

International students' adaptation in Ankara: The mediating roles of anxiety and self-esteem

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ABSTRACT

With globalization, the appeal of studying abroad has grown among university students seeking better educational and career opportunities. However, adapting to a new culture often presents significant challenges, especially as international students face language barriers, cultural differences, and stressors that affect their anxiety, self-esteem, and identity development. Despite the importance of these factors, research on this topic in Turkey remains limited. This study addresses this gap by assessing general anxiety levels of students and examining the relationship between adaptation and identity development among international students, using cross-sectional quantitative methods and self-reported questionnaires. Data from 488 participants were analyzed using SPSS and SmartPLS. Results indicate that both anxiety and self-esteem partially mediate the relationship between identity development and adaptation. Anxiety negatively associates with both identity development and adaptation, while self-esteem shows positive associations with both. Proficiency level and previous travel experience were identified as significant factors influencing students' adaptation. These findings offer valuable insights for universities, policy-makers, and other stakeholders in creating a supportive environment that enhances the adaptation experience of international students.

Introduction

In an increasingly interconnected world, students are increasingly drawn to study abroad, motivated by hopes of better opportunities and resources (Yılmaz & Temizkan, 2022). Cross-cultural exchanges have grown, with international students engaging in educational pursuits that shape a globally connected landscape (Gebre & Yuksel-Kaptanoglu, 2020). The worldwide population of international students has surged, reaching approximately 5.6 million, with many attracted to study in countries like the United States (1000,075), the United Kingdom (551,445), and Canada (503,270), all competing for a share of the \$100 + billion international education market (Yılmaz & Temizkan, 2022). International students are recognized as valuable contributors to host countries, bringing academic and cultural diversity that enriches local environments (Bethel et al., 2020). Their presence supports economic growth, strengthens labor markets with their skills, and fosters opportunities for cross-cultural exchanges that enhance global awareness (Smith & Khawaja, 2011). Yet, despite these contributions, international students often encounter significant adaptation challenges. These difficulties are frequently intensified by the sociocultural differences and psychological stressors that arise in cross-cultural settings (Gebregergis et al., 2020; Gong et al., 2021; Smith & Khawaja, 2011). Issues such as language barriers, unfamiliar academic structures, discrimination, financial pressures, and practical day-to-day challenges have been shown to impact their

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well-being and academic success (Mesidor & Sly, 2016). Adjusting to a new culture while preserving one's identity is crucial for international students' adjustment and identity formation, though this process is often challenging (Bethel et al., 2020; Gebregergis et al., 2020).

In recent years, Turkey has emerged as a significant destination for international students, with its student population increasing from nearly 50,000 in 2013 to over 300,000 in 2023, which has positioned Turkey as the eighth most popular study destination worldwide (Lewis & Lüküslü, 2024). Initiatives like the Türkiye Scholarships Program have bolstered this growth, attracting 117,000 applications in 2023 alone. By 2023, Turkey hosted more than 200,000 students from 182 countries, with over 60 % coming from places like Syria, Azerbaijan, Iran, Turkmenistan, and Iraq (Lewis & Lüküslü, 2024). Students choose Turkey for its quality education, affordable living and tuition, scholarships, and geographic and cultural proximity (Özoğlu et al., 2015). However, since Turkish is the dominant language for instruction and communication, many students find preparatory courses insufficient, leading to ongoing language barriers that hinder academic engagement, social integration, and relationship-building with Turkish peers—ultimately contributing to isolation (Gebre & Yuksel-Kaptanoglu, 2020). Beyond language issues, insufficient institutional support and negative attitudes from some academic staff create confusion during application, enrollment, and orientation processes, further impeding students' academic success and sense of belonging (Özoğlu et al., 2015).

