorientierung und Karriereentschlossenheit sowie die vermittelnden Rollen von Karriereanpassungsfähigkeit und Selbstwirksamkeit bei Karriereentscheidungen in einer Stichprobe von iranischen Agraruniversitätsstudenten ($N = 210$). Die Ergebnisse zeigten, dass die proteanische Karriereorientierung positiv mit der Karriereanpassungsfähigkeit und der Selbstwirksamkeit bei Karriereentscheidungen zusammenhing. Die Ergebnisse zeigten auch, dass die Selbstwirksamkeit bei Karriereentscheidungen eine vermittelnde Rolle in der Beziehung zwischen proteanischer Karriereorientierung und Karriereentschlossenheit spielte, während kein solcher Vermittlungseffekt für die Karriereanpassungsfähigkeit beobachtet wurde. Darüber hinaus vermittelten die Karriereanpassungsfähigkeit und die Selbstwirksamkeit bei Karriereentscheidungen sequenziell den Zusammenhang zwischen proteanischer Karriereorientierung und Karriereentschlossenheit.

Resumen

Este estudio investigó la relación entre la orientación de carrera proteica y la decisión de carrera, y los roles mediadores de la adaptabilidad de carrera y la autoeficacia en la toma de decisiones de carrera en una muestra de estudiantes universitarios de agricultura iraníes ($N = 210$). Los resultados indicaron que la orientación de carrera proteica estaba positivamente relacionada con la adaptabilidad de carrera y la autoeficacia en la toma de decisiones de carrera. Los resultados también revelaron que la autoeficacia en la toma de decisiones de carrera jugó un papel mediador en la relación entre la orientación de carrera proteica y la decisión de carrera, mientras que no se observó tal efecto de mediación para la adaptabilidad de carrera. Además, la adaptabilidad de carrera y la autoeficacia en la toma de decisiones de carrera secuencialmente mediaron la asociación entre la orientación de carrera proteica y la decisión de carrera.

Introduction

Deciding on one's career is one of the most complex and important decisions faced by people during their lives, with significant effects on different aspects of their lives. With the career decision, an individual not only selects a job choice but also consciously or unconsciously decides on such issues as lifestyle, status, the need for continuing education, how they will spend their free time, and whom they will work with (Gati & Kulcsar, 2021; Kulcsár et al., 2020). In the age of globalization, the aggravation of uncertainty and the lack of job security in the job market has made it much more difficult for students and graduates to select a job and career. When thinking about their future career, they feel reservations and have low self-confidence in determining a particular career (Ginevra et al., 2016; Li et al., 2019). Career decidedness refers to the degree to which one is confident about the future career path that they intend to pursue and develop after education (Restubog et al., 2010). Previous research has indicated that career decidedness has a positive relationship with the

well-being and successful transition of students from the university to the workplace (Lounsbury et al., 2005). Those who decide on their career paths can better detect career opportunities within their selected field of work and better enjoy their career and life (Hirschi, 2011; Uthayakumar et al., 2010). However, limited research exists on the career decidedness of students, particularly among Iranian students, and the available information on this subject is quite scarce. Further investigation is necessary to effectively support the significant number of undecided students. Failure to address career decidedness during early adulthood could significantly impact future career paths (Mojgan et al., 2013). Therefore, it is critical to investigate the factors influencing this issue.

A factor that can play an essential role in the students' career decidedness in today's variable and ambiguous job and career conditions is protean career orientation (PCO; Li et al., 2019; Steiner et al., 2019). This orientation reflects an individual's ability to adapt to change and independently manage their career trajectory (Hall et al., 2018), which is essential for navigating the unpredictable environments of the twenty-first century, whether in work or study (Hirschi & Koen, 2021). As Blaique et al. (2023) state, an individual with PCO will be liable to and capable of adapting to variable career status. Even though this concept was introduced in the 1970s and plays a key role in the school-to-work transition, career planning, and professional behaviors, little research has addressed it (Li et al., 2019; Zhang et al., 2023). Several scholars have emphasized the need to study the effect of such orientation on people's career consequences (Chui et al., 2022).

This study aimed to explore the relationship between PCO and career decidedness, as well as the underlying mechanisms, among agriculture students in Iran. On the basis of Career Construction Theory (CCT; Savickas, 2005), we proposed that career adaptability (CA) could act as a significant mediator in this relationship. Furthermore, drawing from Social Cognitive Career Theory (SCCT; Lent et al., 1994), we suggested that career decision self-efficacy (CDSE) may also serve as a mediator (Figure 1). The two constructs of CDSE and CA are conceptually linked to PCO, and both involve self-regulation and a feeling of control over one's career. (Ginevra et al., 2016; Rudolph et al., 2017). These two constructs are extensively considered important sources for successfully directing career development processes and

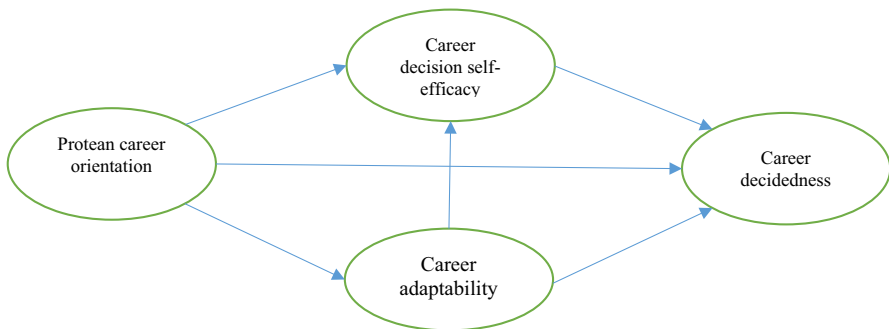


Figure 1 Research framework

career decidedness (Stead et al., 2022). They are also important sources for coping with future career barriers and dominating career transfers, such as the transition from school to the workplace in challenging environments (Duffy et al., 2015; Kvasiková et al., 2023; Savickas & Porfeli, 2012). The need for CA and CDSE has considerably increased in the local and global job markets in recent years (Maree, 2017). Employers look for employees who can rapidly adapt to changes and trust their abilities to address the challenges and changes during their career path (Carter, 2019). Thus, it is crucial to ensure that job seekers, especially graduate students who are on the verge of entering the job market, possess what they need for their professional success (Hamzah et al., 2021). So, the relationships of these constructs must be scrutinized empirically, too (Li et al., 2019).

