International Journal for Educational and Vocational Guidance
https://doi.org/10.1007/s10775-025-09738-2

Reciprocal relations between self-esteem, class engagement, and career calling: evidence from a two-wave longitudinal study

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Received: 17 September 2024 / Accepted: 8 April 2025

Abstract
This study aims to longitudinally investigate the relationships between self-esteem, class engagement, and career calling. A total of 161 university students were included in the final sample. Data were obtained using the Two-Dimensional Self-Esteem Scale, General Class Engagement Scale, and Career Calling Scale. The cross-lagged panel model revealed the paths (for indirect effects models and autoregressive) between self-esteem, class engagement, and career calling. The cross-lagged panel model demonstrated an acceptable fit with the data. The cross-lagged effect of self-esteem at time 1 on class engagement at time 2 was positive and significant. Furthermore, the cross-lagged effect of class engagement at time 1 on career calling at time 2 was positive and significant. Finally, all these results would support the longitudinal mediation effect of class engagement in the relationship between self-esteem and career calling.

Keywords Self-esteem · Class engagement · Career calling

Résumé
Cette étude vise à examiner longitudinalement les relations entre l'estime de soi, l'engagement en classe et la vocation professionnelle. 161 étudiants universitaires ont été inclus dans l'échantillon final. Les données ont été obtenues à l'aide d'une Échelle d'Estime de Soi à Deux Dimensions, d'une Échelle Générale d'Engagement en Classe, et d'une Échelle de Vocation Professionnelle. Le modèle de panel à effets croisés a révélé les chemins (chemins pour les modèles d'effets indirects et au-

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Published online: 02 May 2025

torégressifs) entre l'estime de soi, l'engagement en classe et la vocation professionnelle. Le modèle de panel à effets croisés a démontré un ajustement acceptable avec les données. L'effet croisé de l'estime de soi au Temps 1 sur l'engagement en classe au Temps 2 était positif et significatif. De plus, l'effet croisé de l'engagement en classe au Temps 1 sur la vocation professionnelle au Temps 2 était positif et significatif. Enfin, tous ces résultats soutiendraient l'effet de médiation longitudinale de l'engagement en classe dans la relation entre l'estime de soi et la vocation professionnelle.

Zusammenfassung
Diese Studie zielt darauf ab, die Beziehungen zwischen Selbstwertgefühl, Klassenengagement und Berufung longitudinell zu untersuchen. 161 Universitätsstudenten wurden in die endgültige Stichprobe aufgenommen. Die Daten wurden mit einer zweidimensionalen Selbstwertskala, einer allgemeinen Klassenengagement-Skala und einer Berufungs-Skala erhoben. Das kreuzverzögerte Panel-Modell zeigte die Pfade (Pfade für indirekte Effektmodelle und autoregressive) zwischen Selbstwertgefühl, Klassenengagement und Berufung. Das kreuzverzögerte Panel-Modell zeigte eine akzeptable Übereinstimmung mit den Daten. Der kreuzverzögerte Effekt des Selbstwertgefühls zu Zeitpunkt 1 auf das Klassenengagement zu Zeitpunkt 2 war positiv und signifikant. Darüber hinaus war der kreuzverzögerte Effekt des Klassenengagements zu Zeitpunkt 1 auf die Berufung zu Zeitpunkt 2 positiv und signifikant. Schließlich würden all diese Ergebnisse die longitudinale Vermittlungswirkung des Klassenengagements in der Beziehung zwischen Selbstwertgefühl und Berufung unterstützen.

Resumen
Este estudio tiene como objetivo investigar longitudinalmente las relaciones entre la autoestima, el compromiso en clase y la vocación profesional. En total, 161 estudiantes universitarios fueron incluidos en la muestra final. Los datos fueron obtenidos utilizando la Escala de Autoestima Bidimensional, Escala General de Compromiso en Clase y Escala de Vocación Profesional. El modelo de panel cruzado reveló los caminos (para modelos de efectos indirectos y autorregresivos) entre la autoestima, el compromiso en clase y la vocación profesional. El modelo de panel cruzado demostró un ajuste aceptable con los datos. El efecto cruzado de la autoestima en el tiempo 1 sobre el compromiso en clase en el tiempo 2 fue positivo y significativo. Además, el efecto cruzado del compromiso en clase en el tiempo 1 sobre la vocación profesional en el tiempo 2 fue positivo y significativo. Finalmente, todos estos resultados respaldarían el efecto de mediación longitudinal del compromiso en clase en la relación entre la autoestima y la vocación profesional.

Introduction

Individuals' selection of their careers, their pursuit of education, and continued engagement in the workforce post-education significantly contribute to their success during career transitions and employment (Hall, 2002). It has been found that individuals who are proactive about their careers can quickly establish career networks and achieve career success (Fuller & Marler, 2009; Hirschi et al., 2013). Efforts by individuals to pursue their careers with positive emotions enhance their person–environment fit (Ashforth et al., 2007) and positively contribute to their self-regulation (Bindl et al., 2011). Consequently, a longitudinal examination of university students' positive traits, such as self-esteem and proactive endeavors toward their careers, expressed as class engagement and career calling, can provide theoretical explanations, implications for practice, and contributions to empirical research.