These students' adaptation is influenced by the adjustment to the new sociocultural environment, with acculturative stressors, such as language barriers and cultural differences, impacting academic performance, social connections, and overall psychological well-being (Smith & Khawaja, 2011). This process requires both sociocultural and psychological adjustments, which are challenging as they seek meaningful relationships in the host culture (Gong et al., 2021). A stable and committed sense of identity helps individuals navigate these challenges, fostering a sense of belonging and facilitating smoother adaptation (Berry, 1997; Ward et al., 2020). Students with a strong identity are better able to manage cultural differences and psychosocial difficulties, aiding their social integration (Luyckx et al., 2008; Quinton, 2020). However, when support networks are lacking in culturally new environments, factors such as loneliness, low self-esteem, and identity conflicts often arise (Gong et al., 2021), though higher self-esteem has been referred to its influence to ease adaptation by boosting confidence and promoting social engagement (Quinton, 2020). Also, anxiety from cultural shock and misunderstandings with locals can hinder this adaptation (Mesidor & Sly, 2016).

Despite the significant presence of international students in Turkey, research on their identity development and adaptation, particularly the mediating roles of self-esteem and anxiety remains scarce and lacks empirical testing. Moreover, the general anxiety levels of these students have not yet been assessed. This study addresses these gaps by (1) assessing students' general anxiety levels, (2) examining the direct effect of identity development on adaptation, (3) examining the mediating roles of self-esteem and anxiety in this relationship, and (4) examining the influence of previous travel experience, language proficiency and length of stay on adaptation. Tailored support programs addressing the cultural, social, academic, and psychological challenges faced by international students have proven effective, with pre-arrival resources, cultural orientation, resilience workshops, and mentorship fostering a welcoming environment (Mesidor & Sly, 2016). The findings from this research offer valuable insights into the factors influencing these students' adaptation in Turkey, aiming to help universities and other stakeholders develop customized support systems that improve cultural transitions and promote successful adaptation.

Literature review

The relationship between identity development and adaptation

Identity development is the process through which individuals explore, define, and solidify a cohesive sense of self, including their values, beliefs, and commitments (Branje et al., 2021; Luyckx et al., 2006; Marcia, 1966). Building on Erikson's theories, Marcia (1966) proposed that forming a coherent identity is a central goal during adolescence. In this context, a synthesized identity fosters well-being and adjustment, while identity confusion can impede personal growth. Marcia's identity status paradigm consists of two dimensions: exploration, which involves actively questioning and considering different identity options, and commitment, which refers to the decisions made regarding these options. Expanding on this model, Luyckx et al. (2006) introduced additional dimensions: commitment making (the process of making definitive choices about one's identity), exploration in breadth (actively seeking out various identity alternatives related to goals and values), exploration in depth (ongoing evaluation of existing commitments to ensure they align with personal beliefs), and identification with commitment (emotional investment in those choices). Together, these dimensions capture distinct aspects of how individuals refine and commit to their identity, supporting a stable self-concept that is essential for personal and social integration.

Adaptation is defined as the ability to 'fit in' and effectively navigate interactions in a new cultural environment by integrating new knowledge, skills, and adjustments to norms and values (Masgoret & Ward, 2006). This process involves developing skills tailored to the host culture's conventions, which support smoother functioning in a new social setting (Masgoret & Ward, 2006). Adaptation encompasses two main types: psychological adaptation, which involves personal emotional and cognitive adjustments, and socio-cultural adaptation, which refers to changes in social behaviors and interactions within the new cultural context (Gong et al., 2021; Ward & Rana-Deuba, 1999). Social adaptation specifically refers to the process through which individuals adjust to new social environments, which can be particularly challenging for international students facing acculturative stressors that negatively impact their psychological well-being and social integration (Smith & Khawaja, 2011). Psychological adaptation, or emotional/affective adjustment, is influenced by individual factors like personality, coping styles, and social support (Ward & Kennedy, 1999). It focuses on well-being outcomes such as distress or depression, often framed through stress and coping theories (Branje et al., 2021; Ward & Rana-Deuba, 1999). In contrast, sociocultural adaptation emphasizes the acquisition of culturally appropriate skills needed to navigate

the host environment effectively (Ward & Kennedy, 1999). Together, these dimensions—psychological and sociocultural adaptation—shape how individuals respond to and ultimately thrive within a new cultural environment (Gebregers et al., 2020).

