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Psychometric properties of career aspirations scale among undergraduate students

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ABSTRACT

Career aspiration plays a crucial role in shaping individuals' role identity and preparation for future responsibilities in society. However, limited research has focused on developing and validating instruments for assessing career aspirations within the Tanzanian higher education context. This study aimed to evaluate the psychometric properties of the Revised Career Aspiration Scale (CAS-R) O'Brien and Gregor (2016) among undergraduate students in Tanzania. A cross-sectional quantitative design was employed, involving a convenience sample of 231 undergraduate students (129 males, 55.8%; 102 females, 44.2%; M_{age} = 22.0 years, SD = 1.84) from Mbeya University of Science and Technology. Descriptive analysis and confirmatory factor analysis (CFA) were conducted using IBM SPSS and AMOS version 23. Results supported a three-factor structure—achievement aspiration, leadership aspiration, and educational aspiration—comprising 24 items. The model demonstrated an acceptable fit (χ^2/df = 1.89, CFI = 0.94, TLI = 0.93, RMSEA = 0.062, SRMR = 0.062), and satisfactory internal consistency ($\alpha > 0.70$). The findings confirm that the revised CAS-R is a valid and reliable measure for assessing career aspirations among undergraduate students in Tanzanian higher learning institutions.

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KEY WORDS:

career aspiration; configural invariance; confirmatory factor analysis; psychometric properties.

Introduction

Career aspiration is a fundamental aspect in education and career development through which students can realize their educational and career goals. The question of who to be in life is pertinent to individuals pursuing education and training as it represents their self-perceptions and roles in society (Gottfredson, 1981). Gottfredson stresses the self-awareness and career orientation for mapping future life. Gao and Eccles (2020) argue that career aspiration is fundamental for future prosperity as individuals invest time, effort and other resources in education and training to realise their educational and career dreams.

Moreover, several studies Hoff et al. (2022), Sapra et al. (2021), Zewude and Habtegiorgis (2022) found that career aspiration drives academic achievement, career choice, and decision-making. It is built on self-ability, interest, goals, expected outcomes, and positive perceptions of the related barriers to navigating career pathways (Murray et al., 2021). Education aims to prepare individuals to engage in socio-economic development in society; hence, aspiring career routes is critical. Al-Bahrani et al. (2020) elaborate that career aspiration sets a map for academic and future career orientation among students. Al-Bahrani and colleagues also found that students with high career aspirations showed high academic orientation, so high academic achievement. Likewise, Dzimiri (2019) asserts that students with career aspirations concentrate on their studies and are ambitious for their future profession. Valeeva et al. (2024) and Hsieh (2025) report that knowing the career pathway motivates career choice through which individuals take the career route of their interest, eventually, job satisfaction, and become independent in their lives and work productively. However, students need educational and career support as they come from diverse backgrounds, hence vary in academic abilities, career knowledge, perceptions, and experience (Amani & Mkumbo, 2016b; Amani & Mkumbo, 2016a; Margaret Nduta, 2020). Also, the school and home environment affect the student's career aspirations, eventually impacting their education and career trajectories (DeWitt and Archer, 2015; Saito, 2024). In this view, educators and career counsellors are central in

supporting students to realize their career dreams and follow the appropriate career pathways (Berger et al., 2020; Ismail, 2022; Acquah et al., 2020; Lazarová et al., 2019).

In addition, Wiswall and Zafar (2021) contend that preparing human capital for socioeconomic development is the central function of educational institutions, where students orient their educational and career aspirations. Beier et al. (2019) found that relevant teaching and learning approaches in classes have a significant contribution to career aspirations. Beier and colleagues also advocate for the role of teachers, school counsellors, and other education stakeholders in exposing students to educational and career experiences. In the same view, Krannich et al. (2019) highlight the importance of intervention programs to help students adjust their perceptions of studies and related career expectations.