It should be noted that, so far, research has primarily concentrated on investigating the predictors and outcomes of PCO in a fragmented way, without elucidating the underlying mechanisms that could account for the connections with significant career results (Kim et al., 2023). In addition, the proposed model was tested with a sample of agriculture students in an Iranian university. Iran offers a favorable context for investigating career outcomes in an agriculture sample for the following reasons.

First, the few studies on PCO and its career consequences have mostly been conducted in Western countries (Gubler et al., 2014). Scholars suggest that cultural differences can impact students' vocational behaviors and career decision-making (Li et al., 2019; Karimi et al., 2021). They argue that people in collectivist and family-oriented cultures (such as Iran) may have a weaker association between PCO and career outcomes, in contrast to individuals in individualist cultures (such as Western countries; Gubler et al., 2014). In collectivist cultures, individuals prioritize shared goals and external roles, while in individualistic cultures, they emphasize personal goals and internal attributes (Markus & Kitayama, 1991; Triandis, 1995). These cultural distinctions influence the development of individual personalities (Triandis, 2001). For instance, in collectivist cultures, individuals tend to rely more on parental guidance when making career decisions, whereas in individualistic cultures, they have more autonomy in their career choices, potentially leading to greater satisfaction and happiness with their career decisions (Noordin et al., 2002). In this respect, it is essential to study how well the research model applies to Iranian university students. This will help us understand how culture influences its effectiveness and make it more applicable to a wider range of people.

Second, this research is important in Iran, where the employment prospects for university graduates, particularly in agriculture-related fields, are unfavorable, with an unemployment rate of 25.7%, exceeding the average. Indeed, the unemployment rate of agricultural graduates in Iran is higher than that of the graduates of other fields (Ataei et al., 2024; Karimi, 2020). Additionally, it is projected that the agricultural job market in Iran requires a maximum of 110,000 graduates annually, while the number of agricultural graduates amounts to 230,000 per year, resulting in a lack of employment opportunities for approximately 25–52% of the graduates (Vatankhah & Rezaei Moghaddam, 2015). Therefore, agriculture students in Iran are incurred with a high level of uncertainty and pressure in their career decision-making process, turning PCO, CA, and CDSE into important constructs for promotion. Understanding the underlying mechanisms of the relationships between these

constructs is essential for developing effective strategies to enhance students' career outcomes.

Third, the Iranian agricultural higher education system tends to focus more on theoretical aspects and academic achievement rather than practical skills and career development, neglecting the importance of preparing students for their future careers (Mojarradi & Karamidehkordi, 2016). In addition, the career consultation and guidance discipline has not been well developed in Iran, and there is no career consulting service in most universities (Movahedi, 2017). It is thus important to develop a stronger empirical and theoretical basis for supporting educators and job consultants who help university students make informed career decisions and be well-prepared for their future.

Theoretical framework and hypotheses

SCCT and CCT

SCCT (Lent, 2021; Lent et al., 1994) is an extension of Bandura's (1986) Career Development Theory, which offers a framework for understanding, describing, and predicting individuals' actions in developing their career interests, making occupational choices, and achieving career success. It suggests that individuals can exercise self-direction in their career development through self-efficacy beliefs, outcome expectations, and personal goals (Lent, 2013). Self-efficacy pertains to an individual's belief in their ability to perform specific tasks, while outcome expectations focus on the anticipated results of engaging in certain behaviors. Together, self-efficacy and outcome expectations play a vital role in guiding human behavior (Bandura, 1986). In addition, personal goals represent an individual's objectives for engaging in activities and reflect their sense of agency within both personal and occupational domains. The positive pursuit of these goals enhances self-efficacy beliefs and outcome expectations (Lent, 2013). These three cognitive person variables—self-efficacy beliefs, outcome expectations, and personal goals—interact with various personal factors (such as personality) and environmental elements (such as social support) to provide a comprehensive understanding of career development (Lent, 2021).

Another theory that offers a fresh perspective on vocational behavior and career development amidst rapid changes and unpredictability is CCT (Savickas, 2005, 2021). CCT explains that individuals undergoing transitions tend to gradually integrate into their life-related roles over time, conceptualized as a continuum of adaptation processes. This continuum begins with adaptive readiness (adaptivity), progresses to adaptability resources (adaptability), and then evolves into adaptive responses (adapting), ultimately culminating in adaptation results (adaptation). The theory posits that individuals vary in their levels of willingness (adaptive readiness) and ability (career adaptability) to foster positive beliefs and career-related behaviors (adapting responses) that address changing environmental contexts. This variation plays a critical role in achieving successful integration and fit within work roles (adaptation results). In essence, higher levels of adaptation are anticipated for those

who are both willing (adaptive) and capable (adaptability) of engaging in behaviors that respond effectively to evolving conditions (adapting); Savickas, 2021; Savickas & Porfeli, 2012; Šverko & Babarović, 2019). Support for this sequential model has been demonstrated through longitudinal studies involving undergraduate students (Hirschi et al., 2015), and career adaptability, as framed by CCT, has been positively correlated with numerous favorable vocational outcomes (Johnston, 2018; Kvaskova et al., 2023). This highlights the critical role of adaptability in successfully navigating an individual's career path in a dynamic environment.