The relationship between identity development and adaptation is supported by developmental psychology research, which suggests that identity formation shapes and is shaped by adaptation to a new cultural environment (Luyckx et al., 2008). This implies that forming and understanding one's identity can influence adaptation effectiveness in a new cultural environment. Acculturation theory (Berry, 1997) also suggests that individuals with a strong sense of identity are better equipped to navigate the challenges of adapting to a new environment, as a stable identity provides a foundation for processing cultural differences and establishing a sense of belonging (Ward et al., 2020). Identity development is closely tied to psychosocial adjustment, as individuals with stable and committed identity formation tend to experience better adjustment outcomes and greater life satisfaction, enabling them to navigate challenges in new cultural settings more effectively than those with ongoing identity uncertainty (Branje et al., 2021).

Identity formation, particularly within the university setting, involves dynamic shifts in commitment and exploration, influenced by contextual factors (Luyckx et al., 2006). Adapting to university life can shape students' identities by providing a psychosocial moratorium that extends identity formation, creating opportunities for internal exploration and growth (Luyckx et al., 2006). However, psychological challenges such as identity tension—often reported by international students—reflect difficulties in adapting to a new cultural and educational environment (Gong et al., 2021). Students with low commitment levels during their identity development are frequently associated with maladjustment, underscoring the significant link between identity development and adaptation (Luyckx et al., 2008). According to Quinton (2020), a strong university identity can help international students adapt better by facilitating social interactions, which aids in adjusting to the new cultural environment and social settings. Therefore, it is predicted that:

H1. There is a positive relationship between identity development and adaptation.

The mediating role of anxiety between identity development and adaptation

Generalized anxiety disorder (GAD) involves persistent and often uncontrollable worry about various aspects of life, accompanied by symptoms such as sleep disturbances, muscle tension, and restlessness (Spitzer et al., 2006; Zucker et al., 2019). Approximately 5.7 % of individuals experience GAD during their lifetime, with an additional 8–13.7 % experiencing subclinical levels that still cause distress and functional impairment (Zucker et al., 2019). Anxiety is frequently linked to depression, reduced life satisfaction, and negative effects on overall mental health (Iunes et al., 2017). University life, while offering growth opportunities, brings stressors such as financial strain, academic pressures, and social adjustments, which can trigger or exacerbate anxiety disorders (Iunes et al., 2017). Anxiety is widespread among students worldwide, with Son et al. (2020) finding that 47.1 % of Turkish and 41 % of local American students are affected. This prevalence worsened during the COVID-19 pandemic, with around 70 % of students experiencing heightened anxiety due to stressors like fears of infection, isolation, lifestyle changes, and financial concerns (Son et al., 2020).

A well-developed sense of identity provides individuals with psychological stability, reducing feelings of uncertainty and anxiety in unfamiliar environments (Branje et al., 2021). People with a clear and stable self-concept are less likely to experience identity-related stress, which can otherwise contribute to heightened anxiety (Stephan & Stephan, 1996). Stress impairs cognitive and emotional functions, often leading to self-doubt and identity confusion (Arnett, 2002). Identity uncertainty, particularly among students studying abroad, is linked to increased anxiety and adjustment difficulties, as an unstable sense of self can heighten anxiety, especially in cultural and social adaptation (Mesidor & Sly, 2016). As identity development fosters self-assurance and security, it is expected to reduce anxiety by providing emotional resilience needed to navigate new experiences (Branje et al., 2021).

Anxiety presents a significant barrier to adaptation by impairing cognitive and emotional functions essential for social and academic engagement (Kaya, 2023). Students experiencing high anxiety often struggle with focus, stress management, and social interactions, which disrupt time management, lead to avoidance behaviors, missed deadlines, and decreased academic performance, further hindering adaptation (Kaya, 2023). Anxiety is associated with increased feelings of loneliness, depression, and difficulty adjusting to new cultural and social environments. Mesidor & Sly (2016) emphasized that international students' psychological adaptation is significantly influenced by mental health challenges, including anxiety, loneliness, depression, and cultural adjustment issues. The COVID-19 pandemic further exacerbated students' anxiety, illustrating how heightened stressors—such as health concerns, isolation, and financial instability—can severely impact psychological adaptation (Son et al., 2020). Anxiety creates psychological barriers to adaptation by impairing cognitive and emotional functions, making it more difficult to engage with new social and academic systems (Kaya, 2023; Ward & Kennedy, 1999).

