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Development and validation of career decision making proficiency scale

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ABSTRACT

The purpose of the present research was to develop and examine the psychometric properties of the Career Decision Making Proficiency Scale (CDMPS). The new tool amalgamates various conceptual domains of career exploration process and validates its usage for students and young adults (N=565). The researcher used a survey research design that involved the theoretical evaluation by experts, mandating two subscale divisions for the original 40 items. A deductive approach was considered for the scale development. The content validity assessment by means of CVR- Lawshe's Test, Fleiss' Kappa statistics, and the CVI-proportion agreement method retained 34 items. R Studio software was used for dimension reduction techniques and inter-factor bi-variate correlations. The results of the item analysis confirmed 30 items clustered into five dormant constructs. The reliability coefficients of the two sub-scales were found to be high (α= 0.80 and 0.87). Furthermore, the exploratory factor analysis explained 52.45 percent and 50.99 percent of total variance, confirming the factorial internal structural validity of the two sub-scales, respectively. The scale can be administered by career and school counsellors to guide students with their career decisions, to assess career decision difficulties faced by weak students and potential dropouts or repeaters, and to assess students' confidence, motivation, and abilities in handling problematic situations at the time of deciding a career path.

Contribution/ Originality: A variety of populations have found CDMPS useful in various contexts. It is helpful for determining a person's readiness to make educated career selections, and is designed to evaluate an individual's actual competencies and behaviours (absent on the existing scales) rather than their self-perceived capacity to make professional decisions.

1. INTRODUCTION

Over the course of time, career exploration has become the most essential factor that influences career decision-making abilities among individuals [1]. Exploring one's career is perhaps a part of the extensive process of career decision-making and plays a vital role in motivating students to choose among various alternatives. The process of exploring various career alternatives is related to whether the individual is consistent and persistent in one's approach, whether he or she is extrinsically or intrinsically motivated, and the specific way of exploring their right career [2].

Career exploration and choosing a pertinent career of one's own choice is a challenging yet important method for majority of Indian adolescent students. It is required for students to have a detailed awareness of the various

career options to proceed with selecting the right career at the appropriate time to attain success in the future. The inevitability of career decision-making may motivate or dissuade students from picking the right career for themselves. Previous studies have shown a deplorable ignorance among Indian students about the broad spectrum of career options [3]. In most research, the focus has been given to career-related intervention programs to foster career exploration while also identifying specific reasons for difficulties faced by students during the career decision-making process [4]. Many career development theories explain the underlying aspects of career decision making in students. For instance, the essence of social-cognitive career theory [5, 6] revolves around three concomitant variables: self-efficacy beliefs, outcome expectations, and goals of an individual, additionally comprising interests, values, and other environmental factors as well.

Career decision-making proficiency is a concept that emerged from the various facets of career exploration process and is an amalgamation of different career developmental constructs such as *career decision-making autonomy*, *career decision-making maturity*, and *career indecision*. It is defined as "*an implicit capability of the individual to decide their career that manifests a proper understanding of what is required in accordance with their skills and aptitude*." Inefficiency in deciding one's career, being undecided most of the time, or facing difficulties in making right career choices could be very distressing for the student and hence may become the cause of their incongruous behaviour. On the other hand, being self-sufficient while deciding one's career, maintaining a positive attitude towards career decision-making beliefs, and being mature enough to be aware of one's abilities could lead students to a better future.

The process of developing a new scale is comprehensive and requires much iteration to ensure its wide utility among the target population. Administering various scales separately with copious items or statements to a large population of participants is exhaustive, and the chances of faking responses due to mental fatigue can increase the risk of result contamination. Therefore, the objective of the present study is to develop and standardize a new scale called 'Career Decision Making Proficiency Scale' (CDMPS), targeting mainly the academic state of native students with reasonable items concerning and covering various facets of career decision-making proficiency for adolescent students, and to examine its factor structure and psychometric properties.

2. METHODOLOGY

2.1. Scale Design

Scales, primarily aim to measure the underlying covert constructs that are difficult to assess overtly [7]. Also, developing new scales is meant to add a lot of social, emotional, behavioural, and cultural aspects to the existing ones, making them more reliable and valid for their usage. Narrowing down the applicability of the scale by understating the prime conceptual aspects of the latent constructs and the presence of disparate variances among scores must not be taken into consideration to elude scale invalidation [8-10].