Drawing from SCCT and CCT, in this study, the PCO was considered as an indicator of adaptive readiness. Empirical evidence highlights significant relationships between this protean orientation and personality traits such as conscientiousness, openness to experience, and proactive personality (Wiernik & Kostal, 2019). These traits are often considered indicators of adaptivity within CCT and are also recognized as important variables in SCCT. In this research, the adaptability dimension from CCT (i.e., CA) and the self-efficacy dimension from SCCT (i.e., CDSE) were considered as mediating variables, while career decidedness was viewed as the adaptation outcome. This framework formed a mediating model, depicted in Figure 1.

PCO, CDSE, and career decidedness

SCCT provides a suitable framework for understanding the role of PCO in individuals' career decision-making. Based on this theory, personal resources, such as individuals' career orientation, contribute to the development of self-efficacy in making career-related decisions—which is also referred to as CDSE. This, in turn, enhances individuals' level of career outcomes such as career decidedness. In other words, SCCT suggests that CDSE acts as a mediator between personal factors (e.g., PCO) and career-related outcomes (e.g., career decidedness; Lent et al., 1994; Penn & Lent, 2019).

Career orientation as a personal career self-concept is a major factor that influences career development (Coetzee & De Villiers, 2010). Depending on their career orientation, people base their career decisions on values, preferences, and needs (Ginevra et al., 2016). Among different career orientations, PCO has drawn the attention of many researchers in the field of management, professional psychology, and organization in the last 2 decades (Bravo et al., 2017; Fearon et al., 2018; Ngo & Li, 2018). PCO predicts how people effectively adjust to changes in their careers (Hall, 2018). People who have such orientation put their effort into their personal growth and development and have a strong tendency toward independence and self-actualization (Gasteiger, 2007). These people are flexible and learning-oriented in their careers and adjust their careers according to their personal values to attain success (Hall, 1996).

Previous research has revealed that PCO has a positive association with career decidedness (Li et al., 2019). Students with higher PCO have a stronger tendency to seek out information and resources related to their careers, are more adapted to the variable economic environment, and have more trust in their professional choices (Fearon et al., 2018; Herrmann et al., 2015). Compared with studies with lower

PCO, they have fewer problems in the career decidedness process and are more confident in their future careers (Li et al., 2019). Conceptually, PCO is closely related to attitude and behavioral variables (e.g., self-efficacy and adaptability), which seem to play a crucial role in facilitating career development (Hall, 2004; Waters et al., 2014; Zhang et al., 2023). However, the relationships of these variables have not been clarified in the literature empirically, which is a key gap in the career literature (Herrmann et al., 2015; Hirschi et al., 2017; Zhang et al., 2023). This research focuses on two important variables that are conceptually related to PCO: CDSE and CA (Figure 1).

Self-efficacy plays a crucial role in career adaptation processes (Betz, 2004). This concept, which is a component of the cognitive-social theory, refers to the individual's beliefs about successfully performing a certain task or behavior (Bandura, 1977). This belief not only motivates individuals to set ambitious goals but also influences their level of effort and perseverance in achieving those goals (Bandura et al., 2001). Conversely, a negative self-perception, particularly characterized by low self-efficacy beliefs, can hinder active exploration of career opportunities and effective career planning (Lent et al., 2017). Bandura states that self-efficacy dictates whether the individual will or will not initiate an activity, how much effort they will put into the activity, and how persistent and determined they will be in dealing with barriers and problems during the activity (Brown & Lent, 2013).

A concept that is related to self-efficacy is CDSE. According to SCCT (Brown & Lent, 2013; Lent et al., 1994), CDSE represents an individual's belief in their ability to successfully do the tasks required for career decidedness (Betz et al., 1996). In other words, it shows the individual's beliefs about their ability to perform various career tasks and career-decidedness-related behaviors (Hackett & Betz, 1995). Low self-efficiency prevents individuals from taking some choices into account or causes them to postpone some career decisions (Lent & Brown, 2006). Penn and Lent (2019) state that CDSE assists individuals in organizing and utilizing relevant skills, experiencing low anxiety, and demonstrating persistence in exploring career and decision-making tasks. Studies indicate that this construct has a positive correlation with career outcomes, including career decidedness (Chuang, et al., 2020; Li et al., 2019; Sheu, 2023). Additionally, people with higher PCO are likely to have higher levels of CDSE because they are more eager to take responsibility for their career development and feel more control and competence in career decidedness (Li et al., 2019). Previous research has also revealed a positive relationship between PCO and CDSE (Baruch, 2014; Li et al., 2019; Ngo & Li, 2018).

As mentioned earlier, on the basis of SCCT, it is assumed that CDSE mediates the effect of contextual and personal factors on career goals, choices, and consequences (Lent et al., 1994; Penn & Lent, 2019). Thus, according to previous studies and SCCT, it can be assumed that PCO as a personal source shapes CDSE and helps career decidedness improvement as a career consequence.

As revealed by previous studies, people with high CDSE are likely to feel fewer career-related barriers and issues (Santos et al., 2018), engage in career exploration activities to a greater extent, and ask for more professional help and support (Li et al., 2019). These perceptions and behaviors facilitate their career decidedness and make them more determined about their future careers (Mao et al., 2016). Although

the mediating role of CDSE between personal and contextual variables and career outcomes has been explored in the literature (Penn & Lent, 2019; Santos et al., 2018; Sheu, 2023), only one study (Li et al., 2019) has specifically looked at the mediating role of CDSE in the link between PCO and career decidedness. Li et al. (2019) conducted a research study among students in Hong Kong and the USA, and their findings showed that CDSE mediated the relationship between PCO and career decidedness. However, there is still limited empirical knowledge on this topic. Thus, we further propose that CDSE has a mediating effect on this relationship among Iranian university students.

H1 PCO is positively related to career decidedness.

H2 PCO is positively related to CDSE.

H3 CDSE is positively related to career decidedness.

H4 The positive relationship between PCO and career decidedness is mediated via CDSE.

PCO, CA, and career decidedness

CCT puts forth another view that helps elucidate the relationship between PCO and career decidedness. This theory assumes that human development proceeds by adapting to the variable environment through self-organizing and integration with their surroundings. (Savickas & Porfeli, 2012). CA is an important component in this theory and plays a critical role in understanding the career decidedness process (Li et al., 2019).