Hypothesis development

The relationship between self-esteem and class engagement

Self-esteem is commonly viewed as a judgment where individuals express their approval or disapproval of themselves and assess their value (Rosenberg et al., 1995). Self-esteem plays a pivotal role in career outcomes, influencing the selection of occupations and overall career success ((Salmela-Aro & Nurmi, 2007). Research demonstrates that individuals with high self-esteem tend to pursue challenging and prestigious careers, aligning with their positive self-perception (Gottfredson, 1981; Tesser, 1988). This alignment suggests a self-fulfilling prophecy where positive self-regard enhances career achievement (McNatt & Judge, 2004). In contrast, those with negative self-esteem may settle for less prestigious positions, reinforcing their low self-worth (Kammeyer-Mueller et al., 2008). Thus, self-esteem significantly impacts career decisions and outcomes, highlighting self-perception's importance in professional development. Longitudinal studies have also underscored the importance of self-esteem. According to the results of a 10-year longitudinal study that began during university education, latent growth curve modeling revealed that individuals with high self-esteem tend to secure permanent employment a decade later, earn higher salaries, and experience greater work engagement and job satisfaction, along with lower burnout levels. Conversely, those with low self-esteem are more likely to be unemployed, feel exhausted and cynical, achieve less at work, and report lower work engagement and job satisfaction (Salmela-Aro & Nurmi, 2007). In summary, self-esteem is one of the most influential factors in the development of career-related attributes such as career adaptability (Hui et al., 2018), career decision self-efficacy (Hamzah et al., 2021), and career identity (Park & Choi, 2015).

The relationship between self-esteem and class engagement can be evaluated within the scope of studies conducted in an academic context. From a theoretical perspective, when the relationship between these two variables is examined, according to the expectancy-value theory, individuals' positive self-evaluations affect their

academic achievements and the positive outcomes they will demonstrate academically (Fang, 2016; Sirin & Rogers-Sirin, 2015). Studies have shown that self-esteem motivates academic engagement (Lim & Lee, 2017). As a result, self-esteem generally influences academic engagement. However, in this study, engagement is considered at the class level. It is thought that individuals' levels of self-esteem will increase, leading to an increase in their levels of class engagement.

The relationship between class engagement and career calling

Students' engagement is a significant indicator of academic life (Furrer et al., 2014). There are three critical engagement indicators: affective, behavioral, and cognitive. Engagement has many positive effects. These positive effects include energizing students for their academic tasks and simultaneously making them more motivationally resilient, as well as students' success in the learning attendance, process, students, and successful graduation (Fredricks et al., 2004; Martin & Marsh, 2009). Class engagement also protects students from risky behaviors (Furrer et al., 2014; Janosz et al., 2008).

The relationships between engagement and career calling have been addressed in various studies. For example, in a study conducted on Chinese students, positive relationships were found between their engagement and career callings (Chen et al., 2016). Another study examined the relationship between individuals' career callings and work engagement. It was concluded that the relationship between the two variables was positive (Xie et al., 2016). However, in the literature, studies need to directly examine the relationships between self-esteem, class engagement, and career calling.

Career calling is a concept that is closely related to an individual's sense of self. According to Elangovan et al. (2010), individuals' career callings are considered as their awareness of the gap between their actual and ideal selves. At this point, career calling is closely related to self-esteem, representing an essential aspect of the individual self (Higgins et al., 2013). According to self-determination (Ryan & Vansteenkiste, 2023) and perceived control (Skinner, 1995) theories, competence and satisfaction of other needs are behind individuals' class engagement. According to career construction theory, individuals' discoveries about their careers increase their career adaptability (Savickas & Porfeli, 2012). Class engagement can be seen as an essential exploration tool for university students' career callings. Longitudinal verification of the theoretical explanations expressed here can make critical contributions to the literature by verifying the assumptions of the theories and revealing the relationships between variables.

Theoretical framework

Although this study is based on theories such as expectancy-value theory and self-determination theory, as stated in the sections explaining the relationships between variables, other theories relate to the study. These theories are the career construction theory, person–organization fit theory, and life-span, life-space approach.

