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Identifying subgroups of career decision-making difficulties in Chinese college students: a latent profile analysis

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Abstract This study aimed to identify meaningful facets of career decision-making difficulties in the Chinese context and explore the effects of study engagement and ego-identity on subtypes of career decision-making difficulties. We applied latent profile analysis (LPA) to identify career decision-making difficulties facets using the 11 difficulty scale scores of the Chinese revised version of the Career Decision-Making Difficulties Questionnaire (CDDQ-C) among two Chinese samples (analysis sample: $N=593$, age 21.51 ± 1.49; replication sample $N=344$, age 21.22 ± 1.30). Five career decision-making difficulties profiles were identified and replicated: *negligible* (10.46%), *lack of readiness* (7.59%), *moderate* (47.05%), *lack of information–general indecisiveness* (7.76%), and *salient* (27.15%). In addition, we found that these profiles differed in socio-demographic characteristics, including gender, major, and grade. Using the logistic regression methods, results revealed that relationships between every profile and study engagement were more significant than those with ego-identity. Overall, the present study's findings suggested that Chinese college students' nature of career decision-making difficulties are heterogeneous, which will facilitate tailoring counseling interventions more sensitively for the specific client.
Clinical trial registration This study was approved by the school of psychology, South China Normal University Human Research Ethics Committee for Non-Clinical Faculties (SCNU-PSY-2021-179).

Keywords Career decision-making difficulties · Study engagement · Ego-identity · Latent profile analysis · Person-centered approach

Introduction

Deciding upon a career is a significant life-development task for college students entering society (Lent & Brown, 2020). Previous research has found that a higher level of career decision-making difficulties impacts not only one's vocational life, but also social situations (Udayar et al., 2020), as well as increasing feelings of depression, anxiety, and stress (Anghel & Gati, 2021; Kulcsár et al., 2020). Therefore, preventing career decision-making difficulties in college students can significantly help them through important life transitions and maintain their mental health (Gati et al., 1996).

Identifying the type of career decision-making difficulties is the first and most crucial step in a student's career counseling process (Brown & Rector, 2008). Most studies to date have used a variable-centered method to explore how best to identify career decision-making difficulty types. For instance, Mau (1995) classified individuals who had difficulty making vocational choices into different groups according to the average score of the used scale, which requires that those completing the scale come from a homogeneous group of people. However, previous research has found that career decision-making progress should be regarded as heterogeneous (Gadassi et al., 2013). Therefore, it is more suitable to apply a person-centered method to distinguish the heterogeneity of the group, and then to identify the types of career decision-making difficulties.

Several studies have reported the existence of different types of career decision-making difficulties using a

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person-centered method (Levin et al., 2022; Milot-Lapointe et al., 2022). These studies have successfully and effectively explained the underlying facets of career decision-making difficulties within a Western cultural context, but it is unclear whether these findings can be generalized to youth populations from other cultural backgrounds. Western countries are largely made up of individualistic cultures while most Eastern countries are collectivistic cultures, under which social conformity and family expectations are more highly prioritized (Mau, 2004). Furthermore, in China, which is influenced by traditional Confucian relational ethics, young populations tend to fulfill others' expectations during their career decision-making process, which has been shown to cause them to experience increased career indecision (Leung et al., 2011). Willner and colleagues (2015) have suggested that Chinese students' level of difficulty in making career decisions was more acute compared to U.S. or Israeli students. Thus, the present study applied latent profile analysis to identify heterogeneous groups with CDDQ-C within a Chinese social context and explored the influences of study engagement and ego-identity on various career decision-making difficulties experienced across these heterogeneous groups.

Career decision-making difficulties

Career decision-making difficulties (Gati et al., 1996) describe the difficulties people encounter when trying to decide on a career. These challenges manifest as a lack of enthusiasm to engage in the job-search process, an insufficient understanding of themselves and career options, or even a dearth of essential job-hunting skills, among others (Gati et al., 1996). Previous research has suggested that people may encounter challenges when making career decisions in any or all of these dimensions (Kulcsár et al., 2020; Storme & Celik, 2018).

Some research has suggested the heterogeneity of career decision-making (Gati et al., 2010; Levin et al. 2022). For instance, Gati et al. (2010) stated that some individuals may have the same total CDDQ score as others, even though they encounter varying degrees of challenges across different facets of career decision-making. They may face a single difficulty or a combination of difficulties when making career decisions (Gati et al., 1996; Levin et al., 2022). What's more, some difficulties may co-occur more often than other difficulties (Gati et al., 1996; Levin et al., 2022).

Several previous studies have used cluster analysis to explore different classifications of career indecision. For instance, Larson et al. (1988) found a subtype in which some individuals appear to lack some degree of career-planning information and were therefore labeled "uninformed cluster". Chartrand and colleagues (1994) labeled one group "ready to decide" as individuals in this group seemed to be relatively more advanced in their vocational choices than those in other groups. Meanwhile, Amir and colleagues (2008) identified salient (average total score between 1 and 2), moderate (average total score between 3 and 4), and minor (average total score 5 and above) career decision-making difficulties groups. This research provided different perspectives for understanding the classification of career decision-making difficulties.

Cluster analysis and LPA both belong to the person-centered approach (Hofmans et al., 2020). Unlike the variable-centered method, a person-centered approach assumes a population is heterogeneous and follows a non-normal distribution (Muthén & Muthén, 2000). Person-centered statistical approaches classify individuals into distinct profiles or clusters so that persons within a particular profile share more similarities as compared to those from different profiles (Muthén & Muthén, 2000; Jiang et al., 2016). However compared with LPA, cluster analysis typically favors clusters of equal size and lacks agreed-upon metrics for identifying the best-fitting solution (Meyer et al., 2013). Therefore, we used LPA to explore the homogeneous career decision-making difficulties subgroups. To our limited knowledge, there are only two studies exploring profile types of career decision difficulties using the LPA method (Levin et al., 2022; Milot-Lapointe et al., 2022). For example, Levin and colleagues (2022) found five profiles of career decision-making difficulties, which are unmotivated, generally indecisive, unrealistic, uninformed, and conflicted. However, their conclusions were based on individuals in Western cultural contexts. It is worthwhile to investigate whether the latent profile types in Eastern culture will change.

The association between career decision-making difficulties and other variables

Findings regarding career decision-making difficulties have differed across socio-demographic characteristics. For example, some studies have found that males generally experience fewer difficulties than females in career decision-making (Zhou & Santos, 2007; Gadassi et al., 2015; Kulcsár et al., 2020). Others have concluded that there is no statistically significant relationship between career indecision and gender (Bergeron & Romano, 1994; Gordon & Meyer, 2002; Guerra & Braungart-Rieker, 1999). The degree of career indecision has also been found to vary according to grade and major. Some researchers have suggested that sophomores and juniors are more likely to experience significant career decision-making difficulties (Wang et al., 2020), while others have found that freshmen suffer from a

noticeably greater degree of career indecision than students in other years of study (Guerra & Braungart-Rieker, 1999). Research has also suggested that students who are about to transition to employment (i.e., grade 12 vs. grade 11) are less vulnerable to career decision-making difficulties (Kulcsár et al., 2020). The degree of indecision experienced has also been shown to differ among study majors. Lv (2010) found that students in the liberal arts report feeling more difficulty choosing a career than students in the sciences.

Ego-identity also influences career decisions. Ego-identity is an individual's subjective feeling and experience of internal consistency and continuity of the past, present, and future (Wheeler & Bechler, 2021). In other words, ego-identity can be seen as the answer to questions like "Who am I?" and "Where am I going?" (Erikson, 1980). According to Erikson's eight-stage developmental theory (Erikson, 1980), individuals who fail to develop self-identity may struggle to integrate their self-concepts. While the development of self-concept was closely related to career decision-making style (Burnett, 1991). Many empirical studies also revealed the relationship between ego identity and career decision-making difficulties. For example, some studies have found that career indecisiveness was characterized by a diffused sense of ego-identity (Cohen et al., 1995; Guerra & Braungart-Rieker, 1999; Kulcsár et al., 2020), indicating that unclear ego-identity can be considered a cause of career indecision. Additionally, the phase of college marks the most intense period of self-identity transformation (Marcia et al., 2012). Therefore, investigating the relationship between the ego identity and other profiles is important for college career-planning interventions.