Similarly, the qualitative study with secondary school students in Tanzania revealed varied perceptions about self and studies in relation to their future expectations (Adamson, 2024). Other studies in Tanzania Josephat et al. (2024), Ngussa and Charles (2019) found limited ability among secondary school students to choose appropriate subjects for their career and educational pathways. Also, limited career guidance and counselling services have been reported among secondary school students in Tanzania (Vaghela & Matimbwa, 2019). Amani, (2016) and Kibona (2023) found unstable and limited knowledge of the degree programs of their choice, and the actual world of work among students in Tanzanian higher learning institutions. In the same way, the studies Nyaganilwa et al., (2022), Urio and Nziku (2024) found limited career awareness among students in Tanzanian higher education students. In such a situation, Mwantimwa (2021) suggest devising external motivating factors for the higher education students to understand various study programs in relation to career opportunities in the labour market.

In sum, the studies conducted in Tanzania Adamson (2024), Amani and Mkumbo (2016b), Amani (2016), Amani and Mkumbo (2016a), Kibona (2023), Mwantimwa (2021), Ngussa and Charles (2019), Vaghela and Matimbwa (2019) emphasise the need for helping students to streamline their educational and career pathways. So, assessing career aspirations among higher education among higher education students is fundamental to help them realise their potential and appropriate educational and career routes. In addition, there is no evidence of development and validation of career aspiration scales in Tanzania. Therefore, validation of O'Brien and Gregor (2016) is pertinent.

The CAS-R was developed to assess the career aspirations of undergraduate female students in the U.S. The scale is a revised form of O'Brien (1996) original

scale and has three factors, comprising 24 items: leadership aspiration, achievement aspirations, and educational achievement. Leadership aspiration refers to the intention to take a leadership position in the future; achievement aspiration is an aspiration to attain set goals; while educational aspirations encompass the individual's motivation towards reaching higher levels of education in line with career prospects. The scale and its sub-sales showed adequate internal consistency in Cronbach's alpha (α>0.70) and the measurement model showed acceptable psychometric indices. The scale showed acceptable validity and reliability for assessing university students' career aspirations in the U.S.

The scale was developed to assess the career aspirations of female students in the U.S; but it has been widely used to assess career aspirations among students at various levels of education. For example, Kunchai et al. (2021) validated the Brien and Gregor Scale (CAS-R) in Thailand, in which only 18 scale items were extracted, and the sub-scales showed reliability at Cronbach's alpha (α) above the threshold value (0.7). Kim et al. (2016) translated and validated the scale to assess the career aspirations of female university students in Korea, in which 18 items were relevant, and sub-scales' Cronbach's Alpha ranged from 0.82 to 0.90. The study Gregor et al. (2019) showed that education and leadership aspirations were reliable in studying career aspirations among men in the U.S, while achievement aspiration demonstrated low Cronbach's Alpha (<.70). Furthermore, Bacanli (2025) validated CAS-R among Turkish university students. The study found the scale was valid and reliable to study career aspirations among university students in Turkey, and all 24 items were retained. The measurement model showed acceptable model-fit indices. Likewise, Khampirat (2020) adapted CAS-R to study career aspirations among university students in Thailand. In the study, all 24 scale items were retained and the scale showed adequate psychometric properties.

Although the CAS-R O'Brien and Gregor (2016) has been widely used in different research, but there are scanty studies in Tanzania, particularly in higher education institutions. Also, the reviewed studies have shown variation of the scale items and model-fit indices across different geographical regions. The present study, therefore, aimed at assessing the psychometric properties of the scale among undergraduate students in Tanzania. The validated scale would be used to assess career aspirations in Tanzania and other contexts. Also, the study would add more data instruments for assessing career aspirations among students in education settings.

Method

The study adapted a cross-sectional survey to examine the psychometric properties of the revised career aspiration scale (CAS-R) O'Brien and (Gregor, 2016) The study adopted quantitative approach through which data were gathered by a five point Likert scale.