According to the person–organization fit theory, individuals make the right career choice and development when the characteristics of the job, organization, or environment are appropriate in addition to the characteristics of the individual (Kristof-Brown et al., 2023). Studies in the literature mainly evaluate the person–organization fit theory in the dimension of the individual's participation in working life (Raddatz, 2024; Subramanian et al., 2023). However, the preparation process is also critical. The preparation process is the precursor of career development in business life (Super, 1990). In other words, university students choose their careers and receive training in this field. In this context, their characteristics express the personal dimension, the education they receive, their active engagement in this educational process, and the education content constitute the environmental dimension of their career development. In this study, self-esteem and class engagement constitute the person dimension, while career calling constitutes the environmental and individual dimensions. Self-esteem is a meta-characteristic (Solheim et al., 2024) and is related to the self (Manzi et al., 2023). Furthermore, class engagement is an individual's emotional, behavioral, and cognitive connection to the subject matter to be learned in a career-related learning process (Skinner & Pitzer, 2012). Individuals' career callings also increase as these connections increase (Huang & Zhang, 2024). Regarding the person–organization fit theory, career calling points to the individual dimension with personal meaning and active engagement characteristics, while the other-oriented meaning dimension points to the environmental dimension. In this study, career calling is considered an endogenous variable due to its comprehensiveness, as it includes both the environmental and individual dimensions. Since this study covers university education, which is less emphasized but a critical preparation process for working life, it is considered necessary because it expands the assumptions of the person–organization fit theory.

According to Super's Life-Span, Life-Space Approach, university students are in the transition and testing phase of the research period. The focus of this theory is the self-development of individuals. Individuals strengthen themselves through career choices and development (Super, 1990). In this study, the self-esteem variable is considered a meta-psychological construct that contributes to the healthy structuring of the self, independent of the individual's career choices and development (Li et al., 2024). Career calling has been assessed as a psychological factor reflecting the self in the career field (Lau et al., 2020). Engagement is a very important tool that university students use in the college and classroom environments (Skinner & Pitzer, 2012) when exploring and constructing their career-related selves (see Figure 1).

In career construction theory, one of the postmodern theories of career counseling, the components of career adaptability (career curiosity and career confidence) are important psychosocial constructs (Savickas, 2020). Individuals with high career curiosity effectively explore their personal characteristics and professional opportunities. Individuals with high career confidence feel competent to adapt to possible transitions and crises in their career development and to fulfill their career tasks successfully (Santilli et al., 2024). It is believed that self-esteem, one of the variables addressed in this study, supports career confidence, one of the components of career adaptability. In addition, in this study, class engagement is the mediator of how career curiosity is realized in the classroom environment. In

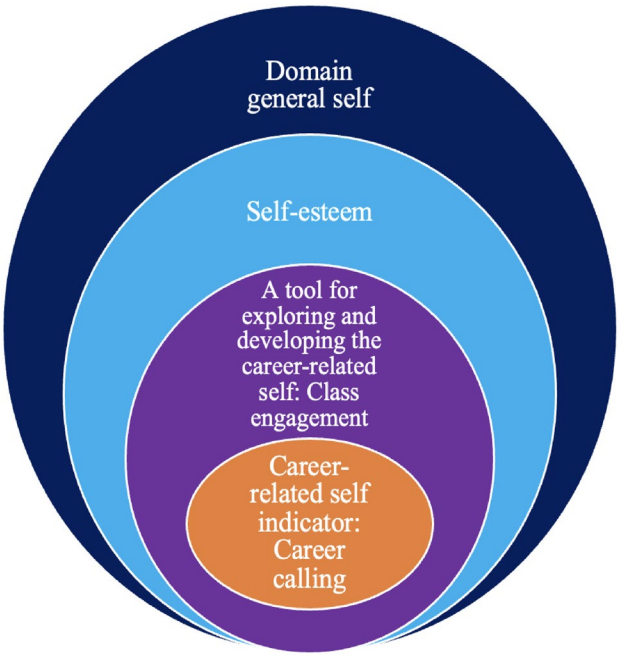

Figure 1 Relationships between variables from Life-Span, Life-Space Approach framework

this context, it is predicted that self-esteem, which supports career confidence, and class engagement, which supports career curiosity, will come together and positively affect career calling, which is an indicator of the outcome variable of career adaptability (Rudolph et al., 2017) (see Figure 2).

Present study

Many positive and negative factors affect career development (Eryılmaz & Mutlu, 2017). Career calling positively affects individuals' careers (Duffy & Dik, 2013). As individuals' career callings increase, they see their work as more meaningful, their professional identity strengthened, and themselves as competent (Hirschi, 2012; Hirschi & Herrmann, 2012). In addition, increased career calling increases individuals' career satisfaction and career resilience (Hu & Gu, 2014), as well as their hopes (Zhang et al., 2015) and career adaptability (Eryılmaz & Kara, 2018a). Studies on the factors that increase individuals' career callings can contribute to the literature.