Study engagement refers to the time and energy students invest in educationally beneficial activities both inside and outside of the classroom (Kuh, 2001). Based on cognitive information processing theory (Clemens & Milsom, 2008), engaged learning can improve individual's understanding of themselves and of their occupations, which would help them move from the innermost circle to a broad, all-encompassing circle of career decision-making process. Some studies have also highlighted an association between study engagement and career decision-making difficulties. For instance, a clear career decision status has a significant positive correlation with study engagement (Peng & Yue, 2022). Ketonen and colleagues (2016) also demonstrated that students with higher study engagement were more certain about their career choices. The possible reason is that when students are immersed into major learning more, they will get a higher professional identity which would finally contribute to less difficulties in career decision-making progress (Liu et al., 2023).

The current study

The current study aimed to explore the heterogeneity of career decision-making difficulties in a sample of Chinese college students using latent profile analysis. This study investigated (a) the number of career decision-making difficulties profiles observed in Chinese college students; (b) the presence of distribution differences in each latent profile of career decision-making difficulties individuals depending on specific socio-demographic characteristics, specifically gender, study major, and grade; and (c) different effects of ego-identity and study engagement on different profiles. Following the findings of prior LPA studies on career decision-making difficulties (Levin et al., 2022; Milot-Lapointe et al., 2022), we hypothesized that three to five career decision-making difficulties profiles would be revealed in the present study as previous relevant studies generally yielded three to five profiles, including one group with relatively low scores in all career decision-making difficulties subscales, one group with relatively high scores in all career decision-making difficulties subscales, and one or more groups showing high scores in certain career decision-making difficulties subscales only. We further hypothesized that study engagement and ego-identity could predict certain profiles of career decision-making difficulties.

Method

Participants and procedure

The study participants were 593 undergraduate students recruited from seven universities located in medium-sized cities in central and western China. Participants were between 18 and 28 years of age ($M = 21.51$, $SD = 1.49$, Median = 22); 43.8% (260) of them were female; 34.1% of the participants were majoring in liberal arts and the remaining (65.9%;391) were in science. Juniors (30.4%) made up the largest proportion of participants, followed by sophomores (19.9%), seniors (26%), and freshmen (23.8%). To see if the developing profiles can be replicated, the present study also included another sample of 344 Chinese undergraduate students as the replication sample. The participants of the replication sample were between 18 and 28 years of age ($M = 21.22$, $SD = 1.30$, Median = 21); 49.2% (169) of them were female; 50.2% (173) were majoring in liberal arts and 49.8% (171) in science. Juniors (36.6%) made up the largest proportion of these participants, followed by sophomores (25.3%), seniors (9%), and freshmen (37.2%).

Participants were recruited through class WeChat group announcements in coordination with each school's career services office. After participants had been screened for eligibility, provided their consent for participation, and

enrolled in the study, they completed an on-campus survey via the Wenjuanxing website (https://www.wjx.cn/). On the first page of the scale, there was a description of the study with details on how to participate and the goal of the questionnaire. After the instructions, it was also made clear that not taking the survey or not finishing it carried no penalty. Each participant was paid 2 RMB (about 0.14 U.S. dollars) after the assessment. This investigation was approved by the ethics committee (SCNU-PSY-2021-177).

Measures

Career decision-making difficulties Career decision-making difficulties were assessed by the revised Chinese version of the Career Decision-Making Difficulties Questionnaire (CDDQ-C; Gati & Saka, 2001; Li, 2007). Although there are several other versions of the CDDQ-C (Creed & Yin, 2006; Mau, 2001; Tien, 2005), the version revised by Li (2007) was the most popular in the Chinese literature, so we use this version (original questions of the CDDQ-C were add in the supplementary materials). CDDQ-C consists of 36 self-report items, as well as two validity items used to ensure that respondents reply only after having properly read each item. The CDDQ-C includes 11 subscales that describe different causes of career indecision. Four of the subscales assess lack of readiness (i.e., lack of motivation, general indecisiveness, inaccurate career beliefs, inaccurate decision-making beliefs), four subscales assess lack of information (i.e., lack of knowledge about the process, lack of information about self, lack of information about occupations, lack of information about ways to obtain additional information), and three subscales assess inconsistent information (i.e., unreliable information, internal conflict, external conflict). Respondents are asked to rate each item according to the extent to which the statement describes them using a nine-point scale that ranges from 1 (does not describe me) to 9 (describes me well). A higher total score indicates a higher level of career decision-making difficulties. The results of confirmatory factor analysis revealed a reasonable fit to the 11 subscales model (c2/df = 1.861, CFI = 0.959, TLI = 0.910, RMSEA = 0.046, SRMR = 0.068). The median Cronbach's α estimates for the 11 subscale scores in the analysis sample were 0.82.

Ego-identity Ego-identity was assessed using the 12-item Ego-Identity Questionnaire (Zhang, 2000), which is composed of three dimensions: desire for self-involvement, past crisis, and future desire for self-involvement. Respondents are asked to rate each item according to how well it describes them using a six-point Likert-type scale ranging from 0 (does not describe me at all) to 5 (describes me well). The higher the score of each dimension, the higher the respondent's level of the corresponding ego-identity dimension. Cronbach's αs in the analysis sample were 0.75, 0.82, and 0.90 for self-involvement, past crisis, and future desire for self-involvement, respectively.

Study engagement The 17-item Utrecht Work Engagement Scale-Student Scale (UWES-S; Schaufeli et al., 2002) was used to measure study engagement in the current study. This scale is based on the UWES-S developed by Schaufeli et al. (2002) and the Chinese revised version was developed by Li (2010). The items reflect three underlying dimensions: dedication (six items; e.g., "I find my studies to be full of meaning and purpose"), vigor (six items; e.g., "When I get up in the morning, I feel like going to class"), and absorption (five items; e.g., "When I'm studying, I forget everything around me"). Respondents are asked to rate how often each item describes them using a seven-point Likert-type scale ranging from 1 (almost never) to 7 (almost always). Higher scores indicate a greater level of study engagement. This measure has a good model fit in CFA and has been validated among Chinese students (CFI = 0.97, RMSEA = 0.02; Meng & Jin, 2017). The Cronbach's αs for dedication, vigor, and absorption in the analysis sample were 0.78, 0.77, and 0.78, respectively.

Data analysis

Descriptive statistics were conducted in SPSS 26.0. Using Mplus 8.4, a latent profile analysis (LPA) was conducted to assess different profiles of career decision-making difficulties.

To identify homogeneous career decision-making difficulties groups (i.e., latent profiles) within the sample of college students, LPA was performed on the CDDQ-C dimension scores. We examined LPA models which ranged from two to six profiles. Several fit indices were compared between the models to identify the best one, including Akaike's Information Criterion (AIC), the Bayesian Information Criterion (BIC), the sample size-adjusted BIC (SSABIC), the Lo-Mendell-Rubin test (LMR), the bootstrap likelihood ratio test (BLRT), and entropy. According to Tein et al. (2013), the fit indicators of the best-fitting model have the following characteristics: AIC, BIC, and SSABIC should be lower; LMR and BLRT should be significant, and entropy should be larger. A significant LMR or BLRT value represents the dominance of the cluster solution *k* over *k*-1. The entropy value above 0.80 indicates the classification accuracy is over 90% (Clark & Muthén, 2009). Furthermore, parsimony, meaningfulness, and ease of interpretation of the latent classes should also be considered when determining the optimal number of profiles (Foti et al., 2012; Marsh et

al., 2009). To avoid local likelihood maxima, model identification for all models. was checked with 200 initial and 50 final stage starts (Muthén & Muthén, 2017–2022).

Following the determination of the ideal number of CDDQ-C latent profiles, we used the DCAT (Asparouhov & Muthén, 2014) command in Mplus to examine how distinct profiles of CDDQ-C would be related to socio-demographic characteristics (i.e., gender, major and grade). Then we used the R3STEP option in Mplus to conduct multinomial logistic regressions by using indicators of psychological variables (e.g., ego-identity and study engagement) to examine how these characteristics predict different career decision-making difficulties profile membership's probability. Traditional multinomial logistic regression was implemented with SPSS. There are various benefits to using the R3STEP command in Mplus instead of the conventional traditional logistic regression method. First, rather than assigning each participant a 100% chance of fitting into a specific profile, class membership was most likely decided using the posterior distribution (i.e. the probability of an individual being in each profile) in R3STEP to account for profile probabilities (Asparouhov & Muthén, 2014; Vermunt, 2010). Moreover, R3STEP may reduce biased estimates for the covariate effects since the auxiliary variables are assessed after the best profile solution has been identified (Gudicha & Vermunt, 2013). Based on these advantages, regression analyses simultaneously included every predictor. The likelihood of being assigned to a particular profile (as opposed to a reference profile) increases with each unit increase in the predictor variable if reported odd ratios (ORs) are greater than 1.