2.2. Domain Identification and Item Generation

Prior to item framing, an abstract idea about domain articulation [11] was accentuated for the target group under study through an expansive literature review. Former scale constructs such as career decision-making autonomy [12], the career decision scale [13], and career decision difficulties questionnaire [14] were taken into consideration for an extensive premeditation on the aforementioned construct. However, in many instances, a lack of proper conceptualization and outlining of the domain can result in scale constructs with low psychometric properties and validity issues, making them difficult to analyze and comprehend [8]. To avoid such complications in our scale, we generated items keeping in view the Indian student population and their perceived strive for career choice, along with the different aspects of the whole career decision-making concept. Weframed40 statements preserving their relevance to the concept of career decision making proficiency.

2.3. Quantification of Content Validity

Content validity ensures the items measure what they purport to measure [7] and stipulates the relevance of their contents in order to encapsulate the perceived experience of the target population about the respective latent constructs [15]. The content domain of interest must justify the measurement's purpose [16].

Scale content representativeness is a two-phase process [17]. The proportional agreement measured by Content Validity Index (CVI) assesses the content validity of the scale, in which every item is recommended to two or more experts who rate it independently and comprehensively, considering its applicability to both the scale's sample of items and the construct as a whole [18]. Despite being subjectively measureable and unstandarized, scales and questionnaires still use content validity as an indicative psychometric index due to the development and judgment processes involved. Criterion-related and construct validity, on the other hand, are much more preferred [17].

The validity of the scale content was examined through expert evaluation by computing CVR, Fleiss' Kappa coefficient, and CVI on basis of the relevance and simplicity criteria. No less than 5 experts are required to evaluate the theoretical construct to control chance agreement [19]. Therefore, all 40 items generated were allowed to be evaluated by 6 male experts and 2 female experts. The experts and judges were recognized researchers who have knowledge and expertise in their respective areas of interest. None of the experts were involved in the delineation of the domain and composite items, thus reducing the chance of bias in their evaluation.

2.4. Content Validity Ratio

We computed the CVR [20] using a three-point rating system (1-essential, 2-useful but not important, and 3-not essential) to assess the essentiality of the items. According to reference [21], the CVR scale should be between -1 (complete disagreement) and 1 (perfect agreement). Items with high CVR ratings are considered essential by the majority of judges [22].

Table 1. Content validity ratio (CVR) by 8 experts rating items as 'Essential' (N=40 items).

Career decision making proficiency scale											
Items	**Ne**	**CVR**	**Items**	**Ne**	**CVR**	**Items**	**Ne**	**CVR**	**Items**	**Ne**	**CVR**
1	7	0.75	11	8	1.00	21	8	1.00	31	6	0.50
2	7	0.75	12	8	1.00	22	6	0.50	32	4	0.00
3	6	0.50	13	7	0.75	23	8	1.00	33	6	0.50
4	6	0.50	14	7	0.75	24	7	0.75	34	7	0.75
5	7	0.75	15	6	0.50	25	7	0.75	35	8	1.00
6	8	1.00	16	5	0.25	26	8	1.00	36	8	1.00
7	8	1.00	17	6	0.50	27	7	0.75	37	8	1.00
8	7	0.75	18	8	1.00	28	6	0.50	38	8	1.00
9	6	0.50	19	4	0.00	29	6	0.50	39	8	1.00
10	3	-0.25	20	7	0.75	30	7	0.75	40	5	0.25

Note: Ne= Number of experts rated item as 'essential'.
CVR/Ave= 0.68.
Proportion agreeing 'essential'= 0.875.

According to the standard values of lawshe's $CVR_{critical}$ table and values reproduced based on the exact binomial probabilities, the proportion of 8 experts rating the items as 'essential' is 0.88 [21, 22]. Table 1 (see above) displays the result of CDMPS content validity analysis. Eight experts rated the 40 items on the scale, determining whether or not each was 'important' for inclusion. We then computed the content validity ratio (CVR) for each item. Items with a CVR of 1.0 show that experts are in complete agreement that the item is necessary to include in the scale. The majority of experts think that an item is essential when its CVR is greater than 0.00 but less than 1.0. A CVR of 0.00 indicates that experts had differing opinions about the item, with an equal number classifying it as "essential" and "not essential."

Items with a negative CVR show that most experts considered them to be "not essential." We provide CVR average for each time. In this example, the average CVR is 0.68. Proportion agreeing "essential" is the percentage of experts who concurred that a particular item was "essential" to include in the scale.