Anxiety acts as a psychological barrier that disrupts the connection between identity development and adaptation, undermining the positive impact of a well-established identity by fostering self-doubt, emotional distress, and difficulty managing challenges, ultimately hindering successful adaptation (Arnett, 2002; Kaya, 2023). High anxiety levels interfere with the development of a cohesive identity, making individuals feel less secure and integrated into new social and academic environments (Kaya, 2023; Ward & Kennedy, 1999). Anxiety disrupts the emotional stability necessary for adaptation, leading to withdrawal, avoidance, and increased struggles with adjustment (Luyckx et al., 2008). Therefore, anxiety is suggested to act as a mediator between identity development and adaptation, as students with a stronger sense of identity tend to experience lower anxiety that facilitates smoother adjustment, whereas those with identity uncertainty face heightened anxiety that complicates the adaptation process. Accordingly, it is proposed that:

H2. Identity development is negatively associated with anxiety.

H3. Anxiety is negatively associated with adaptation.

H4. Anxiety mediates the relationship between identity development and adaptation.

The mediating role of self-esteem between identity development and adaptation

Self-esteem refers to an individual's overall sense of self-worth (Gebregergis et al., 2020). Individuals with high self-esteem often exhibit better mental health, greater resilience, emotional stability, stronger motivation, and enhanced social adjustment and coping abilities, whereas those with lower self-esteem may experience self-criticism, inadequacy, anxiety, depression, and social withdrawal (Crocker & Park, 2004). Generally, people with well-developed identities experience greater self-clarity and are less likely to struggle with identity confusion, leading to increased confidence in their sense of self (Luyckx et al., 2008). A well-formed identity contributes to better emotional regulation and psychological resilience, helping individuals face challenges more effectively (Schwartz et al., 2010). Students studying abroad often experience identity tension, potentially lowering self-esteem, highlighting the importance of a well-established identity in maintaining psychological well-being (Gong et al., 2021). When individuals form stable identity commitments, they tend to report higher levels of self-esteem, as a secure sense of self reinforces positive self-perception and confidence (Branje et al., 2021).

Self-esteem plays a crucial role in students' adaptation to new environments, particularly in multicultural settings (Gebregergis et al., 2020). Those with higher self-esteem tend to engage in adaptive behaviors, such as forming social connections and navigating unfamiliar cultural environments effectively (Schwartz et al., 2010). A positive self-view encourages openness to new experiences, facilitating not only identity development but also successful social and personal adaptation (Arnett, 2002). Self-esteem acts as an internal resource, promoting resilience and motivating students to engage in social activities which is essential for sociocultural adjustment (Crocker & Park, 2004). International students with strong self-esteem are more confident and socially proactive, enabling them to build relationships and adapt more easily by navigating cultural differences and adjusting effectively to their new surroundings (Quinton, 2020).

A stable identity contributes to positive self-esteem, which serves as an internal resource for managing the challenges of adapting to new cultural environments (Crocker & Park, 2004). Individuals with higher self-esteem are more likely to engage in adaptive behaviors, such as developing social relationships and embracing new experiences, which are crucial for successful adaptation (Schwartz et al., 2010). Consequently, Self-esteem is expected to mediate the relationship between identity development and adaptation, as