Results

Preliminary analyses

The mean, standard deviation, and correlation of the variables are shown in the supplementary material 1. Lack of information was negatively associated with all dimensions of study engagement (i.e., dedication, vigor, and absorption) and ego-identity (commitment, crisis, and future self; r ranging from − 0.32 to -0.10, $ps < 0.01$ or 0.05). Inconsistent information was negatively correlated with study engagement (dedication and vigor) and ego-identity (commitment and future self). Lack of readiness was not significantly correlated with the dimensions of either study engagement or ego-identity.

Identifying distinct CDDQ-C profiles

LPA was carried out to identify the latent profiles of the 11 dimensions of the CDDQ-C (i.e., lack of motivation, general indecisiveness, inaccurate career beliefs, inaccurate decision-making beliefs, lack of knowledge about the process, lack of information about self, lack of information about occupations, lack of information about ways to obtain additional information, unreliable information, internal conflict, external conflict). Table 1 shows the LPA model fit indices from the two- to six-profile models in the overall sample of college students ($N = 593$) and the replication sample ($N = 344$). In the analysis and replication samples, a five-class model was determined to be the best fit for four reasons: (a) according to the AIC, BIC, and SSABIC values, the five-class solution performed slightly better; (b) entropy reached its highest in the five-class model; (c) the ps of the LMR and BLRT tests were significant in the five-class model (p-value < 0.001 in the overall college student sample, $p < .05$ in the replication

Table 1 Fit statistics of latent profle analysis models for analysis sample and replication sample

Model	LL	*df*	AIC	BIC	SSABIC	*p*(LMR)	*p*(BLRT)	Entropy	Profile prevalence
Analysis sample ($N = 593$)									
2-class	-12490.99	34	25049.97	25199.07	25091.13	< 0.001	< 0.001	0.77	0.26/0.74
3-class	-12350.56	46	24793.11	24994.83	24848.79	< 0.01	< 0.01	0.78	0.18/0.48/0.34
4-class	-12260.08	58	24636.17	24890.51	24706.38	< 0.001	< 0.001	0.83	0.18/0.47/0.08/0.27
5-class	**-12194.45**	**70**	**24528.90**	**24835.86**	**24613.64**	< 0.01	< 0.01	**0.84**	**0.10/0.07/0.47/0.08/0.27**
6-class	-12157.75	82	24479.51	24839.09	24578.77	0.54	0.55	0.79	0.11/0.35/0.08/0.17/0.05/0.25
Replication sample ($N = 344$)									
2-class	-7276.44	34	14620.87	14751.45	14643.60	< 0.001	< 0.001	0.79	0.24/0.76
3-class	-7215.99	46	14523.99	14700.67	14554.74	< 0.01	< 0.01	0.76	0.18/0.54/0.28
4-class	-7146.61	58	14409.22	14631.97	14447.98	< 0.05	< 0.05	0.83	0.17/0.51/0.26/0.06
5-class	**-7114.69**	**70**	**14369.39**	**14638.23**	**14416.17**	< 0.05	< 0.05	**0.85**	**0.11/0.07/0.50/0.06/0.26**
6-class	-7083.84	82	14331.68	14646.61	14386.49	0.21	0.21	0.82	0.10/0.47/0.08/0.06/0.26/0.03

The bolded model (five-profile model) indicates the chosen solution. *LL,* Log likelihood; *AIC,* Akaike Information Criteria; *BIC,* Bayesian Information Criteria; *SSABIC,* sample-size–adjusted Bayesian information criterion; *p* (LMR) = *p*-value of the Lo–Mendell–Rubin likelihood ratio test. p (BLMR) = *p*-value of the bootstrap likelihood ratio test

Table 2 Profile allocation based on the maximum posterior probability for five latent profiles, mean probabilities of latent profiles and mean scores and standard deviations of the career decision-making difficulties factors

	N	%	Latent profiles [a]					CDMD-LR	CDMD-LI	CDMD-II
			Class 1	Class 2	Class 3	Class 4	Class 5			
Analysis sample (*N* = 593)										
Class 1	62	10.46	0.897					3.17(0.92)	2.79(0.70)	2.72(0.71)
Class 2	45	7.59		0.931				5.47(0.72)	2.59(0.80)	2.44(0.74)
Class 3	279	47.05			0.885			4.58(0.98)	4.60(0.72)	4.68(0.74)
Class 4	46	7.76				0.850		4.93(0.79)	6.23(0.86)	3.18(0.62)
Class 5	161	27.15					0.912	5.52(0.90)	6.08(0.67)	5.68(0.80)
Replication sample (*N* = 344)			Class 1	Class 2	Class 3	Class 4	Class 5			
Class 1	39	11.34	0.905					3.57(1.08)	2.87(0.75)	2.67(0.69)
Class 2	23	6.69		0.892				5.43(0.77)	2.61(0.84)	2.38(0.66)
Class 3	176	51.16			0.906			4.54(0.95)	4.76(0.77)	4.70(0.77)
Class 4	21	6.11				0.941		5.32(0.42)	6.52(0.90)	2.94(0.63)
Class 5	85	24.71					0.886	5.43(0.92)	6.06(0.67)	5.80(0.79)

CDMD = career decision-making difficulties; Class 1 = negligible career decision-making difficulty group; Class 2 = lack of readiness group; Class 3 = moderate career decision-making difficulty group; Class 4 = lack of information–general indecisiveness group; Class 5 = salient career decision-making difficulty group. Information for CDMD descriptive statistics is presented as *M* (*SD*).

[a] Average probabilities of profile membership

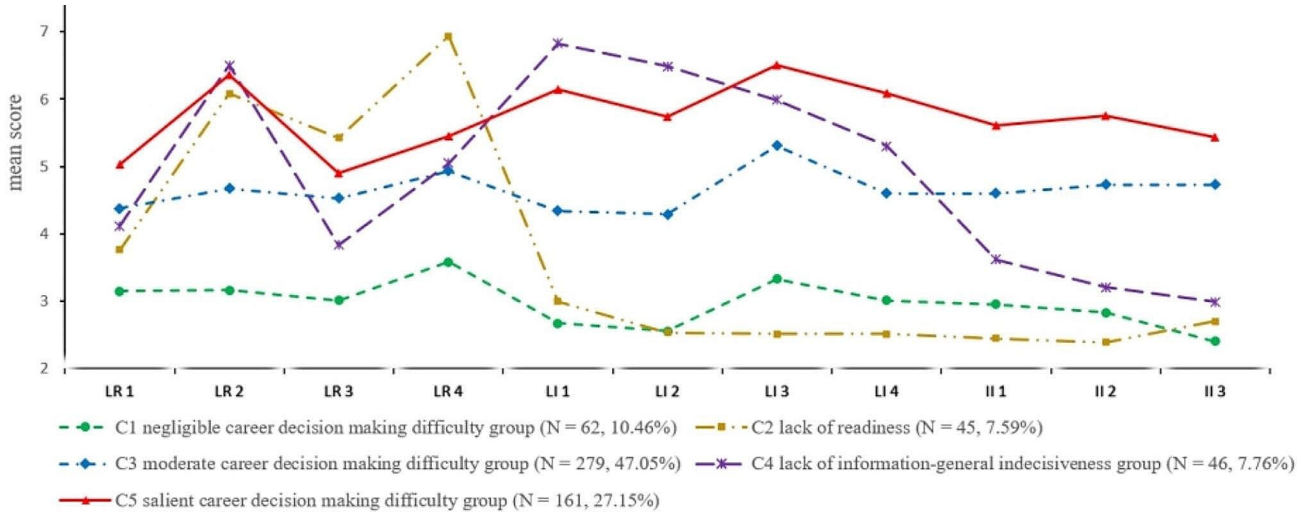

Fig. 1 Each dimension scores of the college students' career decision-making difficulties for the five-class model's profile plot for the analysis sample (*N* = 593). Note: LR1 = lack of motivation, LR2 = general indecisiveness; LR3 = wrong career beliefs, LR4 = wrong decision-making beliefs; LI1 = Lack of knowledge about the process, LI2 = Lack of information about self, LI3 = Lack of information about occupations, LI4 = Lack of information about ways of obtaining additional information; II1 = Unreliable information, II2 = Internal conflicts, II3 = External conflicts. C1 = Class 1, C2 = Class 2, C3 = Class 3, C4 = Class 4, C5 = Class 5

sample), but insignificant in the six-class model, suggesting that the five-class model may be the better one; and (d) For the five-class solution, the average class membership probabilities were greater than 0.80 (ranging from 0.850 to 0.931 in the analysis sample, and from 0.886 to 0.941 in the replication sample, see Table 2).