Population and Sample

The study used convenience sampling to select 231 second-year students pursuing bachelor of Technical Education from the College of Science and Technical Education at the Mbeya University of Science and Technology for the study. The sample comprised 129 (55.8%) males and 102 (44.2%) females with the mean age of 22 years (SD=1.84). Majority of the participants 203 (.87.9%) aged 21 to 25 years.

Instrumentation

The study used the revised career aspiration scale (CAS-R) developed by O'Brien & Gregor (2016). The scale consists of 24 items, which are divided into three sub-scales: Leadership aspirations (8 items), achievement aspiration (8 items) and educational aspirations (8 items) rated at 5-point Likert scale set as 0("not at all true of me") to 4 ("very true of me"). The scale was originally developed to assess the career aspirations of women college students in US. The scale demonstrated adequate psychometric features: X2 (241, N=328) =909.45, p<.05, RMSEA=0.09, CFI=0.95, TLI=0.94. In addition, sub-scales showed adequate and acceptable reliability: Achievement=0.81; Leadership=0.87, and educational aspiration=0.90. The scale has been used globally to assess career aspirations of different groups of individuals in colleges, universities and secondary schools. Also, all items of the scale showed high factor loading (> 0.6).

Procedure and Ethical Considerations

The CAS-R (O'Brien & Gregor, 2016) was administered to the 231 participants who were conveniently sampled. The data were collected from April to May 2025. Prior to conducting the study, the researchers sought permission from the university authority to conduct a study. The researchers explained clearly to participants the purpose of the study that participation in the study was willingly and they were freely to withdrawal to continue with the study any time if they felt so. In addition, the participants were informed about the benefits, their rights, procedures related to engaging in the study and confidentiality of the collected data.

Data Analysis

The collected data were analyzed using IBM SPSS and AMOS version 23. In the analysis, the negative worded scale items (Item 6,8,10,11,14) were reversed in scoring. The analysis involved descriptive analysis and the confirmatory factor analysis (CFA) for examining the measurement model. The descriptive analysis concerned with mean (M), standard deviation (SD), Skewness and Kurtosis. The values of skewness and kurtosis ranging from ±1indicate approximately normal distribution of the data set (Groeneveld & Meeden, 1984). Confirmatory factor analysis focuses at examining the structure and relationships of the latent variables underlying the construct (Field, 2018). Schumacker and Lomax (2010) explain that CFA examines the existing number of factors of the research instrument and how they correlate with the observed variables. In addition, Schumacker and Lomax suggest to use CFA when performing psychometric evaluation of the scale with predefined number of factors.

In CFA, the Maximum Likelihood (ML) was used in which comparative fit index (CFI), Tucker-Lewis Index (TLI), Root mean squared error of approximation (RMSEA), Standardized Root Mean Square Residual (SRMR) were used to evaluate the measurement model (Hu & Bentler, 1999). In this way, the CFI, TLI ≥0.9, RMSEA<0.08, SRMR<0.08 are recommended thresholds for goodness fit of the measurement model. Convergent validity was evaluated by the average variance extracted (AVE); while the discriminant validity was assessed by square root of AVE, maximum shared variance (MSV), and average shared variance (ASV). (Fornell et al., 1981) suggest that the scale construct with AVE of 0.5 and above indicates the convergent validity. The discriminant validity will be evident when the square root of AVE should be greater than the inter-factor correlations and values of MSV and ASV should be lower than values of AVE (Campbell & Fiske, 1959).

Result

Descriptive Analysis

Table 1 shows the statistical analysis of mean, standard deviation, skewness and kurtosis of the 24-scale items of the revised career aspirations scale prior further analysis. The Skewness and Kurtosis values ranged between +1 and -1, indicating an approximately normal distribution of the data set (Groeneveld & Meeden, 1984).