The percentage in this instance is 0.875 (Table 1), indicating that 87.5% of the experts felt that each item was necessary on average. However, in our case, 25 items were rated as 'essential' by the majority of the experts and their agreement is beyond chance. CVR is calculated by the formula (Ne-N / 2) / (N / 2) where Ne= number of experts rating each item as 'Essential' and N= total number of experts. Items 10, 32, 19, 16, and 40 received a low CVR value, CVR<0.5 [21], but were allowed to be revised in CVI according to the experts. Item 10 received a negative CVR value, however, and were considered to be reviewed and tested again for other validity checks. Item 10 with a negative CVR value reflected a strong disagreement among the raters regarding their inclusion in the specific statement.

2.5. Proportion Agreement Method

Two 4-point Likert scales were used to score the items, with 1-Not relevant, 2-Items require revision, 3-Relevant but need some revision, and 4-Very relevant) and 1-Not clear, 2-Items need revision) representing relevance and simplicity, respectively. To verify that the items reflect the intended dimensions of the professional choice-making proficiency construct, the following criteria must be met: 3-Clear but needs some adjustment, and 4 is clear.

The expert opinion also suggested further partitioning the scale into two sub-sections according to the statements. The first sub-scale included items that evinced positive and encouraging connotation, while the other sub-scale consisted of items that reflected a negative connotation for the respective construct.

The content validity of individual items (I-CVI) and content validity of the overall scale using the Universal Agreement (UA) method (S-CVI/UA) was calculated manually (Tables 3 and 4). We dichotomized the 4-point ordinal scale into 'relevant' and 'not relevant' response categories, and the value of content validity index for each item on relevancy lies in the acceptable range.

Four items (item10, item19, item32, and item 40), received poor ratings, I-CVI<0.70 [19], and hence were eliminated from the initial scale. Similarly, the 4-point ordinal simplicity scale was dichotomized as 'simple' and 'not simple' response categories, and the content validity index for each item on simplicity obtained also lies in the acceptable range. Two items (item 16 and item 20) receiving poor ratings by all the experts were removed, I-CVI<0.70 [19].

The I-CVI for all 40 items ranged from 0.50 to 1.00. 32 items received I-CVI equal to 1 for the relevancy measure, and 34 items received I-CVI equal to 1 for simplicity measure. The values of S-CVI/UA greater than 0.80 and mean expert proportion (S-CVI/Ave) greater than 0.90 obtained for both relevance and simplicity scales were considered to be high and acceptable [23] (Table 2). A total of six items were eliminated due to low numeric values of CVI and CVR.

Table 2. Overall content validity index (CVI) of the scale (N=40 items) by 8 experts.

Relevance scale				Simplicity scale			
Total I-CVI	**S-CVI/Ave**	**S-CVI/UA**	**Proportion relevant**	**Total I-CVI**	**S-CVI/Ave**	**S-CVI/UA**	**Proportion simple**
37.39	0.93	0.80	8.8	37.80	0.95	0.85	8.4

Note: I-CVI= Item content validity index.
S-CVI= Scale content validity index.
UA- Universal agreement

Table 3. Ratings on 20 items by 8 experts: Items rated 3 or 4 on 4-point relevance scale (Subscale1).

Career decision making proficiency scale (Subscale1)										
Items	**Exp1**	**Exp2**	**Exp3**	**Exp4**	**Exp5**	**Exp6**	**Exp7**	**Exp8**	**No. of agreement**	**I-CVI**
1	x	x	x	x	x	x	x	x	8	1.00
2	x	x	-	x	-	x	x	x	6	0.75
3	x	x	x	x	x	x	x	x	8	1.00
4	x	x	x	x	x	x	x	x	8	1.00
5	x	x	x	x	x	x	x	x	8	1.00
6	x	x	x	x	x	x	x	x	8	1.00
7	x	x	x	x	x	x	x	x	8	1.00
8	x	x	x	x	x	x	x	x	8	1.00
9	x	x	x	x	x	x	x	x	8	1.00
10	-	x	-	x	x	x	x	x	6	0.75
11	x	x	x	x	x	x	x	x	8	1.00
12	x	x	x	x	x	x	x	x	8	1.00
13	x	x	x	x	x	x	x	x	8	1.00
14	x	x	x	x	x	x	x	x	8	1.00
15	x	x	x	x	x	x	x	x	8	1.00
16	-	x	-	x	x	-	x	x	5	0.63
17	x	x	x	x	x	x	x	x	8	1.00
18	x	x	x	x	x	x	x	x	8	1.00
19	-	x	-	x	x	-	x	-	4	0.50
20	x	x	-	x	x	x	x	x	7	0.88
Proportion relevant	0.85	1.00	0.75	1.00	0.95	0.90	1.00	0.95		

Note: Proportion relevant= 7.4.
I-CVI= 18.51.
S-CVI/UA= 0.75.
S-CVI/Ave= 0.93 (Accepted).