In today's world, university students are viewed as individuals preparing for adulthood (Arnett, 2007). To participate in the adult world, university students need to explore their identities (Arnett, 2000). The dimensions of identity exploration include love, worldview, and work. In particular, university students need to fulfill their academic obligations to realize their identity exploration in the field of work successfully. From the perspective of career psychology, the nature of

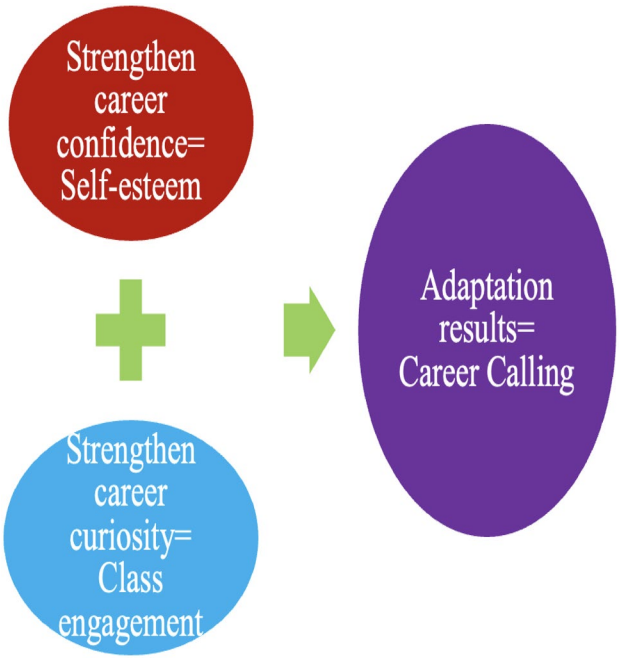

Figure 2 Relationships between variables from career construction theory framework

career calling (Duffy et al., 2022) shows us that identity is a very important motivational tool for identity exploration in the field of work. Learning psychology theories state that learning by doing, experimenting, and experiencing is the most effective method (Dewey, 1986). According to Super's Life-Span, Life-Space Approach, university students are in the exploration stage of career development. In other words, during this period, students prepare for their chosen careers (Super, 1980). The most important tool for this exploration in the classroom is cognitive, emotional, and behavioral engagement. This tool even helps university students cope with their problems and become psychologically resilient (Skinner & Pitzer, 2012). More importantly, it increases the career callings of university students (Chen et al., 2016). While these variables constitute the work dimension of identity, it is important not to ignore the critical variables related to the self of university students (Mortimer & Lorence, 1979; Super, 1980). For example, one of these variables is self-esteem. Longitudinal studies (Krauss & Orth, 2022; Salmela-Aro & Nurmi, 2007) have shown that individuals' high salaries, work engagement, and job satisfaction increase parallel with the rise in self-esteem. As university students improve their self-esteem, they have more emotional, behavioral, and cognitive engagement in the classroom environment (Sadeghi & Ganji, 2020). Engagement also contributes to students learning a subject better (Skinner & Pitzer, 2012). Learning the subject better helps them discover themselves and explore their careers (Eryılmaz & Kara, 2017, 2018b; Kara et al., 2022). Increased exploration also increases their career callings by improving their

career adaptability. (Eryılmaz & Kara, 2018a; Kara & Eryılmaz, 2021). However, there is a need for longitudinal studies that examine these relationships as a whole. In addition, various psychological tools are needed to help university students healthily experience the discovery process and successfully transition to the next career development period. Self-esteem, class engagement, and career calling, which are discussed in this study, may be among these important tools. As a result, this study aims to longitudinally investigate the relationships between self-esteem, class engagement, and career calling (Figure 3).

Hypothesis 1 *Self-esteem T*1 *significantly influences class engagement T*2.

Hypothesis 2 *Class engagement T*1 *significantly influences career calling T*2.

Hypothesis 3 *Class engagement has a longitudinal mediating role in the relationship between self-esteem and career calling*.