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Table 1
Descriptive Analysis of 24 CAS-R items

	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
1. I hope to become a leader in my career field.	2.66	1.234	-.319	.160	-1.187	.319
2. I do not plan to devote energy to getting promoted to a leadership position in the organization or business in which I am working.	2.48	1.033	-.460	.160	-.251	.319
3. Becoming a leader in my job is not at all important to me.	2.41	1.251	-.378	.160	-.812	.319
4. When I am established in my career, I would like to manage other employees.	2.42	1.108	-.425	.160	-.342	.319
5. I want to have responsibility for the future direction of my organization or business.	2.59	1.165	-.300	.160	-.929	.319
6. Attaining leadership status in my career is not that important to me.	2.43	.966	-.424	.160	.006	.319
7. I hope to move up to a leadership position in my organization or business.	2.39	.953	-.394	.160	-.110	.319
8. I plan to rise to the top leadership position of my organization or business.	2.54	1.211	-.309	.160	-.929	.319
9. I want to be among the very best in my field.	2.01	.777	-.023	.160	-1.340	.319
10. I want my work to have a lasting impact on my field.	1.78	.879	-.134	.160	-.094	.319
11. I aspire to have my contributions at work recognized by my employer.	1.74	1.014	.035	.160	-.421	.319

12. Being outstanding at what I do at work is very important to me.	2.21	.929	.385	.160	-.674	.319
13. I know that I will be recognized for my accomplishments in my field.	2.14	.739	.491	.160	.291	.319
14. Achieving in my career is not at all important to me.	2.00	.772	.222	.160	-.718	.319
15. I plan to obtain many promotions in my organization or business.	2.13	.688	.466	.160	.519	.319
16. Being one of the best in my field is not important to me.	2.48	1.190	.114	.160	-1.511	.319
17. I plan to reach the highest level of education in my field.	2.55	1.391	-.357	.160	-1.304	.319
18. I will pursue additional training in my occupational area of interest.	2.57	1.113	-.572	.160	-.311	.319
19. I will always be knowledgeable about recent advances in my field.	2.62	1.227	-.406	.160	-.907	.319
20. I know I will work to remain current regarding knowledge in my field.	2.50	1.149	-.558	.160	-.389	.319
21. I will attend conferences annually to advance my knowledge.	2.71	1.185	-.694	.160	-.379	.319
22. Even if not required, I would take continuing education courses to become more knowledgeable.	2.55	1.171	-.414	.160	-.619	.319
23. I would pursue an advanced education program to gain specialized.	2.63	1.191	-.634	.160	-.491	.319
24. Every year, I will prioritize involvement in continuing education to advance my career.	2.62	1.146	-.359	.160	-.818	.319

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A Test for Sample Adequacy

The researchers performed a test for sample adequacy to perform confirmatory factor analysis. The KMO value is 0.91 (Table 2) which is above the threshold value greater or equal to 0.5 warranting performance of factor analysis.

Table 2

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.911
Bartlett's Test of Sphericity	Approx. Chi-Square	3541.982
	df	276
	Sig.	.000

Confirmatory Factor Analysis (CFA)

The study used CFA to examine the structure of the scale constructs by considering the scale items with factor loadings ≥0.4 as suggested by Stevens 2002 in (Field, 2018) . Also, the original scale O'Brien and Gregor (2016) and other studies that validated the scale, such as Kim et al. (2016) used 0.4 as the cut-off point for retaining the scale items. In the present study, all items of the scale showed adequate factor loading ranging from 0.49 to 0.89; hence all 24 items were retained (See Figure 1 & Table 3).