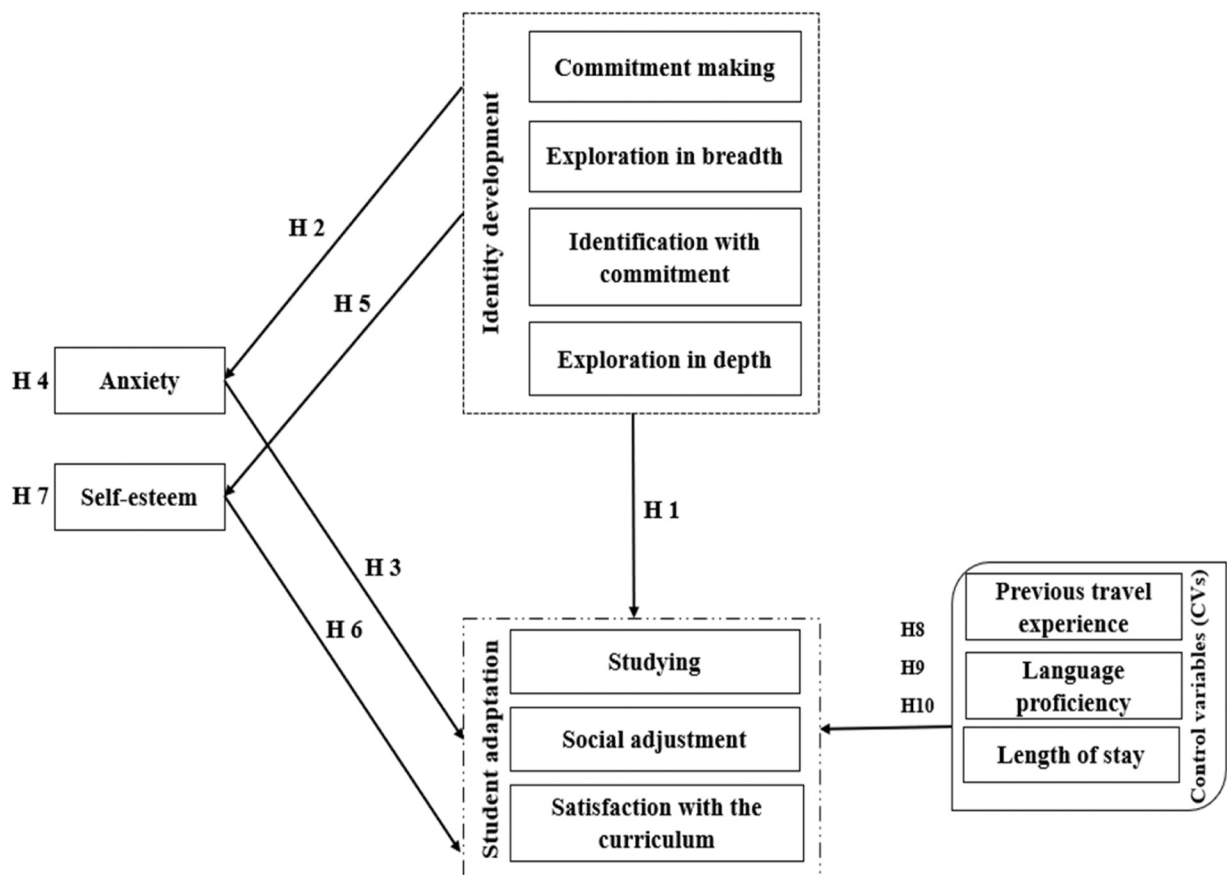


Fig. 1. The model "Author's Creation".

stronger identities foster greater self-worth and confidence, which in turn motivate students to engage in behaviors that support effective sociocultural and psychological adjustment, ultimately leading to better adaptation in new cultural contexts. Thus, it is hypothesized that:

- H5. Identity development is positively associated with self-esteem.
- H6. Self-esteem is positively associated with adaptation.
- H7. Self-esteem mediates the relationship between identity development and adaptation.