Table 4. Ratings on 20 items by 8 experts: Items rated 3 or 4 on 4-point relevance.

Career decision making proficiency scale (Subscale2)										
Items	**Exp1**	**Exp2**	**Exp3**	**Exp4**	**Exp5**	**Exp6**	**Exp7**	**Exp8**	**No. of agreement**	**I-CVI**
21	x	x	x	x	x	x	x	x	8	1.00
22	x	x	x	x	x	x	x	x	8	1.00
23	x	x	x	x	x	x	x	x	8	1.00
24	x	x	x	x	x	x	x	x	8	1.00
25	x	x	x	x	x	x	x	x	8	1.00
26	x	x	x	x	x	x	x	x	8	1.00
27	x	x	x	x	x	x	x	x	8	1.00
28	x	x	x	x	x	x	x	x	8	1.00
29	x	-	-	x	x	x	x	x	6	0.75
30	x	x	x	x	x	x	x	x	8	1.00
31	x	x	x	x	x	x	x	x	8	1.00
32	-	x	-	x	-	x	x	-	4	0.50
33	x	x	x	x	x	x	x	x	8	1.00
34	x	x	x	x	x	x	x	x	8	1.00
35	x	x	x	x	x	x	x	x	8	1.00
36	x	x	x	x	x	x	x	x	8	1.00
37	x	x	x	x	x	x	x	x	8	1.00
38	x	x	x	x	x	x	x	x	8	1.00
39	x	x	x	x	x	x	x	x	8	1.00
40	-	-	x	x	-	x	x	x	5	0.63
Proportion relevant	0.90	0.90	0.90	1.00	0.90	1.00	1.00	0.95		

Note: Proportion relevant= 7.6.
I-CVI= 18.88.
S-CVI/UA= 0.85 (Accepted).
S-CVI/Ave= 0.94 (Accepted).

2.6. Inter-Rater Reliability (IRR)

An index of inter-rater agreement must be used to figure out how relevant and reliable each item is. This index just shows how much agreement can be skewed by chance [18, 24, 25]. Fleiss' Kappa (k), an extension to Cohen's kappa, was used that overcomes the limitation of the latter regarding codes of only two raters for IRR [26]. Fleiss' kappa calculates a single kappa for all the raters for all possible combinations of codes [27].

Table 5. Inter-rater reliability (IRR) by 8 experts.

Items	1	2	3	Pi	Items	1	2	3	Pi
1	8	0	0	1	21	8	0	0	1
2	5	2	1	0.39	22	6	1	1	0.53
3	8	0	0	1	23	8	0	0	1
4	7	1	0	0.75	24	7	1	0	0.75
5	8	0	0	1	25	7	0	1	0.75
6	8	0	0	1	26	8	0	0	1
7	7	1	0	0.75	27	7	1	0	0.75
8	8	0	0	1	28	6	1	1	0.53
9	8	0	0	1	29	6	0	2	0.57
10	3	2	3	0.25	30	7	1	0	0.75
11	7	1	0	0.75	31	5	2	1	0.39
12	7	1	0	0.75	32	4	2	2	0.28
13	8	0	0	1	33	6	2	0	0.57
14	8	0	0	1	34	7	1	0	0.75
15	8	0	0	1	35	8	0	0	1
16	5	2	1	0.39	36	8	0	0	1
17	7	1	0	0.75	37	8	0	0	1
18	8	0	0	1	38	8	0	0	1
19	4	1	3	0.32	39	7	1	0	0.75
20	6	1	1	0.53	40	4	1	3	0.32
Pj	0.86	0.08	0.05		Pj	0.84	0.08	0.06	

Note: 1= Essential, 2= Useful but not essential, 3= Not essential.
Pi= Paired agreement of experts relative to the number of all possible pairs.
Pj= Proportion of all assignments for each category.