According to CCT (Savickas, 2013; Savickas & Porfeli, 2012), CA refers to psychological resources that people use to coordinate with variable and unpredictable environments and conditions and deal with job problems and challenges. Savickas (2005) states that CA is the possession of attitudes, competencies, and behaviors that help people adjust to their work context in the best possible way. In other words, CA is the process through which people actively design their careers by coping with the variable conditions that they experience in their social contexts (Savickas, 2013). CA is a multifaceted construct with four sources: concern, control, curiosity, and confidence. Concern includes awareness of and readiness to respond to the demands and challenges of the future workspace. Control is the belief in people's responsibility in building their careers. Curiosity makes people reflect on different situations and roles and check the other possible scenarios that they can form. Confidence shows people's beliefs about their ability to realize their career goals, solve problems, and tackle impediments. In general, these four sources enable the individual to adapt to career changes, individual-environment integration, and successful transition throughout their career (Savickas & Porfeli, 2012).

Some scholars propose that CA can be influenced by a feeling of a high level of control (Duffy, 2010; Johnston, 2018). As was already stated, people who have

PCO have a strong sense of control, which can promote CA development. Furthermore, they have a strong attitude toward adapting to the variable environment, bear complete responsibility for their careers, and grasp new opportunities for self-improvement (Herrmann et al., 2015; Ngo & Li, 2018). According to Drenzo and colleagues (2015), PCO enables people to further expand their career-related skills and resources. PCO helps individuals enhance their ability to adapt to career challenges by providing additional psychological resources (Savickas, 1997). Prior studies have reported a positive relationship between PCO and CA (Sathish et al., 2024; Zhang et al., 2023). Similarly, CA is positively related to career consequences such as career decidedness in the literature (Al-Waqfi et al., 2023; Chan et al., 2015; Li et al., 2019; Stauffer et al., 2019). In a meta-analysis, Rudolph et al. (2017) reported that there was a positive association between CA and career-related consequences such as career decidedness. Also, it has been mentioned in the literature that CA can act as a mediator and mediate the effect of personal variables on career outcomes (Chui et al., 2022; Johnston, 2018; Woo, 2018). For instance, Li et al. (2015) found that CA played a mediating role in the association between personality and career exploration. In their most recent study, Chui et al. (2022) reported that CA mediated the association between PCO and career optimism. Zhang and colleagues (2023) also reported that CA acts as a mediator in the connection between PCO and proactive career behaviors among Chinese undergraduate and postgraduate students. It can, therefore, be assumed that students with stronger PCO will be more career adaptive, which will, in turn, strengthen their career decidedness. However, there has been no empirical investigation into the mediating role of CA between PCO and career decidedness, especially among agriculture students. As previously mentioned, the agriculture sector is complex and involves a variety of interdisciplinary activities deeply connected to cultural, social, and political contexts. Consequently, students and graduates in this field must have flexible and adaptable skills to tackle challenges and navigate the ever-changing landscape of the industry. Therefore, the following hypotheses are formulated:

H5 PCO is positively related to CA.

H6 CA is positively related to career decidedness.

H7 The positive relationship between PCO and career decidedness is mediated via CA.

The chain mediating role of CA and CDSE

The Career Construction Model of Adaptation (CCMA: Rudolph et al., 2017) is rooted in CCT and posits that “adaptive readiness mobilizes adaptability resources that shape adapting responses to produce adaptation results” (Savickas et al., 2018, p. 139). This model delves into the process of career construction over an individual’s lifespan, examining the connections among adaptivity dimensions (personality, psychological traits, and orientations), adaptability resources (career adaptability),

adapting responses (engagement in adaptive behaviors), and adaptation outcomes (the results of adaptive behaviors; Rudolph et al., 2017; Šverko & Babarović, 2019). According to this model, an individual's adaptivity has a positive impact on CA, which in turn is positively associated with adapting responses and adaptation outcomes (Rudolph et al., 2017). In our research model (Figure 1), CA, as an adaptability resource, acts as a mediator in the associations between adaptivity (i.e., PCO) and adapting responses (i.e., CDSE), as well as adaptation outcomes (i.e., career decidedness).

The CCMA has been provided as a holistic framework for comprehending the relationship between CA and CDSE (Hirschi et al., 2015; Johnston, 2018; Savickas, 2002). Based on this theory, CA refers to adaptive resources that result in adaptive behaviors and responses, assisting in the completion of developmental tasks in variable conditions (Savickas, 2013; Savickas & Porfeli, 2012). In this model, CDSE is considered an adaptive response derived from CA (Johnston, 2018; Rudolph et al., 2017). Among various adaptive responses, self-efficacy beliefs are considered a crucial factor in career adaptation processes (Betz, 2004; Hirschi et al., 2015). Specifically, CDSE is particularly relevant for career preparation, entry, adjustments, and transitions across career paths, as it reflects individuals' confidence in their ability to employ the necessary strategies for successfully navigating the career decision-making process (Hirschi et al., 2015; Lent & Brown, 2013). Numerous studies have shown that CA has a positive and significant relationship with CDSE (Hamzah et al., 2021; Kvaskova' et al., 2023; Jiang et al., 2022; Lee & Jung, 2022). The results of Stead et al.'s (2022) meta-analysis also revealed a positive association between CA and CDSE. CA can help people exploit their strengths, e.g., self-efficacy, to advance their career planning, self-regulatory skills, and coping skills (Johnston, 2018). However, the chain mediating role of CA and CDSE between PCO and career decidedness has not yet been thoroughly examined. On the basis of the theory and previous research, the following hypothesis is formulated:

H8: CA and CDSE sequentially mediate the relationship between PCO and students' career decidedness.