Figure 1 shows the mean scores of the 11 CDDQ-C subscales in each latent profile for the overall college students' sample (*N* = 593). Means and standard errors of the CDDQ-C levels of each class are reported in Table 2. Participants in class 1 (*N* = 62, 10.46%) showed low scores across all 11 CDDQ-C subscales, therefore this class was termed a *negligible* group. In contrast, participants in class 5 (*N* = 161, 27.15%) reported high scores across all 11 CDDQ-C subscales, and the profile was therefore labeled a *salient* group. Participants in class 3, the largest group (*N* = 279, 47.05%), showed average levels across all 11 CDDQ-C subscales; we therefore termed this class a *moderate* group.

Two other profiles presented reverse patterns across the 11 CDDQ-C subscales. Those in class 2 (*N* = 45, 7.59%) showed high scores across the three specific subscales of lack of readiness (i.e., general indecisiveness, inaccurate

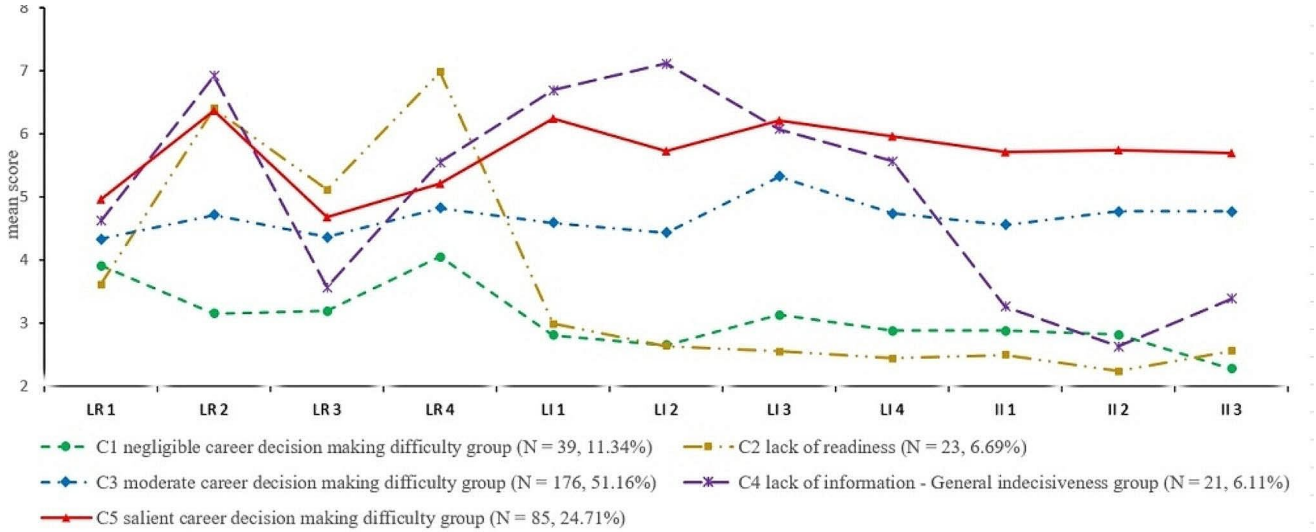

Fig. 2 Each dimension scores of the college student's career decision-making difficulties for the five-class model's profile plot for the replication sample ($N=344$). Note: LR1 = lack of motivation, LR2 = general indecisiveness; LR3 = wrong career beliefs, LR4 = wrong decision-making beliefs; LI1 = Lack of knowledge about the process, LI2 = Lack of information about self, LI3 = Lack of information about occupations, LI4 = Lack of information about ways of obtaining additional information; II1 = Unreliable information, II2 = Internal conflicts, II3 = External conflicts. C1 = Class 1, C2 = Class 2, C3 = Class 3, C4 = Class 4, C5 = Class 5

Table 3 Relations of the five latent profiles to the socio-demographic characteristics variables in the analysis sample ($N=593$)

Variables	Class 1 ($N=62$)	Class 2 ($N=45$)	Class 3 ($N=279$)	Class 4 ($N=46$)	Class 5 ($N=161$)	χ^2 (df)	p
Gender							
Male	34(10.2%)	26(7.8%)	178(53.5%)	18(5.4%)	77(23.1%)	16.67(4)	0.002
Female	28(10.8%)	19(7.3%)	101(38.8%)	28(10.8%)	84(32.3%)		
Major							
Science	47(12.0%)	21(5.4%)	184(47.1%)	35(9.0%)	104(26.6%)	12.37(4)	0.015
Art	15(7.4%)	24(11.9%)	95(47.0%)	11(5.4%)	57(28.2%)		
Grade							
Freshman	17(12.6%)	11(8.1%)	68(50.4%)	10(7.4%)	29(21.5%)	55.36(12)	< 0.001
Sophomore	139(10.7%)	23(18.9%)	44(36.1%)	5(4.1%)	37(30.3%)		
Junior	9(5.1%)	10(5.6%)	81(45.5%)	21(11.8%)	57(32.0%)		
Senior	23(14.6%)	1(0.6%)	86(54.4%)	10(6.3%)	38(24.1%)		

Analyses performed using DCAT procedures in Mplus 8.4. Class 1 = negligible group; Class 2 = lack of readiness group; Class 3 = moderate group; Class 4 = lack of information–general indecisiveness group; Class 5 = salient group

career beliefs, inaccurate decision-making beliefs) but low scores for the subscales of lack of information (e.g., lack of information about one's self) and inconsistent information (e.g., unreliable information). This profile was labeled the *lack of readiness* group. In contrast, a small group of participants made up class 4 ($N=46$, 7.76%), showing slightly higher scores for the four lack of information subscales (e.g., lack of information about self) and one lack of readiness subscale (i.e., general indecisiveness). This class was therefore labeled the *lack of information–general indecisiveness* group. We found a similar pattern in the graphical description of the five-class solution for the replication sample (see Fig. 2).

Socio-demographic characteristics of the CDDQ-C profiles

Table 3 show the socio-demographic details of participants in each CDDQ-C profile. Gender, study major, and grade were significantly associated with distinct career decision-making difficulties profiles: for gender, $\chi^2(4)=16.67$, $p=.002$; for study major, $\chi^2(4)=12.37$, $p=.015$, for grade, $\chi^2(4)=55.36$, $p=<0.001$. Compared to those in the other profiles, the students in both the *salient* group and the *lack of information–general indecisiveness* group were more likely to be female. Science students were more likely than art students to be in the *negligible* group and less likely to be in the *lack of readiness* group. Compared with those in other grades, junior students were more likely to be in either

the *salient* group or the *lack of information–general indecisiveness* group, and less likely to be in the *negligible* group; meanwhile, sophomore students were more likely than those in other grades to be in either the *salient* group or the *lack of readiness* group.

Associations of CDDQ-C profiles with psychological variables

Table 4 shows the results of the categorical latent variable multinomial logistic regressions in the analysis sample for the associations among study engagement, ego-identity, and profile classification. The relationships between every career decision-making difficulty profile and study engagement were more significant than those with ego-identity.