All 8 experts rated the statements based on the 3-point scale (1= Essential, 2= Useful but not essential, 3= Not essential) used earlier for CVR. The Kappa statistics were calculated for the two sub-scales separately by the formula:

(Observed Agreement) - (Expected Agreement)/ 1- (Expected Agreement)

Banerjee, et al. [28] according to Table 5, for subscale1 (items 1-20), Observed score= sum of Pi's/N = 0.782143 and Expected score= sum of Pj's/N = 0.037684. N refers to no. of responses by the experts. Therefore, Fleiss kappa= 0.773612. Similarly, for 21-40 items, Observed score= sum of Pi's/N = 0.735714 and Expected score= sum of Pj's/N = 0.036215. Hence, Fleiss kappa= 0.725784. based on their personal opinions, the expert raters interpreted the k values for both sub-scales as indicating substantial agreement [29].

2.7. Data Aggregation and Sample Size

The data was collected through an online form from students residing in different cities in Uttar Pradesh, India. A sample of 588 students participated in the survey. The statements were given to a group of adolescent students (*Mage*=18.00, *SD*=6.42) and young adults (*Mage*=23.00, *SD*=7.28), and they were asked to rate each item on the most reliable 5-point Likert-rating scale, **1**= strongly disagree, **2** = disagree, **3** = neutral, **4**= agree, and **5** = strongly agree, according to McKelvie [30] on the basis of their career proficiency, maturity, and autonomy about career decision-making. There were no missing cases, as the data was gathered through an online source. However, during data screening, few outliers were present that were removed before the analysis to avoid any contamination

of the results. The box plot observation detected 23 outliers in the data, and a sample of 565 students was left for the final analysis, which is a very good sample size for scale development [31].

2.8. Statistical Tools

R Studio version 1.4. 1106 [32] was used for dimension reduction techniques and inter-factor bivariate correlations using a bunch of in-build functions from different R packages: 'haven' for data ingression [33] 'psych' for psychometric and psychological research [34] 'MASS' (Modern Applied Statistics with S) is for modern applied statistics [35] 'stats' for statistical computation and graphics [36] 'ggplot2' for data visualization [37] and 'Hmisc' for computing sample size, factor analysis, and bi-variate correlation among several factors [38].

2.9. Factor Extraction and Inter-Factor Correlations

Reliability analysis and an inter-correlation matrix check were use to eleminate the scale's initial analyses of multi-collinearity and singularity. Thirty items remained on the original scale after the factor analysis eliminated four items and the content validation of the scale deleted six items (items 10, 16, 19, 20, 32, and 40). The sub-scales were subjected to separate applications of the principal component analysis (PCA) extraction method and an orthogonal Varimax rotation method to align with the correlated coordinates. The factor loadings led to the exclusion of items 3 and 4 from subscale 1 and items 22 and 29 from subscale 2, as their invalid factor loading was less than 0.50 in the final scale. For subscales 1 and 2, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy had values of 0.83 and 0.89, respectively, and both cases showed a significant result (p=0.00) on the Bartlett's Test of Sphericity (Table 6). 3 component solutions with Eigen values greater than one were obtained for subscale 1 by an unrestricted factor analysis on 16 items, which recovered 52.50% of the sample variance (inter-factorial validity). When there was a discernible difference between the three factors, we produced a more significant and comprehensible 3-factor regression model (Table 7). After factor loadings greater than 0.50 for every item were taken into account and kept, 14 elements fell into three latent factors, namely career autonomy, career maturity, and career reiteration. For subscale 2, to understand the underlying structure of a set of 18 items, PCA produced a 2-factor regression model explaining 51.00% of the sample variance (Table 8). Slope coefficients below 0.50 were considered unacceptable, although it is recommended to retain items possessing factor loadings above 0.40 [39, 40]. Only 16 items were clustered into two factors, namely career indecision and career resoluteness. The RStudio [32] result outputs are shown in Table 6, 7, and 8.

Table 6. Subscales 1 & 2: KMO and chi-square tests (N=565).

CDMPS (Career decision making proficiency scale)	Kaiser Meyer factor adequacy	Chi-square	p-value	Degrees of freedom (DF)
Subscale1	0.83	2156.92	0.00	91
Subscale2	0.89	3693.20	0.00	120

Table 7. Subscale 1: Rotated component matrix and variance explained.

Loadings	Factor1	Factor2	Factor3
Item1	0.659		
Item2			0.559
Item5	0.645		
Item6	0.734		
Item7	0.754		
Item8	0.717		
Item9	0.654		
Item11			0.708
Item12			0.787
Item13		0.640	

Loadings	Factor1	Factor2	Factor3
Item14		0.659	
Item15		0.702	
Item17		0.678	
Item18		0.512	
SS (Sum of squares) loadings	3.304	2.434	1.604
Proportion variance	0.236	0.174	0.115
Cumulative variance	0.236	0.410	0.525

Table 8. Subscale2: Rotated component matrix and variance explained.