Method

Participants

A survey was conducted among seniors of agricultural disciplines at Bu-Ali Sina University in the west of Iran. The sample was composed of 120 females (80%) and 80 males (40%). They were selected under the assumption that they would have a relatively clear understanding of their future plans and upcoming career decisions (Karimi et al., 2014). In terms of age, the respondents' mean age was 26.49 years, with a standard deviation (SD) of 1.95. Approximately 65% of students successfully completed the internship course, obtaining work experience and skills relevant to their field of study in agricultural institutions or businesses. Finally, 67% of students reported having job experiences in various areas, including farms, greenhouses, and agricultural enterprises.

Procedure

The participants were chosen using a convenient method, and they were provided with a questionnaire in Persian containing the study's measurement tools. They were requested to read a brief study description on the cover page, and they were assured of anonymity and confidentiality throughout the study. Participation was entirely voluntary, and no incentives were offered. The students completed printed survey forms at the end of the last course session of the semester and submitted them to the course lecturer, resulting in 210 questionnaires being received. Before analysis, the questionnaires were screened for detecting missing data and outliers. Finally, 200 questionnaires were included in the statistical analysis.

Measures

The measures used were adapted from previously validated measures after carefully analyzing the literature. To ensure the face validity of the measures, a standard translation and back-translation procedure was carried out (Breslin, 1970). The content validity of the measures was also approved by a panel of experts. Afterward, a pilot test was conducted with 20 agriculture students not included in the research sample to further refine the instrument. On the basis of their feedback and suggestions, a few minor modifications were made. All items were measured on a five-point Likert scale from 1 (completely disagree) to 5 (completely agree).

Protean career orientation PCO was assessed using the 5-item scale by Baruch (2014). Previous research has employed this scale to assess students' PCO and has indicated a coefficient alpha (α) value ranging from 0.70 to 0.71 (Cortellazzo et al., 2020). Baruch (2014) has provided evidence supporting the validity of this scale. An example item is "I am in control of my own career." In the current study, the Cronbach's α of the scale was 0.66, and the validity of the scale was confirmed through its expected relationships with other study variables, such as career decidedness and CA (Table 1).

Career adaptability To measure CA, the Career Adapt-Ability Scale-Short Form (CAAS-SF; Maggiori et al., 2017) was used, with three items on each of the four subscales. Sample items are "Looking for opportunities to grow as a person" (curiosity), "Thinking about what my future will be like" (concern), "Taking care to do

Table 1 Descriptive statistics and correlation matrix

Variable	Mean	SD	1	2	3
1. Protean career orientation	4.14	0.60	1		
2. Career decision self-efficacy	3.84	0.74	0.36**	1	
3. Career adaptability	4.16	0.61	0.48**	0.40**	1
4. Career decidedness	3.69	0.83	0.35**	0.49**	0.27**

* $p < 0.05$

** $p < 0.01$

things well” (confidence), and “Making decisions by myself” (control). The career adaptability subscales showed strong and positive correlations with various work and career factors, including work engagement, employability, and job satisfaction, thereby demonstrating criterion validity (Maggiori et al., 2017). For the present study, the total score seemed more appropriate because this study seeks to examine CA in relation to other types of sources and does not intend to examine the performance of specific aspects of CA. Maggiori et al. (2017) reported Cronbach’s α 0.90 and established the scale’s validity through its positive associations with job satisfaction and occupational self-efficacy among students. The current study demonstrated strong reliability for the scale ($\alpha = 0.88$). Its validity was confirmed by the expected positive correlations with PCO and CDSE (Table 1).

Career decision self-efficacy CDSE was assessed using the eight-item scale developed by Ho and Sum (2018). A sample item includes “I am able to choose a career that will fit my ability.” Previous studies (Ho & Sum, 2018; Li et al., 2019) have demonstrated that this scale has adequate construct validity and reliability. Cronbach’s α of the scale was 0.80 in this study. Additionally, the scale’s validity was supported by its positive correlations with other relevant study variables, such as PCO and career decidedness (Table 1).

Career decidedness Career decidedness was assessed using a six-item scale developed and validated by Lounsbury et al. (2005). A sample item includes “I have made a definite decision about a career for myself.” Prior research (Chatterjee et al., 2023; Kovačević et al., 2023) has shown that this scale possesses sufficient construct validity and reliability. In the present research, the internal consistency of the scale was 0.85. Furthermore, its validity was supported by the expected positive associations with other study variables, including PCO and CA (Table 1).

Data analysis

The research model and the relationships of the variables were evaluated by structural equation modeling (SEM) using the partial least square (PLS) approach. Data were also analyzed in the SmartPLS 3.0 software (Ringle et al., 2015), which is most widely used in SEM. PLS-SEM is a variance-based approach, which is a more robust statistical method than covariance-based SEM (CB-SEM; Lohmöller, 1989). PLS-SEM has some advantages over CB-SEM such as fewer assumptions for sample size, data distribution, and measurement scales (Chin, 1998). Also, when evaluating the effect of a mediator, PLS is suitable for simultaneously exploring complicated structural relationships between antecedent, mediator, and outcome variables.

In the contemporary literature on the career, researchers use PLS-SEM for data analysis and interpretation (e.g., Ahmad & Nasir, 2023; Ma & Chen, 2022). PLS-SEM is defined in two steps: (i) the assessment of the measurement model and (ii) the assessment of the structural model. To evaluate the measurement model, four criteria were used, i.e., index reliability, internal consistency, convergent validity, and divergent validity (Hair et al., 2021). Factor loadings should be greater than 0.5 (Fornell & Larcker, 1981). For internal consistency, Cronbach’s alpha (α) and composite reliability (CR) values should exceed 0.70.

For convergent validity, the AVE of each construct should be above 0.50. This study used the hetero-trait–mono-trait ratio (HTMT) to examine divergent validity (Henseler et al., 2015). After reliability and validity analysis, the structural model must be evaluated to explore the relationships between the constructs of the proposed research model (Hair et al., 2021). A structural model is evaluated in the following aspects: multicollinearity, the fitness of the global model, the coefficient of determination (R^2), the model's predictive relevance (Stone–Geisser's Q^2), and the significance of the path coefficients (β). To this end, the bootstrapping technique with 5000 resamples was used to test the proposed hypotheses.