For study engagement, individuals with lower vigor had a greater likelihood of being classified in either the *moderate* group (OR = 3.22) or the *salient* group (OR = 3.86) than they did being in the *lack of readiness* group, indicating that individuals with lower vigor exhibit symptoms on multiple CDDQ-C dimensions. Individuals with lower motivation were associated with a greater likelihood of being classified in the *lack of readiness* group than they were to be classified in the *negligible* group (OR = 2.48), indicating that compared to students with high motivation, students with low motivation are more likely to experience career decision-making difficulties due to a lack of readiness. The associations between absorption and the likelihood of any profile classification were either nonsignificant or negligible (OR = 0.57).

For ego-identity, although commitment and future self was significantly associated with the likelihood of profile classifications, the effect sizes were all negligible ($0.70 < OR_{commitment} < 1.36$, $0.77 < OR_{future\ self} < 1.31$,), indicating that commitment and future self contributes weakly to the prediction of profile classification. The associations between crisis and the likelihood of profile classifications were all non-significant.

Discussion

Although there is research on career decision-making difficulties that have taken a person-centered approach, the overall findings are still inconclusive and limited within an Eastern cultural context. To address these gaps in the literature, the current study explored the heterogeneity of individuals' career decision-making difficulties by using LPA in a sample of Chinese college students. Five distinct career decision-making difficulties profiles were revealed in the analysis sample and replicated in the replicated sample: *negligible*, *lack of readiness*, *moderate*, *lack of information–general indecisiveness*, and *salient*. Additionally, differences were revealed in the five profiles as compared to the findings of previous studies.

Type of career decision-making difficulties

Class 4, which was labeled the *lack of information–general indecisiveness* group and comprised 7.76% of the full study sample, was salient in the lack of information dimension and general indecisiveness. The characteristics of this category are like those described in previous studies (Larson et al., 1988; Levin et al., 2022). For instance, similar groups described as "uninformed" were found in both Levin's profile and Larson's cluster. Together with the findings of

Table 4 Multiple multinomial regression analysis predicting career decision-making difficulties profiles from ego-identity and study engagement ($N = 593$)

Predictors	C1 versus C2		C1 versus C3		C1 versus C4		C1versus C5		C2 versus C3	
	Coef.	OR	Coef.	OR	Coef.	OR	Coef.	OR	Coef.	OR
dedication	0.91*	2.48	0.31	1.36	0.71	2.03	0.21	1.23	-0.61*	0.54
vigor	-1.00**	0.37	0.17	1.19	-0.33	0.72	0.35	1.42	1.17***	3.22
absorption	0.62	1.86	0.05	1.05	0.10	1.11	0.30	1.35	-0.57*	0.57
commitment	-0.16	0.85	0.07	1.07	0.19*	1.21	0.15**	1.16	0.23**	1.26
crisis	0.04	1.04	-0.04	0.96	0.06	1.06	-0.04	0.96	-0.08	0.92
future self	-0.13	0.88	0.10	1.11	0.17	1.19	0.10	1.11	0.23**	1.26
Predictors	C2 versus C4		C2 versus C5		C3 versus C4		C3 versus C5		C4 versus C5	
	Coef.	OR	Coef.	OR	Coef.	OR	Coef.	OR	Coef.	OR
dedication	-0.20	0.82	-0.71*	0.49	0.41	1.51	-0.10	0.90	-0.51	0.60
vigor	0.67	1.95	1.35***	3.86	-0.50	0.61	0.18	1.20	0.69	1.99
absorption	-0.52	0.59	-0.59	0.55	0.05	1.05	-0.02	0.98	-0.07	0.93
commitment	-0.35***	0.70	0.31***	1.36	0.12	1.13	0.08*	1.08	-0.04	0.96
crisis	0.02	1.02	-0.09	0.91	0.09	1.09	-0.01	0.99	-0.10	0.90
future self	-0.04	0.96	0.23**	1.26	-0.26**	0.77	0.01	1.01	0.27**	1.31

Class 1 = negligible; Class 2 = lack of readiness group; Class 3 = moderate group; Class 4 = lack of information-general indecisiveness group; Class 5 = salient group

previous studies (Gati et al., 1996), these results replicated the lack of information and general indecisiveness that may co-occur in a specific subgroup of individuals. This result reflects the fact that aspects of career decision-making difficulties may not be completely independent of one other (Campbell & Heffernan, 1983).

Class 2, labeled as the *lack of readiness* group, made up the smallest proportion (7.59%) of the full study sample. Individuals in this group are characterized by having high scores in the lack of readiness dimension of the CDDQ-C, but low scores in the other two CDDQ-C dimensions. These results indicate that general indecisiveness, inaccurate career beliefs, and inaccurate decision-making beliefs can be seen as being the primary reasons why some individuals have trouble making career decisions. These findings are inconsistent with those of Levin et al. (2022), who found three career decision-making difficulties profiles that included individuals who tended to score higher in the lack of readiness dimension. This may be partly due to differences in the study samples. Levin and colleagues' sample was made up of people visiting a free career website, which means that the sample population would likely all be suffering from career indecision to some extent (Levin et al., 2022). Meanwhile, the sample in our study was made entirely of students. It is possible that some of the students had not yet experienced difficulties in making career decisions simply because they had yet to begin the process of job hunting. The implication of this for the future career counseling of college students may be that students should be encouraged to conduct some career explorations and experiments to become motivated to find out whether they suffer from certain other career decision-making difficulties (Makki et al., 2023).

The present study has also revealed three profiles of CDDQ-C in Chinese college students: *negligible* (10.46%), *moderate* (47.05%), and *salient* (27.15%). These three profiles differ primarily in terms of one's overall level of career decision-making difficulties. Specifically, the average scale score distribution interval of all difficulty facets was between 1 and 4, between 4 and 5, or 5 and above for individuals classified in the *negligible*, *moderate*, and *salient* career decision-making difficulties groups, respectively. The ranges of values for these categories were somewhat consistent with the conclusions of Amir and colleagues (2008). In contrast to how the salient, moderate, and minor career decision-making difficulties groups were differentiated using cut-off points of a composite score, LPA assumes the heterogeneity of career decision difficulties, as noted by previous studies (Gadassi et al., 2013). In an LPA approach, individuals are classified with comprehensive consideration of their response patterns in different dimensions (Muthén & Muthén, 2000) rather than relying only on the total or average scores calculated statistically across all individuals (Magnusson, 2003). Besides the *negligible*, *moderate*, and *salient* group, the results of LPA also provided two new subtypes, which suggested that using only a total career decision-making difficulties score may not be sufficient. Because individuals with the same total career decision-making difficulties scores may present different combinations of scores across the 11 subscales. For these reasons, our results obtained by using a personal-centered method add to the existing classification results, which have been defined through variable-centered studies.

The present study also compared the profiles of Chinese samples and American samples. First, Chinese students are more salient in *general indecisiveness*. This subscale score is prominent in three profiles (i.e., C2, C4, and C5) of the Chinese sample, while it is only somewhat higher in one profile (i.e., *indecisive*) of the American profile. Chinese students are generally very confused and worried about their career choices, and they may be more afraid of making the wrong choice (Gao & Wang, 2023; Li et al., 2021). This could be due to differences between Eastern and Western cultures. Chinese students are more influenced by collectivistic cultures and traditional Confucian relational ethics, resulting in them taking both their role in society and family expectations into consideration (Mau, 2001; Leung et al., 2011). However, when incongruence occurs in parent–child expectations or choices run counter to mainstream social values, students may become stuck in career-making difficulties (Zhang et al., 2022; Leung et al., 2011). Age was also found to affect career decision-making difficulties in the Chinese context. Compared with American samples around the age of 29, the students in the Chinese tended to have less career experience, which may also lead to them feeling more uncertain about their career choice. Second, while the overall *inconsistent information* score is lower in each profile for the Chinese sample, there is a *conflict* profile in which the scores of *inconsistent information*, specifically *external conflict*, are the highest. This result is similar to that of Willner and colleagues (2015) and could be because, in Western individualistic cultures, individuals may feel conflicted between their desire to please their significant other and following the cultural norm that encourages making a personally satisfying decision, resulting in the individual experiencing indecisiveness. However, Chinese students may experience this less because Chinese collectivistic culture's traditional Confucian relational ethics encourages young people to fulfill their parents' expectations (Leung et al., 2011).