Loadings	Factor1	Factor2
Item21	0.609	
Item23	0.676	
Item24	0.726	
Item25	0.743	
Item26	0.790	
Item27		0.772
Item28		0.767
Item30		0.662
Item31	0.732	
Item33	0.684	
Item34	0.731	
Item35	0.575	
Item36	0.680	
Item37	0.761	
Item38		0.575
Item39		0.727
SS (Sum of squares) loadings	5.544	2.614
Proportion variance	0.346	0.163
Cumulative variance	0.346	0.510

The significance levels for Pearson coefficient of correlations using 'rcorr' function in the 'Hmisc' package [38] were used for bi-variate correlations. The variables are named factors in the respective Table due to the coding configuration used by the present researchers. The results of the RStudio [32] analysis output are shown in Table 9.

Table 9. Subscales1 & 2: Correlation matrix (N=565).

Factors (Subscale1)	1	2	3	Total
1	1	0.47	0.26	0.86
2		1	0.20	0.77
3			1	0.56
Total				1
Factors (Subscale2)	1	2	Total	
1	1	0.22	0.94	
2		1	0.55	
Total			1	

Note: Subscale1: 1-Career autonomy, 2- Career maturity, 3- Career reiteration.
Subscale2: 1-Career indecision, 2- Career resoluteness.

2.10. Internal Consistency Measures and Descriptive Statistics

We assessed the internal consistency of the scale items using the Cronbach's alpha (α) coefficient [7, 41]. To estimate the psychometric property of a scale, it is preferred to have an alpha coefficient value ≥ 0.80; however, an adequate coefficient value of 0.70 can also be considered [40-42]. Using the 'alpha' function under the 'psych'

package [34], reliability analysis was carried out. Cronbach's α values ≥ 0.70 or 0.80 indicate a good reliability [43]. We calculated descriptive statistics using the pre-installed functions of the base packages in RStudio [32].

Table 10. Reliability and descriptive statistics of subscale 1.

Subscale1						95% confidence boundaries	
Dimensions	**Mean**	**Standard deviation (SD)**	**No. of items**	**Cronbach α (Raw alpha)**	**Standard alpha**	**Lower**	**Upper**
1	22.49	4.19	6	0.82	0.82	0.79	0.84
2	18.12	3.26	5	0.70	0.71	0.66	0.74
3	9.77	2.36	3	0.52	0.53	0.45	0.59
Total scale	50.38	7.406	14	0.80	0.81	0.78	0.83

Table 10 presents an overall evaluation of Subscale 1's reliability, as well as details on the descriptive statistics and dependability of each of the subscale's distinct aspects. The internal consistency of the items within each dimension is measured by Cronbach's alpha. Greater dependability is indicated by higher values. To illustrate, Dimension 1's Cronbach's alpha is 0.82.

In Dimersion 2, the Cronbach's alpha is 0.70.

For Dimension 3, the Cronbach's alpha is 0.52.

Overall, Subscale 1 has good internal consistency and reliability; Dimensions 1 and 2 are more reliable than Dimension 3. Additionally, the entire scale has excellent dependability, meaning that the items in Subscale 1 as a whole consistently measure the desired construct.

Table 11. Reliability and descriptive statistics of subscale 2.

Subscale2						95% confidence boundaries	
Dimensions	**Mean**	**Standard deviation (SD)**	**No. of items**	**Cronbach α (Raw alpha)**	**Standard alpha**	**Lower**	**Upper**
1	32.44	8.59	11	0.90	0.90	0.89	0.91
2	13.43	3.61	5	0.75	0.75	0.72	0.78
Total scale	45.87	10.01	16	0.87	0.86	0.85	0.88

Table 11 presents an overall evaluation of the reliability of Subscale 2 and provides information on the descriptive statistics and dependability of each of the subscale's distinct characteristics. With a high mean score of 32.44 for Dimension 1, it is clear that respondents typically receive high scores in this area. Although it's still pretty high, the standard deviation of 8.59 indicates considerable fluctuation in scores.

In comparison to Dimension 1, Dimension 2 has a lower mean score of 13.43, suggesting that respondents typically do worse on this dimension. When compared to Dimension 1, the standard deviation of 3.61 indicates lower score variability.