Previous travel experience, language proficiency, and length of stay as control variables (CVs)

Prior cultural exposure and language proficiency enhance individuals' capacity to navigate and adapt to new sociocultural environments (Schwartz et al., 2010). Language proficiency directly influences international students' academic, social, and psychological adaptation by facilitating communication, supporting relationship-building, and promoting cultural inclusion (Bethel et al., 2020; Gebru & Yuksel-Kaptanoglu, 2020; Gong et al., 2021; Özoğlu et al., 2015; Smith & Khawaja, 2011). Prolonged exposure to cultural norms fosters a deeper understanding of social dynamics (Ward & Kennedy, 1999), while a longer stay in the host country helps individuals internalize these norms, establish social networks, and develop a sense of belonging (Berry, 1997). These studies indicate that such factors are critical CVs for successful adaptation, as they strengthen social ties, reduce misunderstandings, and promote communication, cultural understanding, resilience, and openness—ultimately supporting belonging, and improved cross-cultural and psychological adjustment. Atinc et al. (2012) recommend including CVs only when they add conceptual and empirical value to a model and establish incremental validity, cautioning against the use of unjustified CVs. Aligned with this rationale, the following is proposed:

- H8. Previous travel experience positively affect adaptation.
- H9. Language proficiency positively affect adaptation.
- H10. Length of stay positively affect adaptation.

The summary of the proposed hypotheses and the final research model is presented in Fig. 1.

Methodology

Procedure and data collection

This quantitative study employed a five-section, questionnaire-based design using convenience sampling among international students currently enrolled in Ankara. Data were collected via social media platforms using bilingual (English and Turkish) statements. Ethical approval was obtained from the Atilim University Ethics Board, and measures were taken to ensure data integrity throughout the research process. The data were analyzed using SPSS and SmartPLS. Partial Least Squares Structural Equation Modeling (PLS-SEM), widely used in social sciences, is a causal-predictive approach for explaining relationships and predicting outcomes (Shmueli et al., 2019). It was selected for this study due to the model's complexity, involving multiple latent constructs, mediators, and CVs. PLS-SEM offers a robust and flexible analytical framework suitable for assessing indirect effects and handling model complexity (Sarstedt et al., 2019). It also accommodates both reflective and formative measurement models—aligned with the study's mixed structure—and maximizes explained variance without requiring strict data assumptions (Hair et al., 2019).

Following Anderson and Gerbing's (1988) recommendation, a two-step approach was used for data analysis. In the first step, the reflective measurement model was assessed for indicator reliability, internal consistency, convergent validity, and discriminant validity to ensure that the observed variables accurately reflect their latent constructs (Sarstedt et al., 2019). The formative measurement model was then evaluated for convergent validity, collinearity, and the significance and relevance of factor weights to capture the multidimensional nature of the constructs. In the second step, after confirming the validity and reliability of both measurement models, the structural model was tested for explanatory and predictive power using path coefficients (β), p-values, determination coefficient (R^2), effect sizes (f^2), and predictive relevance (Q^2) (Hair et al., 2019).

To address Common Method Bias (CMB), which can inflate variable relationships when data for both independent and dependent variables are collected using the same method, Harman's (1967) single-factor test was applied using SPSS factor analysis (Kock et al., 2021). The results showed that four factors accounted for 23.65 % of the variance, which is well below the 50 % threshold. A full collinearity assessment was also conducted for all constructs, and all VIF values were below the threshold of 3.3, indicating that multicollinearity was not a concern in this study (Kock et al., 2021). Therefore, CMB is not considered a significant issue in this study.

Participants

The research sample consisted of international students enrolled in universities in Ankara, Turkey. The required sample size was determined using G*Power 3.1.9.4 (Faul et al., 2007) with the parameters set at Power = 0.80, f^2 = 0.15, and α = 0.05, which calculated a minimum of 85 participants. To ensure greater consistency in the model, this base sample size was multiplied by three, indicating

that at least 255 participants should ideally be included (Hair et al., 2019). The final sample collected consists of 488 of participants, who represented a variety of academic fields, including media & communication, social sciences, business & management, education, arts & humanities, law, natural sciences, computer science, engineering, healthcare, social work, and public policy.