The influencing factors of the profiles

Gender, study major, and grade were all found to be related to distinct career decision-making difficulties profiles. Regarding gender, we found that females were more likely to report *salient* and *lack of information–general indecisiveness* career decision-making difficulties than males. Based on the findings of previous research using the variable center method, females reported higher levels of career decision-making difficulties than males (Gadassi et al., 2015). Compared to previous studies, the present study can further reveal the characteristics of sex distribution in specific profiles and learn more about the traits of gender-specific career decision-making difficulties. A possible explanation for females experiencing more difficulties than males could be that in the current Chinese social context, females have fewer opportunities to choose their careers and generally perceive more career-related difficulties than males (Hou et al., 2015; Tian & Hou, 2023). For study majors, we found that science students were more likely to fit the *negligible* profile and less likely to fall into the *lack of readiness* profile. This finding is partially in line with previous studies that science students report lower levels of career decision-making difficulties (Lv, 2010). One explanation for this might be that there are more females in liberal arts majors and more males in science majors while females tend to be more self-critical and to use more ruminative coping strategies than males (Mullen, 2014; Neff, 2003).

Our findings also demonstrate that students in different grades experience different levels of career decision-making difficulties. Juniors and sophomores were more likely to report a higher level of career decision-making difficulties than freshmen or seniors. Furthermore, sophomores were more likely to be classified into the *lack of readiness* group, and juniors into the *lack of information–general indecisiveness* group. This finding is partially in line with those of several variable-centered studies which found that juniors and sophomores consistently reported higher levels of career decision-making difficulties as compared to those in other levels of college study (Wang et al., 2020). Previous research has revealed that people who are still in the pre-screening stage of the career decision-making process have the greatest challenges in making a career decision, whereas people who are in the choice stage have the lowest challenges (Gati et al., 2001). Juniors and sophomores are beginning to gather information about the working world and are only starting to make crucial decisions. The process leads juniors and sophomores to experience specific career decision-making difficulties for the first time, so they become more likely to report specific types of career decision-making difficulties while feeling a higher level of career decision-making difficulty. Furthermore, according to previous studies, by the time they are seniors, students are at the choice stage, while freshmen have not yet begun to confront career decisions, so the less-advanced students' experience of career decision-making difficulties may not yet be obvious (Bacanli, 2016; Gati & Saka, 2001).

Concerning study engagement, our findings suggest that individuals with lower motivation are more likely to exhibit symptoms of lack of readiness, while individuals with lower vigor exhibit symptoms across multiple dimensions of difficulty in making career decisions. Interestingly, we did not find that ego identity strongly predicted career decision-making difficulties in that commitment and future self-did contribute weakly to the prediction of profile classification. These findings are inconsistent with those of previous studies which have shown that self-identity is one cause of career decision-making difficulties (Cohen et al., 1995; Guerra & Braungart-Rieker, 1999; Kulcsár et al., 2020). However, previous literature on the relationship between these two has used variable-centered methods, and some studies have indicated that an individual-centered method may yield very different conclusions than a variable-centered method (Howard & Hoffman, 2017). Therefore, this study suggests that study engagement has a more significant impact on career decisions than ego-identity.

Implications for practice

The present study has several theoretical and practical implications. Inconsistent with the findings of previous variable-centered research (Chartrand et al., 1994; Larson et al., 1988) and person-centered research (Levin et al., 2022), the investigation provides a new person-centered exploration of the heterogeneity of career decision-making difficulties among college students from a non-Western context, filling gaps in heterogenic classifications in both measuring and planning career decision-making difficulties in a Chinese cultural context (Hou & Zhang, 2007). In addition, similar to Levin and colleagues (2022), the present study focused mainly on college students rather than the general population, allowing our findings to provide some practical suggestions for universities in improving course design and career guidance.

First, two unique career decision-making difficulties profiles were identified: *lack of readiness* and *lack of information–general indecisiveness*. Identifying two new and unique types of career indecision can contribute to the design of more effective career interventions for these types (Kelly & Pulver, 2003; Levin et al., 2022). For the *lack of readiness* group, we advise colleges to create activities that enhance students' awareness of careers and readiness abilities (Koys, 2017). For example, creating mock interviews

using an online interview tool (Crowne et al., 2020). For the *lack of information–general indecisiveness* group, developing career planning exercises for use in the classroom such as a four-year resume activity (Laker & Laker, 2007) to help students' self-discovery of their strengths and interests, and connecting these to potential career choices. We also suggest involving faculty such as providing career counselors (Crowne et al., 2020) to help build students' confidence in making final career decisions.

Second, the results of the current study suggest that gender, study major, and grade are all related to distinct career decision-making difficulties profiles, for example, females were more likely than males to fall into the *salient group*, and the *lack of information–general indecisiveness* group. Therefore, Chinese universities should help female college students in particular in developing a variety of cognitive strategies to address career gender discrimination by providing career counseling and career planning courses (Tian & Hou, 2023).

Third, the results of this study indicate that different study levels exhibit different types of career decision-making difficulties. To our knowledge, most universities in China offer only one career planning course throughout the whole four years of a college program, rather than presenting the process in stages and continuing the actual career exploration process over multiple years throughout students' entire study program. Combining the findings of this study with the suggestions of Crowne and colleagues (2020), Chinese universities should design a series of career-embedded courses throughout students' four years of college, which could provide them with practical help in each study year as they encounter new career decision-making difficulties.

Finally, our findings reveal that study engagement has a more significant impact on career decisions than ego-identity. Therefore, universities should stimulate students' interest and energy investment in their study majors to reduce their uncertainty in the career decision-making process (Ketonen et al., 2016) to reduce their career decision-making difficulties. For instance, to help students connect their formal education with their future careers, universities should set up career exploration events during their first years of college, such as graduate meetings and professional interviews (Crowne et al., 2020).

Limitations and future research directions

The findings of the current study should be interpreted with several limitations in mind. First, as this study adopted a cross-sectional observational design, we would not investigate the stability or changes of career decision-making difficulties profiles over time. Previous research has indicated that career decisions are not a one-time event (Gadassi et al., 2013), which means that individuals who may have experienced a high level of career decision-making difficulties while making their first career-related choices could experience a low level of difficulty in their later career decisions. Therefore, we recommend that future research adopt a longitudinal design to further explore these interesting topics. Second, the assessment tools utilized in the current study were self-report scales, and results obtained through exclusive reliance of self-report assessments in samples can be influenced by social desirability, lack of insight, or dishonesty (Patrick, 2018). Future research should adopt other reliable assessment methods (e.g., clinical interviews) to replicate our findings using multiple informants.

Conclusion

To summarize, the current study is significant in its use of a person-centered approach (i.e., LPA) to denote career decision-making difficulties in subgroups based on individuals' profiles. It further explored the differences among different types of individuals in terms of their demographic variables, level of study engagement, and ego-identity. The findings contribute toward a better understanding of the characteristics of these subtypes, thus having significant practical implications. In particular, the study's findings can aid college students in making career decisions, which will tangentially improve their quality of life in one of its most important domains—work.

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Data availability The data that support the findings of this study are available from the first author, HW, upon reasonable request.

Declarations

Conflict of interest The authors report no conflicts of interest.

References

Amir, T., Gati, I., & Kleiman, T. (2008). Understanding and interpreting career decision-making difficulties. *Journal of Career Assessment*, *16*(3), 281–309. https://doi.org/10.1177/1069072708317367

Anghel, E., & Gati, I. (2021). The associations between career decision-making difficulties and negative emotional states. *Journal of Career Development*, *48*(4), 537–551. https://doi.org/10.1177/0894845319884119

Asparouhov, T., & Muthén, B. (2014). Auxiliary variables in mixture modeling: Three-step approaches using Mplus. *Structural Equation Modeling: A Multidisciplinary Journal*, *21*(3), 329–341. https://doi.org/10.1080/10705511.2014.915181

Bacanli, F. (2016). Career decision-making difficulties of Turkish adolescents. *International Journal for Educational and Vocational Guidance*, *16*(2), 233–250. https://doi.org/10.1007/s10775-015-9304-8

Bergeron, L. M., & Romano, J. L. (1994). The relationships among career decision-making self-efficacy, educational indecision, vocational indecision, and gender. *Journal of College Student Development*, *35*(1), 19–24. http://psycnet.apa.org/record/1994-31464-001

Brown, S. D., & Rector, C. C. (2008). Conceptualizing and diagnosing problems in vocational decision making. *Handbook of counseling psychology* (4th ed., pp. 392–407). John Wiley & Sons, Inc.