Dimension 1 and Dimension 2 exhibit strong internal consistency and dependability, as indicated by their respective Cronbach's alpha coefficients of 0.90 and 0.75. These coefficients imply a high degree of correlation between the items in each dimension, suggesting that they accurately reflect a similar underlying construct.

With a Cronbach's alpha rating of 0.87, Subscale 2's overall scale reliability is likewise good, suggesting that the subscale's items regularly measure the intended construct. Both dimensions of Subscale 2 exhibit acceptable to high levels of reliability, with the subscale exhibiting excellent internal consistency and reliability overall. Dimension 1's tendency towards greater scores and variability in comparison to Dimension 2 bolsters Subscale 2's overall dependability and descriptive statistics.

2.11. Subscales of Career Decision Making Proficiency Scale

The PCA method produced three latent factors for subscale 1 and two latent factors for subscale 2. We named the subscales based on which statements they contained. The 3 dimensions of subscale 1 measure career autonomy, career maturity, and career reiteration and are goal-focused, problem-focused, and solution-focused, respectively. Career decision-making autonomy (dimension 1) is a state of being self-reliant to make necessary steps regarding career choices and be able to complete career-related tasks effectively without assistance. Career decision-making maturity (dimension 2) is the state of being fully aware of one's capabilities to find a career in stressful and problematic situations.

Table 12. Career decision making proficiency subscales.

		Items	Statements	M	SD
Subscale1	*Career autonomy*	1	I can easily gather information about my career options on my own	3.47	1.07
		5	I can decide my career on the basis of my aptitude, skills and abilities	3.85	0.98
		6	I can complete my work successfully on time	3.85	0.89
		7	I can successfully make systematic steps while completing a bigger task on my own	3.68	0.98
		8	I can choose a career of interest that would motivate me to accomplish my goals	3.93	0.87
		9	I can identify and overcome academic problems once I've chose my career interest	3.71	1.00
	Career maturity	13	I can make right decisions about my career even if any problem occurs	3.64	0.96
		14	I can take necessary decisions while facing academic problems	3.82	0.85
		15	I can continue with my career even if I get frustrated with my career choice	3.39	1.09
		17	I can identify necessary steps while choosing a career for myself	3.82	0.88
		18	I can find new ways/ideas to motivate myself to carry on with a career which is not of my interest	3.44	1.03
	Career reiteration	2	I can switch to other career options if my interest in the current career decreases	3.15	1.10
		11	I can manage to find other career alternatives if I don't get my first career choice	3.48	0.97
		12	I can change my career at any point of time when I'm not satisfied with it	3.14	1.21
Subscale2	*Career indecision*	21	I am afraid I will make wrong choice to decide a career for myself	2.89	1.14
		23	I am undecided most of the times while deciding among different career alternatives	3.05	1.07
		24	I highly doubt my career-choosing abilities	2.73	1.16
		25	I am unsure about deciding among different career options of my interest	2.95	1.07
		26	I become confused while deciding a career for myself	2.93	1.14
		31	I find it difficult to make a career choice on my own	3.07	1.12
		33	I cannot handle the difficulties faced during making a career choice	2.68	1.05
		34	I get confused while making necessary steps to achieve my goals	3.06	1.09
		35	I face difficulty in getting necessary information from books and other sources	2.98	1.10
		36	I become under stress while deciding a career for myself	3.18	1.10
		37	It is usually very difficult for me to decide a career	2.92	1.14
	Career resoluteness	27	I exactly know which career to go for at the right time	2.66	1.06
		28	I can easily decide a right career from different career-related options	2.56	0.97
		30	I am sure and confident about deciding the right career at the right time	2.38	0.94
		38	I don't worry much while deciding a career	3.08	1.09
		39	I can choose a career of my interest effortlessly	2.74	1.04

Career reiteration (dimension 3) is a state in which an individual can redo the process of career exploration and is confident enough to decide amongst career alternatives. The two dimensions of subscale 2 measure career indecision and career resoluteness. Career indecision refers to the inability of an individual to be clear, distinct, and conclusive about the right career at a given point in time, and deal with or understand the situation in an

appropriate way, hence making it difficult to make decisions regarding career choices. On the contrary, career resoluteness refers to an individual's confidence and positive outlook while deciding on a career.