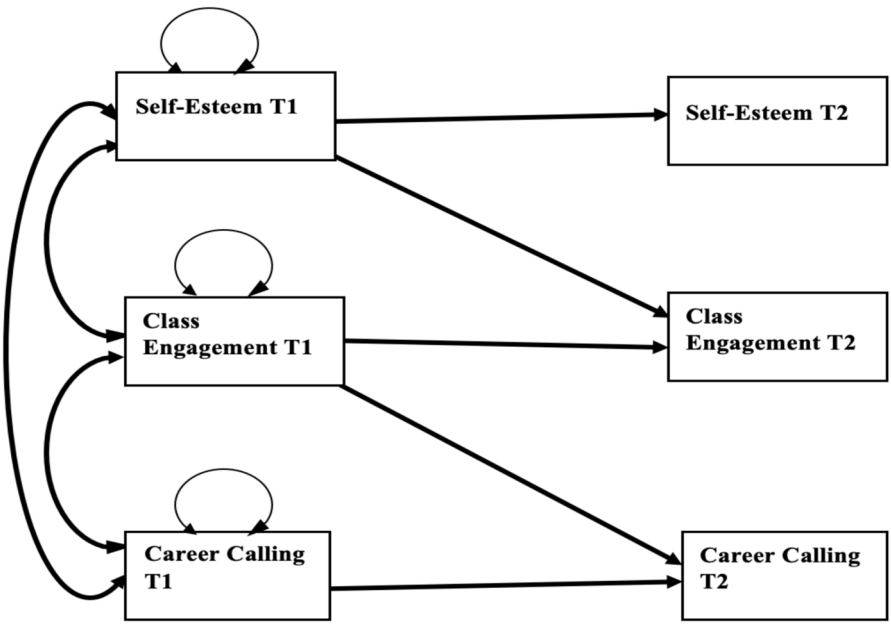

Figure 3 Hypothetical cross-lagged panel model for a half-longitudinal design

Method

Participants and procedure

First, the researchers informed the participants in the classroom environment. A Google form was sent to those who wanted to participate voluntarily. Informed consent was obtained from voluntary participants using this form. Time 1 longitudinal data were collected from 215 university students at the end of September 2023, and 6 months later, 250 university students participated in time 2 longitudinal data at the end of March 2024. The data collected in the two waves were matched, and 161 university students were included in the final sample. Of these final participants (Age^{range} = 18–28, Age^{Mean} = 21.76 Age^{Sd} = 2.51), 101 were female (62.7%) and 60 were male (37.3%). These final participants are continuing their training at the Faculty of Education of a public university in Istanbul, Türkiye, at different grade levels [first year 40 (24.84%), second year 35 (21.74%), third year 41 (25.47%), and fourth year 45 (27.95%)].

In this study, additional analyses were used to minimize the potential for attrition bias between participants who completed the two waves and those who dropped out. First, independent samples *t* test were conducted to determine whether significant differences existed between participants who dropped out and those who continued on critical variables (self-esteem, class engagement, and career calling). Analyses indicated that dropouts were not statistically significantly different on the baseline variables. In the second, we used missing data analysis to assess whether attrition introduced systematic bias. These results suggest that participants who dropped out of the study did not systematically affect our results. Finally, to minimize data loss between the two waves, participants were contacted with various reminders (e.g., by email and telephone), and incentives were offered. All these precautions aim to increase the reliability of our longitudinal analyses and minimize attrition bias. Our methodology supports the robustness and generalizability of the results.

Measures

Two-dimensional self-esteem scale (TDSES)

TDSES was developed by Tafarodi and Swan (2001), and the Turkish version was conducted by Doğan (2011). The TDSES includes 2 dimensions (self-liking and self-competence) and 16 items. Some sample items ("I am sure of my worth"; "I am satisfied with myself") are given. The higher the scores obtained from the TDSES, the higher the self-esteem level of the individual. The goodness of fit values (χ^2/df = 2.64, RMSEA (Root Mean Square Error of Approximation) = 0.04, AGFI (Adjusted Goodness of Fit Index) = 0.91, NFI (Normed Fit Index) = 0.95, CFI (Comparative Fit Index) = 0.97 and GFI (Goodness of Fit Index) = 0.94) are at acceptable levels (Doğan, 2011). Cronbach's alpha

coefficient for self-liking was 0.83, and for self-competence was 0.74 (Doğan, 2011).

General class engagement scale (GCES)

GCES was developed by Eryılmaz (2014), and its psychometric properties were evaluated. Exploratory factor analysis of the GCES revealed 15 items with 3 dimensions (cognitive, affective, and behavioral) and an explained variance of 64.04% (Eryılmaz, 2014). Sample statements of GCES ("The class was fun for me"; "I participated in the activities in the class") are given. When students score high on the GCES, their general engagement in the class is high. Cronbach's alpha coefficient of the whole GCES is 0.92 (Eryılmaz, 2014).

Career calling scale (CCS)

CCS was developed by Praskova et al. (2015), and its Turkish version was performed by Seymenler et al. (2015). The CCS includes 3 dimensions (personal meaning, other-oriented meaning, and active engagement) and 15 items. Some sample items ("Preparing for my career contributes to my personal development"; "I take every opportunity to advance in line with my career goals") are given. An increase in the scores of individuals on the CCS is interpreted as an increase in their career callings. Cronbach's alpha coefficient ranges between 0.80 and 0.88 among the subdimensions of the CCS (Seymenler et al., 2015).

Statistical analysis

This study conducted preliminary analyses (normality, reliability, and correlation) with IBM SPSS Statistics 22 (George & Mallery, 2019; Nunnally, 1979). This study aims to longitudinally investigate the relationships between self-esteem, class engagement, and career calling. In line with this aim, the longitudinal measurement models of time 1 and time 2 were first analyzed using CFAs. Then, the cross-lagged panel model was used to reveal the paths (paths for indirect effects models and autoregressive) between self-esteem, class engagement, and career calling variables (Cole & Maxwell, 2003; Preacher, 2015). Some goodness of fit indices (χ^2/df, RMSEA, AGFI, NFI, CFI, and GFI) were utilized to determine whether the cross-lagged panel model is compatible with the data (Schermelleh-Engel et al., 2003). Mediation analysis and CFAs were performed through the AMOS 21 Graphics program.