Burnett, P. C. (1991). Decision-making style and self-concept. *Australian Psychologist*, *26*(1), 55–58. https://doi.org/10.1080/00050069108258834

Campbell, R. E., & Heffernan, J. M. (1983). Adult vocational behavior. In W. B. Walsh, & S. H. Osipow (Eds.), *Handbook of vocational psychology*. Foundations.

Chartrand, J. M., Martin, W. F., Robbins, S. B., McAuliffe, G. J., Pickering, J. W., & Calliotte, J. A. (1994). Testing a level versus an interactional view of career indecision. *Journal of Career Assessment*, *2*(1), 55–69. https://doi.org/10.1177/106907279400200106

Clark, S., & Muthén, B. (2009). *Relating latent class analysis results to variables not included in the analysis*. https://doi.org/10.1016/j.ijid.2014.03.1250

Clemens, E. V., & Milsom, A. S. (2008). Enlisted service members' transition into the civilian world of work: A cognitive information processing approach. *The Career Development Quarterly*, *56*(3), 246–256. https://doi.org/10.1002/j.2161-0045.2008.tb00039.x

Cohen, C. R., Chartrand, J. M., & Jowdy, D. P. (1995). Relationships between career indecision subtypes and ego identity development. *Journal of Counseling Psychology*, *42*(4), 440–447. https://doi.org/10.1037/0022-0167.42.4.440

Creed, P. A., & Yin, W. O. (2006). Reliability and validity of a Chinese version of the career decision-making difficulties questionnaire. *International Journal for Educational and Vocational Guidance*, *6*(1), 47–63. https://doi.org/10.1007/s10775-006-0003-3

Crowne, K. A., Brown, M., Durant, D., Baburaj, Y., Hornberger, P., McCloskey, D., & Vike, L. (2020). A program for embedding career activities in multiple core business courses. *The International Journal of Management Education*, *18*(3), 100421. https://doi.org/10.1016/j.ijme.2020.100421

Erikson, E. H. (1980). *Identity and the life cycle*. Norton.

Foti, R. J., Bray, B. C., Thompson, N. J., & Allgood, S. F. (2012). Know thy self, know thy leader: Contributions of a pattern-oriented approach to examining leader perceptions. *The Leadership Quarterly*, *23*(4), 702–717. https://doi.org/10.1016/j.leaqua.2012.03.007

Gadassi, R., Gati, I., & Wagman-Rolnick, H. (2013). The adaptability of career decision-making profiles. *Journal of Career Development*, *40*(6), 490–507. https://doi.org/10.1177/0894845312470027

Gadassi, R., Waser, A., & Gati, I. (2015). Gender differences in the association of depression with career indecisiveness, career-decision status, and career-preference crystallization. *Journal of Counseling Psychology*, *62*(4), 632–641. https://doi.org/10.1037/cou0000113

Gao, Z., & Wang, Q. (2023). Employment pressure of Chinese college students and its alleviating strategies. *SHS Web of Conferences*, *180*, 02032. https://doi.org/10.1051/shsconf/202318002032

Gati, I., & Saka, N. (2001). Internet-based versus paper-and-pencil assessment: Measuring career decision-making difficulties. *Journal of Career Assessment*, *9*, 397–416. https://doi.org/10.1177/106907270100900406

Gati, I., Krausz, M., & Osipow, S. H. (1996). A taxonomy of difficulties in career decision making. *Journal of Counseling Psychology*, *43*(4), 510–526. https://doi.org/10.1037/0022-0167.43.4.510

Gati, I., Saka, N., & Krausz, M. (2001). Should I use a computer-assisted career guidance system? It depends on where your career decision-making difficulties lie. *British Journal of Guidance & Counselling, 29*(3), 301–321.

Gati, I., Landman, S., Davidovitch, S., Asulin-Peretz, L., & Gadassi, R. (2010). From career decision-making styles to career decision-making profiles: A multidimensional approach. *Journal of Vocational Behavior*, *76*(2), 277–291. https://doi.org/10.1016/j.jvb.2009.11.001

Gordon, L., & Meyer, J. C. (2002). Career indecision amongst prospective university students. *South African Journal of Psychology*, *32*(4), 41–47. https://doi.org/10.1177/008124630203200405

Gudicha, D. W., & Vermunt, J. K. (2013). Mixture model clustering with covariates using adjusted three-step approaches. In B. Lausen, Van den D. Poel, & A. Ultsch (Eds.), *Algorithms from and for nature and life, studies in classification, data analysis, and knowledge organization* (pp. 87–94). Springer.

Guerra, A. L., & Braungart-Rieker, J. M. (1999). Predicting career indecision in college students: The roles of identity formation and parental relationship factors. *The Career Development Quarterly*, *47*(3), 255–266. https://doi.org/10.1002/j.2161-0045.1999.tb00735.x

Hofmans, J., Wille, B., & Schreurs, B. (2020). Person-centered methods in vocational research. *Journal of Vocational Behavior*, *118*, 103398.

Hou, Z., & Zhang, N. (2007). Counseling psychology in China. *Applied Psychology: An International Review*, *56*(1), 33–50. https://doi.org/10.1111/j.1464-0597.2007.00274.x

Hou, Z., Li, X., Liu, Y., & Gati, I. (2015). The emotional and personality-related career decision-making difficulties questionnaire—validation of the Chinese version. *Journal of Career Assessment*, *24*(2), 366–379. https://doi.org/10.1177/1069072715580565

Howard, M. C., & Hoffman, M. E. (2017). Variable-centered, person-centered, and person-specific approaches. *Organizational Research Methods*, *21*(4), 846–876. https://doi.org/10.1177/1094428117744021

Jiang, D., Santos, R., Mayer, T., & Boyd, L. (2016). Latent transition analysis for program evaluation with multivariate longitudinal outcomes. In L. van der Ark, D. Bolt, W. C. Wang, J. Douglas, & M. Wiberg (Eds.), *Quantitative psychology research. Springer proceedings in mathematics & statistics* (167th ed., pp. 377–388). Springer.

Kelly, K. R., & Pulver, C. A. (2003). Refining measurement of career indecision types: A validity study. *Journal of Counseling and Development*, *81*(4), 445–453. https://doi.org/10.1002/j.1556-6678.2003.tb00271.x

Ketonen, E. E., Haarala-Muhonen, A., Hirsto, L., Hänninen, J. J., Wähälä, K., & Lonka, K. (2016). Am I in the right place? Academic engagement and study success during the first years at university. *Learning and Individual Differences*, *51*, 141–148. https://doi.org/10.1016/j.lindif.2016.08.017

Koys, D. J. (2017). Using the department of labor's my next move to improve career preparedness. *Journal of Management Education*, *41*(1), 94–117. https://doi.org/10.1177/1052562916670195

Kuh, G. D. (2001). Assessing what really matters to student learning inside the national survey of student engagement. *Change: The Magazine of Higher Learning*, *33*, 10–17. https://doi.org/10.1080/00091380109601795

Kulcsár, V., Dobrean, A., & Balázsi, R. (2020). Does it matter if I am a worrier? The effect of worry as a moderator between career decision-making difficulties and negative dysfunctional emotions.

Journal of Youth and Adolescence, *49*(2), 549–564. https://doi.org/10.1007/s10964-019-01118-8

Laker, D. R., & Laker, R. (2007). The five-year resume: A career planning exercise. *Journal of Management Education*, *31*(1), 128–141. https://doi.org/10.1177/1052562906290525

Larson, L. M., Heppner, P. P., Ham, T., & Dugan, K. (1988). Investigating multiple subtypes of career indecision through cluster analysis. *Journal of Counseling Psychology*, *35*(4), 439–446. https://doi.org/10.1037/0022-0167.35.4.439

Lent, R. W., & Brown, S. D. (2020). Career decision making, fast and slow: Toward an integrative model of intervention for sustainable career choice. *Journal of Vocational Behavior*, *120*, 103448. https://doi.org/10.1016/j.jvb.2020.103448

Leung, S. A., Hou, Z. J., Gati, I., & Li, X. (2011). Effects of parental expectations and cultural-values orientation on career decision-making difficulties of Chinese University students. *Journal of Vocational Behavior*, *78*(1), 11–20. https://doi.org/10.1016/j.jvb.2010.08.004

Levin, N., Lipshits-Braziler, Y., & Gati, I. (2022). The identification and validation of five types of career indecision: A latent profile analysis of career decision-making difficulties. *Journal of Counseling Psychology*, *69*(4), 452–462. https://doi.org/10.1037/cou0000603

Li, X. Y. (2007). A report on revised Career decision- making Difficulty Questionnaire. *Chinese Journal of Clinical Psychology*, *15*(5), 467–469. https://doi.org/10.16128/j.cnki.1005-3611.2007.05.019

Li, X. Y. (2010). A revise of the UWES-S of Chinese college samples. *Psychological Research Psychologische Forschung*, *3*(1), 84–88.