PLS-SEM is carried out in two key steps: (i) the assessment of the measurement model. To evaluate this model, four criteria are employed: index reliability, internal consistency, convergent validity, and divergent validity (Hair et al., 2021). Specifically, factor loadings should exceed 0.5 (Fornell & Larcker, 1981). For internal consistency, both Cronbach's alpha (α) and composite reliability (CR) values should be greater than 0.70. In terms of convergent validity, the average variance extracted (AVE) for each construct must be above 0.50. On the basis of the hetero-trait–mono-trait ratio of correlations (HTMT) approach, the conservative criterion for HTMT should be less than 0.85 to support discriminant validity (Henseler et al., 2015). (ii) The second step involves the assessment of the structural model. The criteria for assessing the structural model are multicollinearity, the fitness of the global model, the coefficient of determination (R^2), the model's predictive relevance (Stone–Geisser's Q^2), and the significance of the path coefficients (β). It is suggested to consider the multicollinearity issues through variance inflation factor (VIF) values for all sets of predictor constructs. VIF values should be below the threshold of 3.3 (Shmueli et al., 2019). The fitness of the global model is measured by standardized root mean squared residual (SRMR; Henseler et al., 2016). Although PLS-SEM has no established threshold for SRMR, it is commonly accepted that an SRMR value below 0.10 indicates an acceptable model fit (Hu & Bentler, 1998). According to Cohen (1998), the R^2 values of 0.02, 0.13, and 0.26 are regarded to be small, moderate, and large, respectively. The predictive relevance is checked by calculating the Stone–Geisser criterion (Q^2) using the blindfolding technique (Ringle et al., 2015). Finally, the bootstrapping technique with 5000 resamples is employed to test the proposed hypotheses.

Results

Descriptive statistics

Descriptive statistics and correlation matrix are presented in Table 1. In terms of the study variables, PCO, CA, CDSE, and career decidedness are all significantly positively correlated with each other.

Analysis of the measurement model

The results showed that all factor loadings of measurement indicators range from 0.58 to 0.80, indicating good index reliability. Additionally, the findings revealed that the values of Cronbach's alpha and composite reliability of all constructs were close to or greater than 0.70, indicating that the current study meets the criteria of internal consistency (Table 2). The results also showed that the AVE values of all constructs are close to or greater than 0.5, confirming that the study meets the convergent validity requirement (Table 2). Furthermore, as displayed in Table 3, all HTMT values were below the threshold of 0.85, signifying that the questionnaire used in this study exhibited good discriminant validity.

Analysis of the structural model

Initially, the VIF of the constructs was checked. All VIF values were < 0.3 for the constructs, suggesting the lack of multicollinearity. SRMR value was estimated at 0.09, showing the good fitness of the research model as it is smaller than the reference value of 0.10. Subsequently, R^2 was calculated for the endogenous constructs and yielded values of 0.29 for career decidedness, 0.20 for CDSE, and 0.25 for CA (Table 4). These R^2 values are considered relatively high and acceptable within the context of this study. Furthermore, the results revealed that all Q^2 values were $>$

Table 2 Assessment results of the measurement model

Constructs	α	CR	AVE
Protean career orientation	0.66	0.80	0.50
Career decision self-efficacy	0.88	0.91	0.55
Career adaptability	0.88	0.90	0.44
Career decidedness	0.85	0.89	0.58

Table 3 Assessment of discriminant validity (HTMT criterion)

Constructs	1	2	3	4
1. Protean career orientation	0.71			
2. Career decision self-efficacy	0.36	0.74		
3. Career adaptability	0.36	0.41	0.66	
4. Career decidedness	0.50	0.50	0.29	0.76

Table 4 Assessment results of the structural model

Variables	R^2	Q^2
Career decision self-efficacy	0.20	0.10
Career adaptability	0.25	0.09
Career decidedness	0.29	0.15

Q indicates predictive relevance, and R^2 is the coefficient of determination

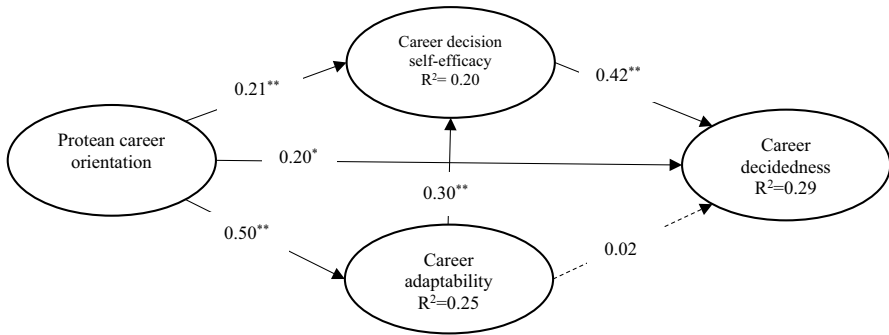


Figure 2 Structural model

Table 5 Hypothesis testing direct and indirect effects

Hypothesis	Relationship	β	<i>t</i> -Values	<i>p</i> -Values	BCI LL	BCI UL	f^2	Decision
Direct effects								
H1	PCO → CD	0.20	2.51	0.012	0.04	0.34	0.04	Supported
H2	PCO → CDSE	0.21	2.64	0.009	0.06	0.38	0.04	Supported
H3	CDS → CD	0.42	5.39	0.000	0.26	0.55	0.20	Supported
H5	PCO → CA	0.50	8.63	0.000	0.37	0.59	0.33	Supported
H6	CA → CD	0.02	0.23	0.817	-0.005	0.12	0.00	Not supported
Indirect effects								
H4	PCO → CDSE → CD	0.13	2.47	0.014	0.04	0.24		Supported
H7	PCO → CA → CD	0.01	0.23	0.825	-0.06	0.08		Not supported
H8	PCO → CA → CDSE → CD	0.06	2.41	0.016	0.02	0.12		Supported
Total effects								
	PCO → CD	0.36	5.44	0.000	0.21	0.48		

β standardized path coefficient, *CI* confidence interval, f^2 effect size, *BCI LL* bootstrapped confidence interval lower level, *BCI UL* bootstrapped confidence interval upper level, *PCO* protean career orientation, *CDSE* career decision self-efficacy, *CA* career adaptability, *CD* career decidedness

0, confirming the model’s predictive relevance regarding the endogenous variables (Table 4). Finally, the research hypotheses were tested.