Figure 1

CFA for the 24 items of CAS-R

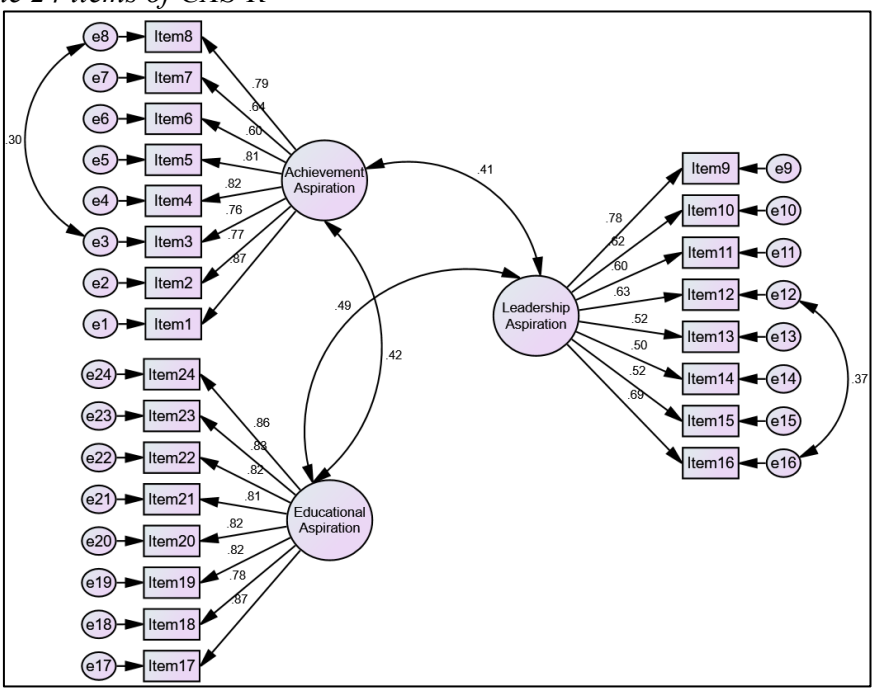


Table 3
Factor loading of the 24 CAS-R items

Factor/ Construct	Scale Statement / Item	Scale Item Code	Factor Loading
Achievement Aspirations	I want to be among the very best in my field.	Item1	.869
	I want my work to have a lasting impact on my field.	Item2	.771
	I aspire to have my contributions at work recognized by my employer.	Item3	.755
	Being outstanding at what I do at work is very important to me.	Item4	.823
	I know that I will be recognized for my accomplishments in my field.	Item5	.812
	Achieving in my career is not at all important to me.	Item6	.603
	I plan to obtain many promotions in my organization or business.	Item7	.637
	Being one of the best in my field is not important to me.	Item8	.789
Leadership Aspirations	I hope to become a leader in my career field.	Item9	.778
	I do not plan to devote energy to getting promoted to a leadership position in the organization or business in which I am working.	Item10	.616
	Becoming a leader in my job is not at all important to me.	Item11	.596
	When I am established in my career, I would like to manage other employees.	Item12	.629
	I want to have responsibility for the future direction of my organization or business.	Item13	.524
	Attaining leadership status in my career is not that important to me.	Item14	.499
	I hope to move up to a leadership position in my organization or business.	Item15	.523
	I plan to rise to the top leadership position of my organization or business.	Item16	.694
Educational Aspirations	I plan to reach the highest level of education in my field.	Item17	.783

	I will pursue additional training in my occupational area of interest.	Item18	.820
	I will always be knowledgeable about recent advances in my field.	Item19	.824
	I know I will work to remain current regarding knowledge in my field.	Item20	.814
	I will attend conferences annually to advance my knowledge.	Item21	.825
	Even if not required, I would take continuing education courses to become more knowledgeable.	Item22	.829
	I would pursue an advanced education program to gain specialized expertise.	Item23	.864
	Every year, I will prioritize involvement in continuing education to advance my career.	Item24	.783

Table 3 shows the factor loading of the scale items, in which all scale items loaded above 0.4. Then, table 4 summarises the model fit indices of the measurement model with respect to the suggested cuff-off (threshold) points for the model-fit indices.