Li, X., Xiang, G., & Gui, Y. (2021). Between materialism and post-materialism-changes in the job attitudes of graduates in post pandemic age. *Beijing Cultural Review*, *75*, 120–129.

Liu, X., Ji, X., Zhang, Y., & Gao, W. (2023). Professional identity and career adaptability among Chinese engineering students: The mediating role of learning engagement. *Behavioral Sciences*, *13*(6), 2–12. https://doi.org/10.3390/bs13060480

Lv, Y. J. (2010). The relationship between career decision-making difficulties and parenting style of college graduates. *Journal of Henan University*, *50*(03), 142–146. https://doi.org/10.15991/j.cnki.411028.2010.03.018

Magnusson, D. (2003). The person approach: Concepts, measurement models, and research strategy. In S. C. Peck & R. W. Roeser (Eds.), *New directions for Child and Adolescent development*. Person-centered approaches to studying development in context (No. 101, pp. 3–23). Jossey-Bass.

Makki, B. I., Feng, F., Waqar, M. A., & Adhikari, I. M. (2023). Work readiness, decision-making Self-Efficacy, and Career Exploration among Engineering students: A two-step Framework. *Mathematical Problems in Engineering*, 1–8. https://doi.org/10.1155/2023/8166825

Marcia, J. E., Waterman, A. S., Matteson, D. R., Archer, S. L., & Orlofsky, J. L. (2012). *Ego identity: A handbook for psychosocial research*. Springer Science & Business Media.

Marsh, H. W., Lüdtke, O., Trautwein, U., & Morin, A. J. S. (2009). Classical latent profile analysis of academic self-concept dimensions: Synergy of person- and variable-centered approaches to theoretical models of self-concept. *Structural Equation Modeling: A Multidisciplinary Journal*, *16*(2), 191–225. https://doi.org/10.1080/10705510902751010

Mau, W. C. (1995). Decision-making style as a predictor of career decision-making status and treatment gains. *Journal of Career Assessment*, *3*(1), 89–99. https://doi.org/10.1177/106907279500300107

Mau, W. C. (2001). Assessing career decision-making difficulties: A cross-cultural study. *Journal of Career Assessment*, *9*(4), 353–364. https://doi.org/10.1177/106907270100900403

Mau, W. C. (2004). Cultural dimensions of career decision-making difficulties. *The Career Development Quarterly*, *53*, 67–77. https://doi.org/10.1002/j.2161-0045.2004.tb00656.x

Meng, L., & Jin, Y. (2017). A confirmatory factor analysis of the Utrecht work engagement scale for students in a Chinese sample. *Nurse Education Today*, *49*, 129–134. https://doi.org/10.1016/j.nedt.2016.11.017

Meyer, J. P., Stanley, L. J., & Vandenberg, R. J. (2013). A person-centered approach to the study of commitment. *Human Resource Management Review*, *23*(2), 190–202. https://doi.org/10.1016/j.hrmr.2012.07.007

Milot-Lapointe, F., Le Corff, Y., & Savard, R. (2022). Processes and outcomes of individual career counselling for different types of clients: A latent profile analysis replication and extension. *British Journal of Guidance & Counselling*, *50*(5), 677–686. https://doi.org/10.1080/03069885.2021.1959518

Mullen, A. L. (2014). Gender, social background, and the choice of college major in a liberal arts context. *Gender & Society, 28*(2), 289–312. https://doi.org/10.1177/0891243213512721

Muthén, B., & Muthén, L. K. (2000). Integrating person-centered and variable-centered analyses: Growth mixture modeling with latent trajectory classes. *Alcoholism: Clinical and Experimental Research*, *24*(6), 882–891. https://doi.org/10.1111/j.1530-0277.2000.tb02070.x

Muthén, L. K., & Muthén, B. O. (2017–2022). *Mplus user's guide* (8th ed.). Muthén & Muthén.

Neff, K. (2003). Self-compassion: An alternative conceptualization of a healthy attitude toward oneself. *Self and Identity, 2*(2), 85–101.

Patrick, C. J. (Ed.). (2018). *Handbook of psychopathy*. Guilford Publications.

Peng, M. Y. P., & Yue, X. (2022). Enhancing career decision status of socioeconomically disadvantaged students through learning engagement: Perspective of SOR model. *Frontiers in Psychology*, *13*. https://doi.org/10.3389/FPSYG.2022.778928

Schaufeli, W. B., Salanova, M., González-romá, V., & Bakker, A. B. (2002). The measurement of engagement and burnout: A two sample confirmatory factor analytic approach. *Journal of Happiness Studies*, *3*(1), 71–92. https://doi.org/10.1023/A:1015630930326

Storme, M., & Celik, P. (2018). Career exploration and career decision-making difficulties. *Journal of Career Assessment*, *26*(3), 445–456. https://doi.org/10.1177/1069072717714540

Tein, J. Y., Coxe, S., & Cham, H. (2013). Statistical power to detect the correct number of classes in latent profile analysis. *Structural Equation Modeling: A Multidisciplinary Journal*, *20*(4), 640–657. https://doi.org/10.1080/10705511.2013.824781

Tian, L., & Hou, Z. (2023). Gender discrimination and career decision-making difficulties among female Chinese college students: The buffering role of coping styles. *Career Development Quarterly*, *71*(1), 56–67. https://doi.org/10.1002/cdq.12314

Tien, H. L. S. (2005). The validation of the career decision-making difficulties scale in a Chinese culture. *Journal of Career Assessment*, *13*(1), 114–127. https://doi.org/10.1177/1069072704270327

Udayar, S., Levin, N., Lipshits-Braziler, Y., Rochat, S., Di Fabio, A., Gati, I., & Rossier, J. (2020). Difficulties in career decision making and self-evaluations: A meta-analysis. *Journal of Career Assessment*, *28*(4), 608–635. https://doi.org/10.1177/1069072720910089.

Vermunt, J. K. (2010). Latent class modeling with covariates: Two improved three-step approaches. *Political Analysis*, *18*(4), 450–469. https://doi.org/10.1093/pan/mpq025.

Wang, D., Hou, Z. J., Ni, J., Tian, L., Zhang, X., Chi, H. Y., & Zhao, A. (2020). The effect of perfectionism on career adaptability and career decision-making difficulties. *Journal of Career Development, 47*(4), 469–483. https://doi.org/10.1177/0894845318803192

Wheeler, S. C., & Bechler, C. J. (2021). Objects and self-identity. *Current Opinion in Psychology*, *39*, 6–11. https://doi.org/10.1016/j.copsyc.2020.07.013.

Willner, T., Gati, I., & Guan, Y. (2015). Career decision-making profiles and career decision-making difficulties: A cross-cultural comparison among US, Israeli, and Chinese samples. *Journal of Vocational Behavior*, *88*, 143–153. https://doi.org/10.1016/j.jvb.2015.03.007.

Zhang, R. S. (2000). A study of ego identity and identity status in youth: The structure of identity status and methods of measurement. *Psychological Science*, *23*(4; ISSU 126), 430–434. https://doi.org/10.16719/j.cnki.1671-6981.2000.04.011.

Zhang, H., Wang, D., Hou, Z. J., Zhu, J., Jiang, Y., & Chen, S. (2022). Career indecisiveness and parent-child expectation incongruence in self-reliance: Does psychological separation buffer the link? *Personality and Individual Differences*, 111800. https://doi.org/10.1016/j.paid.2022.111800.

Zhou, D., & Santos, A. (2007). Career decision-making difficulties of British and Chinese international university students. *British Journal of Guidance & Counselling*, *35*(2), 219–235. https://doi.org/10.1080/03069880701256684.