On the basis of the results (Figure 2; Table 5), PCO has a positive and significant relationship with career decidedness ($\beta = 0.20, p < 0.05$), career decision self-efficacy ($\beta = 0.21, p < 0.01$) and CA ($\beta = 0.50, p < 0.01$). Therefore, hypotheses 1, 2, and 5 are supported. The results also showed that CDES has a positive and significant relationship with career decidedness ($\beta = 0.42, p < 0.01$), and therefore, hypothesis 3 is confirmed. However, the relationship between CA with career decidedness was not significant ($\beta = 0.02, p > 0.05$), so hypothesis 6 is not supported.

The mediation effects were tested using the method proposed by Nitzl et al. (2016). A mediation effect is relevant when the indirect effect is significant. If the

indirect effect is significant but the direct effect is not, then the mediation is said to be perfect. But if both the indirect and direct effects are significant, the mediation is partial. Table 5 presents the details of the mediation analysis using bootstrapping. On the basis of the results, CDSE mediates the relationship between PCO and career decidedness significantly [$\beta = 0.089$; t -value = 2.41, 95% CI (0.04, 0.24)]. Since the direct effect of PCO is significant on career decidedness, CDSE mediates this relationship partially. However, contrary to our expectations, CA does not mediate the relationship between PCO and career decidedness [$\beta = 0.008$ t -value = 0.221, 95% CI (-0.06, 0.08)]. This finding can be attributed to the fact that CA has no significant effect on career decidedness ($\beta = 0.02$; t -value = 0.231). Therefore, hypothesis 4 is supported, but hypothesis 7 is refuted. The results also show that CA and CDSE play the role of sequential mediators in the relationship between PCO and career decidedness [$\beta = 0.06$ t -value = 2.41, 95% CI (0.02, 0.12)]. So, hypothesis 8 is supported, too.

Discussion

The present research aimed to empirically evaluate the effect of PCO in predicting Iranian agriculture students' career decidedness. It also sought to explore the mediating effect of CDSE and CA in this relationship on the basis of SCCT and CCT. According to the results, PCO had a direct and significant relationship with the students' career decidedness. It can therefore be said that students who have such an orientation feel fewer problems in the career decidedness process and are more confident in their future careers. This finding is consistent with the previous studies that reported a direct relationship between PCO and career consequences (Herrmann et al., 2015; Ngo & Li, 2018). This result suggests that promoting protean-like values among students may boost their confidence in their career choices. Agriculture students will face a competitive, dynamic, and changing work environment and must be able to meet various job challenges. In this context, a self-directed and values-oriented career approach (i.e., PCO), become increasingly important. Thus, universities and training institutions should consider incorporating career development programs that promote PCO for agriculture students.

The relationship between PCO and career decidedness was revealed to be partially mediated by CDSE. This means that PCO allows people to be confident in their career decisions, so they will feel fewer barriers and problems in their careers. This result corroborates previous studies that found an indirect association between PCO and career consequences (Chui et al., 2022) including career decidedness (Li et al., 2019). We found that, although PCO had a positive and significant association with CA, there was no significant association between CA and career decidedness, so it did not mediate the association between PCO and career decidedness either. Although this finding is inconsistent with some studies that have reported the mediating role of CA in the association between career orientation and career consequences (Chui et al., 2022), it supports Li et al.'s study (2019). They concluded that CA did not mediate the association between PCO and career decidedness. In this regard, they state that probably the effect of CA on career decidedness becomes

insignificant when CDSE is included in the model. CA is a variable competence that assists individuals in adapting to unfamiliar situations, potentially influencing career decidedness indirectly through cognitive processes such as self-efficacy (Ginevra et al., 2016).

Finally, it was found that the relationship between PCO and career decidedness was sequentially mediated by CA and CDSE. Also, following Duffy et al. (2015), the mediating role of CDSE in the link between CA and adaptation consequences was supported and emphasized. In addition, the reported relationship between CA and CDSE corroborates the theoretical views of Lent and Brown (2013) and Savickas (2002, 2013). These results also supported the CCMA (Rudolph et al., 2017), proposing that an individual's willingness to adapt positively impacts their ability to adapt. As a result, they are more likely to utilize their CA resources to effectively respond to career developmental tasks and achieve successful adaptation outcomes. As stated by Savickas (2013), adaptivity and adaptability influence adapting responses along with each other. If people are not willing to change, the process of adaptability, which involves utilizing existing resources, is likely to be disrupted. Consequently, individuals may not take necessary actions and may fail to achieve favorable outcomes. Specifically, our findings highlight the significance of self-efficacy beliefs as an adaptive response in career adaptation processes by demonstrating that CA resources contribute to increased self-efficacy in successfully carrying out tasks essential for making career-related decisions, ultimately strengthening career decidedness.