Table 1 Descriptive statistics, correlations, and reliability

Variables	1	2	3	4	5	6
(1) Self-esteem T1	1					
(2) Self-esteem T2	0.80**	1				
(3) Class engagement T1	0.43**	0.45**	1			
(4) Class engagement T2	0.44**	0.53**	0.80**	1		
(5) Career calling T1	0.45**	0.40**	0.50**	0.41**	1	
(6) Career calling T2	0.40**	0.47**	0.59**	0.65**	0.69**	1
Cronbach's alpha (α)	0.87	0.89	0.93	0.93	0.81	0.86
Arithmetic mean	56.21	56.63	54.62	54.67	70.39	69.02
Standard deviation	9.53	10.17	9.97	10.45	8.49	9.55
Skewness	−0.54	−0.47	−0.48	−0.80	−0.51	−0.80
Kurtosis	0.24	0.08	0.96	1.74	0.19	1.06

** $p < 0.01$

Table 2 Cross-sectional CFA for time 1 and time 2

CFAs	χ^2/df	RMSEA	CFI	TLI	IFI	NFI	GFI	AGFI
Model 1 (CFA for time 1)	1.23	0.03	0.99	0.98	0.99	0.95	0.97	0.93
Model 2 (CFA for time 2)	1.50	0.05	0.98	0.97	0.98	0.96	0.96	0.92

Results

Preliminary analysis

Cronbach's alpha reliability coefficients of all variables in this study vary between (0.81 and 0.93). According to this result, the measurement reliability of all variables is high (Nunnally, 1979). In addition, the skewness (−0.47 to −0.80) and kurtosis (0.08 to 1.74) coefficients of all variables in this study are within the limits of normality (George & Mallery, 2019). Finally, the correlation coefficients of all variables in this study range between ($r = 0.40$ and $r = 0.80$) and are significantly and positively related (Table 1).

Longitudinal measurement model

In this study, we first evaluated the measurement models of time 1 and time 2. CFAs were used for this. In the CFA for time 1, it was found that all standardized factor loadings ranged between (0.51 and 0.90, $p < 0.001$), while for time 2, they ranged between (0.59 and 0.89, $p < 0.001$). In addition, goodness-of-fit values were determined as a good fit in the CFA for times 1 and 2 (Table 2).

Cross-lagged panel model for a half-longitudinal design

This study aims to longitudinally investigate the relationships between self-esteem, class engagement, and career calling. Accordingly, the cross-lagged panel model was preferred for the half-longitudinal design (Cole & Maxwell, 2003; Preacher, 2015). The cross-lagged panel model demonstrated an acceptable fit with the data (χ^2/df = 1.74, RMSEA = 0.06, AGFI = 0.92, NFI = 0.98, CFI = 0.99, and GFI = 0.98) (Schermelleh-Engel et al., 2003). The cross-lagged effect of self-esteem at time 1 on class engagement at time 2 was positive and significant (β = 0.12, t = 2.48; $p < 0.05$). Furthermore, the cross-lagged effect of class engagement at time 1 on career calling at time 2 was positive and significant (β = 0.30, t = 5.17; $p <$ 0.001) (Table 3 and Fig. 4). Finally, all these results would support the longitudinal mediation effect of class engagement in the relationship between self-esteem and career calling.

Alternative model

This study's alternative model was constructed and analyzed to determine whether it is equivalent to or better than the primary cross-lagged panel model (Vandenberg & Grelle, 2009). Career calling is the exogenous variable. Self-esteem is described as a mediating variable. Class engagement is defined as an endogenous variable. In the alternative model analysis, some of the goodness-of-fit values (NFI = 0.95, CFI = 0.95, and GFI = 0.94) were compatible with the data, while some (χ^2/df = 7.45, RMSEA = 0.20, and AGFI = 0.71) were not compatible with the data. In addition, the cross-lagged effect of career calling at time 1 on self-esteem at time 2 was not significant (β = 0.06, t = 1.10; $p > 0.05$). According to these results, the primary cross-lagged panel model has been proven to best represent the data of this study.

Table 3 Longitudinal associations between self-esteem, class engagement, and career calling

Paths	B	SE	β	t	p
Autoregressive paths					
SE T1 → SE T2 (path *x*)	0.85	0.04	0.80	17.45	< 0.001
CE T1 → CE T2 (path *m*)	0.75	0.05	0.74	14.97	< 0.001
CC T1 → CC T2 (path *y*)	0.60	0.06	0.54	9.76	< 0.001
Paths for indirect effects models					
SE T1 → CE T2 (path *a*)	0.12	0.05	0.12	2.48	< 0.05
CE T1 → CC T2 (path *b*)	0.28	0.05	0.30	5.17	< 0.001

SE self-esteem, *CE* class engagement, *CC* career calling.

Standardized effect sizes were calculated for the paths for indirect effects models, and autoregressive. Kline (2005) reported effect sizes of standardized path coefficients as low effect (< 0.10), medium effect (around 0.30), and high effect (≥ 0.50).