Table 4
Model Fit Indices of the Measurement Model

Goodness of Fit Index	Threshold	Source	Model Result	Interpretation
Chi Square (X^2)/Degree of freedom (df)	≤3	(Tabachnick & Fidell, 2007)	1.89	Good Fit
Comparative Fit Index (CFI)	≥0.90	(Hu & Bentler, 1999)	.94	Good Fit
Tucker–Lewis Index (TLI)	≥0.90	(Schumacker & Lomax, 2010)	.93	Good Fit
Root Mean Square Error of Approximation (RMSEA)	< 0.08	(Hu & Bentler, 1999)	.062	Good Fit
Standardised RMR	≤0.08	(Hu & Bentler, 1999)	.062	Good Fit

Convergent and Discriminant Validity

The values of AVE used to determine the convergent validity of the scale

constructs. The scale construct will have convergent validity when the value of AVE is equal or greater than 0.5 (Fornell et al., 1981). The statistical analysis revealed that the two scale constructs namely, achievement aspiration and educational aspiration showed AVE greater than the threshold value, while leadership aspiration yielded low AVE (Table 5). Basing on the statistical analysis, the two constructs showed convergent validity, while one construct demonstrated weak convergent validity. The discriminant validity was assessed by the square root of AVE (bolded diagonal values) which are greater than the off-diagonal values (inter-correlations of the scale constructs) signifying the discriminant validity of the scale constructs (Table 5).

The study used composite reliability and Cronbach' s alpha (α) to evaluate the reliability of the constructs (sub-scales) in which all three constructs showed internal consitency above the threshold value (≥0.7) (See table 5) as suggested by (Cronbach, 1951).

Table 5

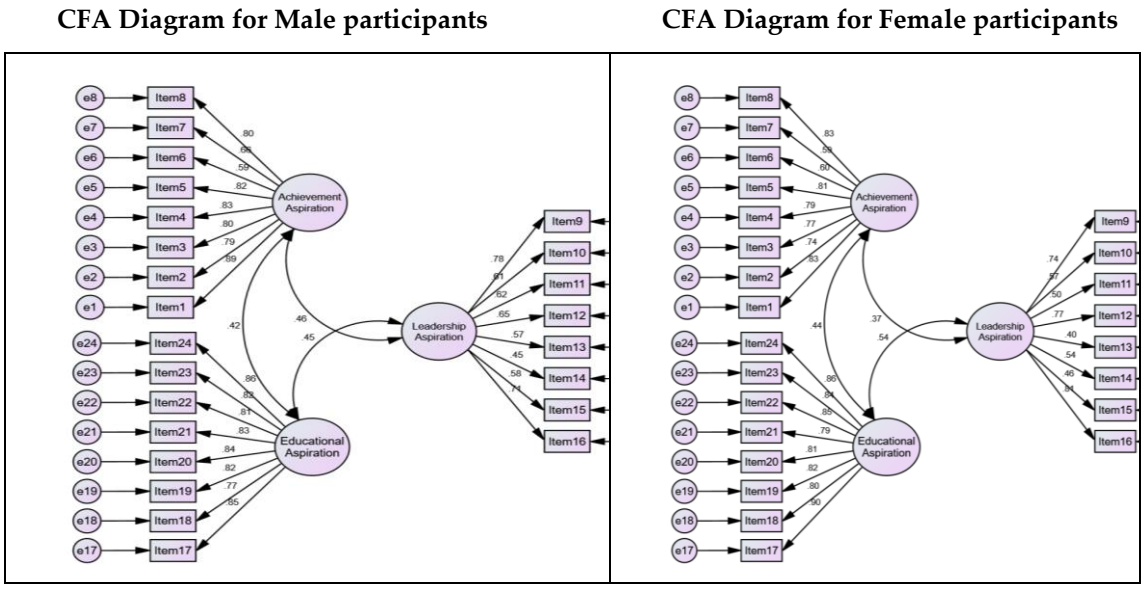
Convergent and Discriminant Validity

Construct	CR	Cronbach's Alpha(α)	AVE	MSV	MaxR(H)	1	2	3
1. Achievement Aspiration	0.92	.92	0.58	0.18	0.93	0.76		
2. Leadership Aspiration	0.83	0.83	0.38	0.24	0.84	0.41	0.61	
3. Educational Aspiration	0.95	.95	0.69	0.24	0.95	0.42	0.49	0.83