This research, which focused on understanding students' PCO and the underlying factors in a developing country, contributes to the career literature significantly. Indeed, this research adds to the body of knowledge exploring the consequences of PCO. Previous studies have given limited attention to the outcomes of PCO, as noted by Gubler et al. (2014). Specifically, the research explored the relationship between Iranian students' PCO and career decidedness and the underlying mechanism, based on CCT and SCT. The present study confirmed these career models in non-Western cultural contexts and developing countries such as Iran. Support for these models within Iranian culture suggests their potential applicability in diverse contexts. Nevertheless, it is imperative to conduct additional research in different countries to validate their generalizability. Researchers argue that the relationships between PCO and career consequences vary with culture (Gubler et al., 2014). They argue that the associations between PCO and career outcomes would be less important in a collectivist setting. This research effectively tested their claim by examining these relationships in a collectivist culture. Despite their expectations, we showed that PCO had notable impacts on career outcomes. To the best of the authors' knowledge, only Li et al. (2019) have investigated the link between these factors among students in the USA and Hong Kong, and no other studies have addressed this, especially in developing countries. Their research also revealed that PCO had comparable effects in both of these societies. Also, CDSE and CA were considered as two mediators in the conceptual model drawing on CCT and SCCT, and then, their effects were evaluated. The results confirmed that only CDSE acted as an important mediator in the relationship. Consistent with the research literature, it was revealed that CDSE was a proximal antecedent of career decidedness. Finally, the sequential mediator

role of CA and CDSE was studied and confirmed in the relationship between PCO and career decidedness. This series of mediating chains for the first time confirms the role of the CCMA in the link between PCO and career decidedness, revealing the internal mechanism.

From a practical standpoint, this research also has various implications. Vocational guidance and career counseling activities in Iran have not been successful and adequately developed. Iranian counselors frequently lack an understanding of the causes and influences of career decisions, highlighting the need for career education and enhanced counseling interventions in Iranian universities. Many university counseling interventions and programs focus solely on gathering career information, potentially leaving a significant portion of undecided students without adequate support for making career decisions (Mojgan et al., 2013). As already mentioned, agriculture faculties in Iran tend to focus mainly on theoretical knowledge and academic performance, with little attention given to evaluating and enhancing practical aspects and other crucial factors such as CA and CDSE, which are important for making career choices. To raise awareness about career development, it would be advantageous to expand professional career counseling services at universities in Iran. Developing practical career courses and internships for college students, rather than solely focusing on theoretical concepts, is an effective method to improve their future career prospects (Mojarradi & Karamidehkordi, 2016). For instance, the majority of Iranian universities have established entrepreneurship centers. These centers can develop effective career courses and collaborate with enterprises to offer more internship and job opportunities for students. In addition, Iranian universities, especially agriculture faculties, could offer counseling services, workshops, and seminars to enhance the CA and CDSE of their students. Rather than solely providing information about career opportunities, it is highly recommended to periodically assess the PCO or CDSE and CA levels of university students. Expanding the availability of career counseling services on campus allows undergraduate students to explore diverse career paths and develop their PCO, CA, and CDSE, ultimately boosting their confidence in future careers.

Furthermore, to enhance students' CDSE and CA, career consultants should focus on improving students' PCO. In Iran, young graduates, particularly those with agricultural degrees, are facing a challenging job market with fewer full-time opportunities. Despite their tertiary education, unemployment and underemployment can discourage them from fully utilizing their skills. In this increasingly competitive professional environment, graduates who have developed essential protean career skills will have a competitive advantage. Therefore, supporting students in developing these skills is crucial for enhancing their career decisions (Haenggli & Hirschi, 2020; Kim et al., 2023). Protean career interventions, such as the one developed by Unite (2014), can improve career value awareness, adaptability, and planning for university students. These interventions, focusing on value exploration and self-directed skills, are beneficial for young adults beyond just their careers. Zhang et al. (2023) also reported that students' PCO can be improved through proper coaching programs. Career consultants should motivate students to determine their career objectives, take responsibility for their own career management, and make decisions guided by their beliefs and values. As mentioned, universities should offer students

more learning opportunities for dealing with professions and jobs, enabling them to develop realistic but positive expectations about their future careers (Li et al., 2019).

Given the influence of CA on CDSE and its indirect effect on career decidedness, universities should consider this competence in their students, as well. For example, universities and job consultants can provide training and interventions to help students develop the skills and readiness to adapt to changes in their future work and job conditions (Nota et al., 2014; Savickas, 2013). Designing training in different CA activities can be useful for promoting CA resources, such as exploring and discovering career self and likely job choices, deciding on following the selected job choices, and developing tactics for coping with the likely career barriers (Rossier, 2015). Given the effect of CDSE on career decidedness, career practitioners can improve this sort of self-efficacy among students by providing some interventions, such as proper role models and previous positive and successful experiences (Chui et al., 2022; Li et al., 2019).

Limitations and future research directions

While this study made significant contributions, it is important to note some limitations. First, the research was conducted on a sample of agriculture students in Iran. So, the results can only be generalized to groups with comparable characteristics. Second, the study's cross-sectional design restricts the ability to make causal inferences. In the future, conducting a longitudinal study will be essential to strengthen the evidence of causality among the research variables. Third, the research was limited merely to PCO as the main determinant of career decidedness. As such, the effect of other career orientations, e.g., borderless, traditional, and unallowable career orientations, was not examined. Furthermore, some personal factors (e.g., personality characteristics) and contextual factors (e.g., career barriers and supports) were not included in the study. It is, therefore, recommended to consider these variables in future research models. Also, future research can focus on other career consequences (such as engagement, satisfaction, and career optimism). Fourth, the research disregarded the likely effects of the respondents' characteristics such as job interests, personality, and socioeconomic status. Since these factors may influence career orientation, adaptation, and decidedness, they should be managed in future research. Finally, the results were based on just self-reporting scales, which showed how the students understood and evaluated their PCO, CDSE, CA, and career decidedness. Also, due to the effects of social desirability, the responses might be biased upwards (Proctor et al., 2009). Therefore, future research can combine different methods and link self-reporting instruments to the participants' real behaviors and results.

Data availability The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Conflict of interest On behalf of all authors, the corresponding author states that there is no conflict of

interest.

Ethical approval This is a survey study. The Research Ethics Committee has confirmed that no ethical approval is required.

Informed consent Written informed consent was obtained from all individual participants included in the study.

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