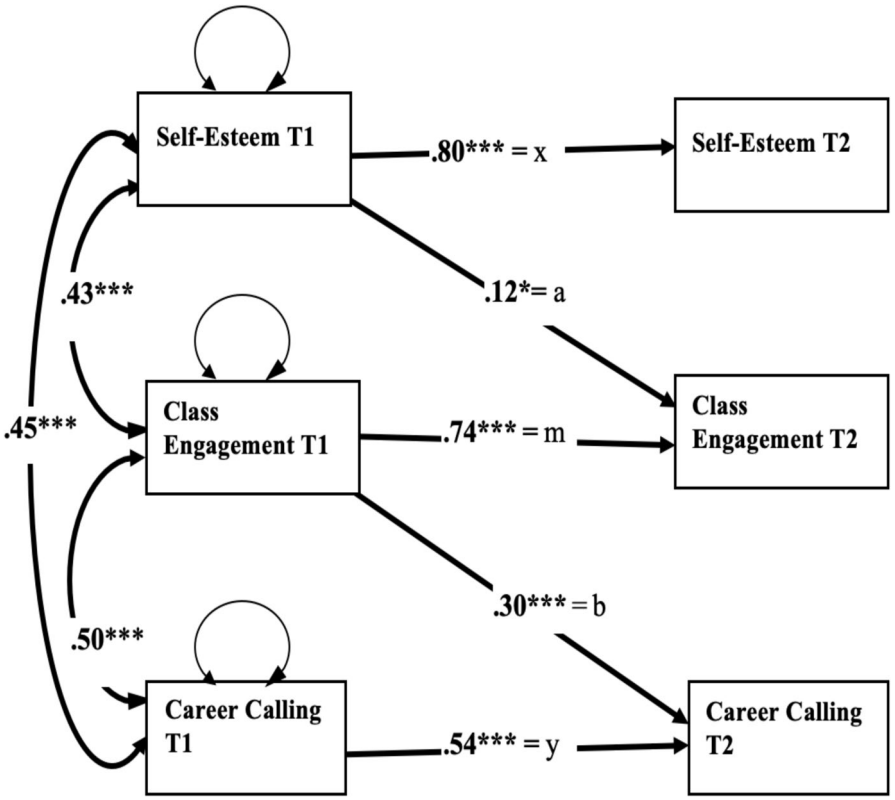

Figure 4 Cross-lagged panel model for a half-longitudinal design**.** ***$p < 0.001$; *$p < 0.05$, Paths *x*, *m*, and *y* are autoregressive effects. Paths *a* and *b* are cross-lag paths. *T1* time 1, *T2* time 2

Discussion

This study examined the relationships between self-esteem, class engagement, and career calling longitudinally. According to the study's findings, the increase in self-esteem levels of university students increases their class engagement. Increased class engagement also increases individuals' career callings.

Studies have shown that individuals' career callings are positively related to different types of engagement, such as study engagement (Chen et al., 2016) and work engagement (Hirschi, 2012; Xie et al., 2016). These studies did not directly examine the relationships between class engagement and career calling. The results of the studies above are parallel to those of this study. On the contrary, as an essential difference, this study found that an increase in individuals' self-esteem and class engagement levels led to an increase in students' career callings. In this respect, the study differs from other studies in the literature. This result may be due to university entrance exams and university education in Türkiye; in Türkiye, individuals are placed in relevant departments only according to the

results of university entrance exams (Telli Yamamoto, 2006). However, there are many factors, such as personality traits, gender, socioeconomic level, and interests, that affect individuals' career choices, and these factors come together to help individuals be adaptable to their careers (Savickas & Porfeli, 2012). Suppose individuals are oriented toward their careers by ignoring these factors. In that case, it can be seen that many individuals need to be more adaptable to their careers or show a low level of harmony. At this point, individuals increase their career callings due to the discoveries they experience during their university education (Eryılmaz & Kara, 2020a).

The study's findings can also be evaluated in the context of career construction theory. According to career construction theory, individuals' increased curiosity and exploration in the career field make them more adaptable (Savickas & Porfeli, 2012). Career calling, addressed in this study, may be an essential indicator of this adaptation. Psychological constructs such as self-esteem and class engagement can be considered resources for career calling. The effects of these resources can be evaluated in terms of self-determination (Conway et al., 2015; Ryan & Vansteenkiste, 2023) and perceived control (Skinner, 1995) theories. At this point, increasing the self-esteem levels of university students and their class engagement can help them fulfill their needs for competence, belonging, and autonomy (Furrer et al., 2014). Among these needs, significant relationships exist between the satisfaction of the need for competence and engagement (Skinner, 1995). When students like themselves and see themselves as competent, their self-determination improves, and improved self-determination increases their career callings.