Table 12 presents the two subscales that make up the Career Decision Making Proficiency Subscales are Subscale 1 and Subscale 2. Every subscale is further broken down into several dimensions, each of which is represented by a unique set of statements and items:

Subscale 1: Autonomy in Career

This subscale emphasizes people's ability to independently decide on and carry out relevant career-related actions. Career Autonomy, Career Maturity, and Career Reiteration are its three constituent dimensions.

The dimension of career autonomy pertains to an individual's capacity to freely absorb information, make decisions, and overcome barriers.

Among the claims made are, "I can easily gather information about my career options on my own."

"I can decide my career on the basis of my aptitude, skills, and abilities."

There are moderate to high levels of agreement with the statements indicated by the mean scores for these items, which range from 3.47 to 3.93.

Dimension of Career Maturity has the capacity to overcome obstacles and make wise professional decisions. Among the assertions is "I can make the right career decisions even in the face of problems."

"I can find new ways or ideas to motivate myself to carry on with a career that is not of my interest." The mean scores range from 3.39 to 3.82, indicating moderate to high levels of agreement with these claims.

Dimension of Career Reiteration: emphasises having the flexibility and readiness to reevaluate and alter job options as needed. Statements like: "I can switch to other career options if my interest in the current career decreases." "I can change my career at any point in time when I'm not satisfied with it." There is moderate agreement with these claims, as shown by mean scores ranging from 3.14 to 3.48.

Subscale2: Uncertainty in Career

This subscale evaluates people's propensity for uncertainty and indecision when making decisions about their careers.

There are two components to it: Career Resoluteness and Career Indecision.

The mean (M) and standard deviation (SD) of each dimension are provided, along with particular items and phrases.

Dimension of Career Indecision represents emotions that come with choosing a vocation, such as anxiety, uncertainty, and perplexity. Among the statements are: "I fear that I won't choose the right career for myself." "I become confused while deciding a career for myself." Indicating moderate degrees of agreement with these claims, mean scores range from 2.68 to 3.18.

Dimension of Career Resoluteness demonstrates assurance, clarity, and comfort in choosing a career.

Some of the statements are, "I know exactly which career to pursue at the right time." "I can easily choose a career that suits my interests." The range of mean scores, which indicate different degrees of agreement with these claims, is 2.38 to 3.08.

3. DISCUSSION

The objective of the present study was to develop and standardize career decision-making proficiency scale and examine its factor structure and psychometric properties. We made an effort to establish content validity index and other validity checks counting CVR and Kappa statistics to make sure each item is essential and necessary to be included in the scale and has a reasonable amount of agreement among the experts. We achieved the factor structure of the scale through numerous reiterations that allowed for an unrestricted rotation. A few items were excluded from the item reduction technique and were discoursed to give an appropriate explanation. The items retained in the final scale possessed strong psychometric properties and a feasible factor structure with optimal

loadings. However, career reiteration had above average reliability (>0.50) and was thus considered to describe the attributes of the self-report instrument. The statistical results of the study provide a strong support for the robustness of the scale's psychometric properties.

The overall proficiency in deciding on an appropriate career can possibly be time-consuming and exhaustive for most of the students these days, and hence they must be encouraged in the right way to engage themselves in exploring various career options, starting with the ones that are easily accessible to them and may be beneficial in the long run. However, it is crucial to consider students' aptitude during this process, as varying internal sources of motivation may influence their approach to a specific career. Most undergraduates experience quandaries in the process of career decision-making, and an explanation for this problem can be manifold. Either students have multiple options, are unable to explore enough career alternatives, or are underprepared to make that choice in the current situation [14].

There are numerous applications for the career decision-making proficiency scale. You can use this self-report test alongside other relevant self-reports and data, and it is suitable for both individual and group testing. The scale is helpful for research, particularly when using interview, therapy, and survey techniques. It can be used by career and school counsellors to help students make career decisions, evaluate the challenges weaker students and potential dropouts or repeaters face in making career decisions, and gauge the students' tenacity, self-assurance, drive, and problem-solving skills when choosing a career path. Researchers can use the subscales separately based on their specific objectives.

3.1. Suggestions

A career decision-making self-report with strong psychometric properties is helpful to gain insights about the determination and motivation of students to pick the right career for them. However, it is also important to pay heed to limitations of the study. It is suggested to re-validate this scale through test of dimensionality on a different population of students to deduce measurement model or measurement invariance for the hypothesized factor structure. Also, a larger sample size would be better to augment its internal consistency. It is also recommended to measure the convergent and discriminant validity of the whole construct, along with examining the distribution of the scale construct scores over known binary groups [39, 44].

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