Measurement Model Invariance across Gender

The study assessed the equivalence of the psychometric properties between male and female participants. The measurement model invariance determines whether the entire measurement model measures consistently across groups or time (Putnick & Bornstein, 2016). The researchers used configural invariance to assess the measurement model invariance across male and female participants. The statistical analysis showed the configural invariance of the measurement model of career aspiration Scale (CAS-R) showed that the indicators of the latent variables were loaded to the respective constructs and measure interpreted in the same way across the groups. The unconstrained model showed good model fit: X2/df=1.55, TLI=0.91, CFI=0.92, RMSEA=0.049, SRMR=0.065. The statistical analysis (figure 2) indicates the data from male and female participants fit the model, therefore no difference in understanding of the indicators of the latent variables of the CAS-R scale among the participants. Also, the appropriateness of scale items loading and their related factor loading indicate configural invariance .

Figure 2
CFA between male and female participants



Discussion

The study focused at evaluating the psychometric properties of the CAS-R developed by O'Brien and Gregor (2016). The statistical analysis involved descriptive and CFA. Descriptive analysis showed skewness and kurtosis falling within ±1, indicating an approximately normal distribution of the data set. The CFA retained the three-factor model consisting of a total of 24 items: achievement aspiration (8 items), leadership aspiration (8 items), and educational aspirations (8 items). The study findings are consistent with the previous research by Bacanli (2025) in Turkey and Khampirat (2020) in Thailand which analysis retained the three factors and all 24 items, and therefore the scale was valid for assessing the career aspiration among university students. Also, the study findings are in line with the original scale (O'Brien & Gregor, 2016) that comprises 24 items. However, the findings of the present study oppose the study Kunchai et al. (2021) in Thailand and Kim et al. (2016) in Korea, in which found that 18 items were relevant for assessing career aspiration among university students.

In the present study, the measurement model showed adequate model-fit indices: X2/df=1.89, CFI=0.94, TLI=0.93, RMSEA=0.062, SRMR=0.062 which meet the recommended thresholds for good model fit (Hu & Bentler, 1999); (Schumacker & Lomax, 2010). Moreover, the convergent validity of the measurement model was evaluated by AVE in which the values were above the

threshold (0.5) (Table 5) indicating convergent validity among the scale constructs. The scale constructs showed good discriminant validity as the square roots of AVE of constructs (0.76, 0.61, 0.83) were greater than their inter-correlation values (See Table 5). The findings are in line with the set criteria (Campbell & Fiske, 1959), recommending that for the scale constructs to demonstrate divergence characteristics, the square root of AVE should be higher than the correlations of the entire constructs.

Moreover, the researchers examined the internal consistency of the scale constructs using Composite reliability and Cronbach's alpha in which the study's findings showed adequate reliability (>0.7). The findings are in line with the recommended threshold value for internal consistency suggested by (Cronbach, 1951).

The study assessed the invariance of the measurement model using configural invariance in which the unconstrained model demonstrated good fit: X2/df=1.55, TLI=0.91, CFI=0.92, RMSEA=0.049, SRMR=0.065. The findings imply consistency of the measurement model across different groups; in this case between male and female participants.

Conclusion

The study aimed at evaluating the psychometric properties of the revises career aspiration scale among undergraduate students in Tanzania. The study revealed that 18 scale items falling into three factors namely, achievement aspiration, leadership aspiration and educational aspiration are valid for assessing career aspirations among undergraduate university students in Tanzania. The findings are significant in psychometric literature and the validated scale can be used by educators and career counsellors in education settings to help students to smoothly go through their education journey and career decision-making. The present study encourages to assess the validity and reliability of the scale in other contexts and different levels of students in higher learning institutions.

Limitations of the Study

Although the study's findings give promising good model-fit, but has some limitations which could set a platform for new research. The study used one higher learning institution, thus more studies can be conducted with multiple institutions. Also, the study used one higher learning institution; other studies may use more than one learning institutions to assess the psychometric properties of the scale.

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