The findings of this study contributed to the literature by confirming the assumptions of the theories explaining career development and expanding the field of assumptions. For example, the primary assumption of the person–organization fit theory is that individuals make the right career choice and development when the characteristics of the job, organization, or environment are appropriate in addition to the characteristics of the individual (Kristof-Brown et al., 2023; Raddatz, 2024; Subramanian et al., 2023). This study's findings support career calling as an individual and environmental characteristic, self-esteem, and class engagement as person dimensions in the person–organization fit theory. In addition, the study's results confirmed the assumptions of Super's Life-Span, Life-Space Approach and revealed the factors through which university students realize the exploration process during the research phase (Super, 1990). Class engagement is an essential tool in the context of education and training when exploring the career-related self (Chen et al., 2016). The use of this tool, together with self-esteem, strengthens students' career callings and enables them to overcome transition and trial steps (Lau et al., 2020; Li et al., 2024). In addition to all these, the study's findings expanded the explanations on supporting career adaptability in the educational and training environment in career construction theory (Santilli et al., 2024; Savickas, 2020). Concretizing and reinforcing career confidence through self-esteem and career curiosity through class engagement is possible. This embodiment and strengthening positively affect career calling, which is the outcome variable of career adaptability (Rudolph et al., 2017).

The results of this study contribute to the existing body of knowledge on the relationships among self-esteem, class engagement, and career calling. The longitudinal

finding that self-esteem positively influences class engagement and that class engagement strengthens career calling suggests that individual self-esteem is a critical psychological resource in achieving academic and career goals. These results indicate that self-esteem should be considered not only as an individual psychological characteristic, but also as a dynamic factor affecting social and academic behaviors. At the same time, the finding that class engagement plays a bridging role between self-esteem and career calling supports the indirect effects of class engagement on career development discussed in the literature. In this context, the study provides a foundation for future research on motivational theories (e.g., self-determination theory) and the links between self-esteem and behavioral outcomes. These findings suggest the importance of interventions and policy recommendations to strengthen self-esteem and increase class engagement. As part of educational practices, it is recommended that awareness programs and supportive learning environments be created to increase students' self-esteem. In particular, structured classroom activities that promote individual achievement and class engagement can increase students' engagement in the classroom. To support career readiness, it is recommended that schools expand guidance services that help students identify their career goals and create a supportive atmosphere for career calling. In addition, given the impact of self-esteem on class engagement, adopting instructional practices that support perceptions of self-efficacy may increase students' academic and career success. Regarding educational policy, these findings may guide national programs explicitly aimed at improving the academic achievement of students with low self-esteem.

Increasing the career callings of university students has many positive outcomes (Eryılmaz & Kara, 2018a; Hirschi, 2012; Hirschi & Herrmann, 2012; Hu & Gu, 2014; Zhang et al., 2015). In the literature, programs have been developed to increase the career adaptability of university students (Eryılmaz & Kara, 2020a, 2020b). However, it is seen that there are very few career calling development programs. The results of this study suggest that dimensions such as self-esteem and class engagement should be included in the content of future career calling programs. In addition, the results of this study showed the mediating role of class engagement in career development. In this direction, some curricula increase class engagement (Eryılmaz, 2015). A curriculum based on class engagement, which includes self-esteem and career calling, can be developed. In addition to all this, in future research, hope and the big five personality traits (individual factors), school commitment, and school quality of life (career-related environmental factors) can be included as moderator variables.

The results of this study show that self-esteem has a positive effect on class engagement, and class engagement has a positive impact on career calling. When these results are evaluated within the framework of the cultural and contextual characteristics of the Turkish education system, they provide a broader perspective on how these processes are shaped. The collectivist values of Turkish society closely link individual self-esteem to social approval, family expectations, and social roles (Kagitcibasi, 2017). For example, a student's self-esteem can be directly influenced by their family's support for academic achievement or reaction to failure (Wagner et al., 2024). This can increase a student's motivation to achieve their career callings

and their level of class engagement. In the context of class engagement, the hierarchical structure of teacher–student relationships prevalent in the Turkish educational system is striking. Norms such as respect for authority, acceptance of teacher leadership, and compliance can encourage students to engagement in class activities (Eryılmaz, 2013; Eryılmaz & Uzun, 2023; Skinner & Pitzer, 2012). In such a context, class engagement may be perceived not only as an individual effort but also as a social obligation. For example, receiving positive feedback from the teacher can strengthen students' self-esteem, and in the process, increase its impact on career callings. Longitudinal studies conducted in the Western context (e.g., Eccles et al., 2002) show that individual autonomy and personal motivation are more dominant in these processes. However, in Turkish culture, community support, peer groups, and family support may be more prominent in such processes (Kagitcibasi, 2017).

In this study, specific student characteristics (gender, age, etc.) were not analyzed as covariate variables. This can be considered a limitation of the current study. Future studies can be designed to reveal differences in self-esteem, class engagement, and career calling on the basis of specific student characteristics (gender, age, background, or field of study). Other limitations of this study include potential self-report bias, using self-esteem as a unidimensional construct, and excluding other potentially influential variables (e.g., socioeconomic status and institutional characteristics).

Funding Open access funding provided by the Scientific and Technological Research Council of Türkiye (TÜBİTAK).

Declarations

Conflict of interest The authors declare that they have no conflict of interest.

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