As shown in Table 1, 75.6% of participants were male, 62.7 % were between 18 and 28 years old, and 79.3 % were single. A majority (64.3 %) were enrolled in undergraduate programs, with 64.1 % studying in Turkish. Proficiency levels varied across B1 (21.3 %), B2 (21.5 %), and C2 (21.3 %). 46.7 % of participants had traveled abroad (Other than to Turkey) 0–3 times, and 65.4 % had a length of stay in Turkey of 0–3 years. Regarding scholarships, 50 % were self-funded, with participants coming from various nationalities, the largest percentages being from Iraq (10.7 %), and Yemen (12.3 %).

Table 1
Respondents' Profile "Generated Using SPSS".

Demographic characteristic	Frequency (N = 488)	%
Gender		
Male	369	75.615
Female	119	24.385
Age		
18–28	306	62.705
29–39	114	23.361
40–50	60	12.295
51 and above	8	1.639
Marital Status		
Single	387	79.303
Married	101	20.697
Education Level		
Undergraduate	314	64.344
Master's	99	20.287
Doctorate	75	15.369
Program Language		
English	167	35.130
Turkish	309	64.870
Proficiency Level		
A 1	32	6.577
A 2	57	11.680
B 1	104	21.311
B 2	105	21.516
C 1	86	17.623
C 2	104	21.293
Previous Travel Experience		
0–3	228	46.721
4–6	197	40.369
6–12	63	12.910
Scholarship		
Turkish government scholarship	190	38.934
Self-funded	244	50.000
Other Scholarship	54	11.066
Length of Stay		
0–3 years	319	65.368
4–6 years	62	12.705
7–14 years	76	15.574
15 years and above	31	6.353
Nationality		
Afghanistan	24	4.914
Egypt	27	5.460
Indonesia	10	2.041
Irak	52	10.667
Iran	28	5.698
Jordan	31	6.352
Morocco	29	5.871
Pakistan	33	6.666
Palestine	40	8.196
Somalia	43	8.818
Sudan	25	5.149
Syria	31	6.352
Turkmenistan	33	6.769
Yemen	60	12.299
Others	22	4.748

Measures

The dimensions of identity development scale (DIDS)

The second section of the questionnaire used the DIDS, which was employed in this study using a 5-point Likert scale. Developed by [Luyckx et al. \(2008\)](#), this scale assesses four components: commitment making, exploration in breadth, exploration in depth, and identification with commitment, with five items for each component. [Morsünbül & Cok \(2014\)](#) adapted the scale for use in Turkey.

The student adaptation to college questionnaire (SACQ)

The third section featured the SACQ, originally created by [Baker and Siryk \(1989\)](#), and adopted in this study using a condensed 12-item version developed by [Liga et al. \(2022\)](#). This version includes three dimensions: studying, social adjustment, and satisfaction with the curriculum, and uses a 5-point Likert scale. The SACQ was translated into Turkish using the forward-backward method ([Lee et al., 2019](#)). The translated version was reviewed by two professors from Atılım University and piloted with 10 postgraduate students to ensure face and content validity, with no further adjustments were needed.

The generalized anxiety disorder 7-item (GAD-7) scale

The fourth section used the GAD-7 scale, originally developed by [Spitzer et al. \(2006\)](#) and validated in Turkish by [Konkan et al. \(2013\)](#), to assess the severity of general anxiety symptoms. This brief clinical instrument consists of seven items rated on a 4-point Likert scale ranging from 0 (not at all) to 3 (nearly every day), yielding a total score between 0 and 21; with higher scores indicating greater anxiety.

The 5-item brief Rosenberg Self-Esteem scale (B-RSES)

The fifth section employed the B-RSES, a shorter version of the widely recognized 10-item Rosenberg Self-Esteem Scale developed by [Rosenberg \(1965\)](#). The brief scale, developed by [Monteiro et al. \(2022\)](#) and adapted in Turkish by [Joshanloo & Yıldırım \(2024\)](#), uses a 7-point Likert scale.

Results

Assessment of anxiety levels

According to the established cut points of the Generalized Anxiety scale, scores of 5, 10, and 15 correspond to mild, moderate, and severe anxiety, respectively ([Spitzer et al., 2006](#)). [Fig. 2.](#) displays the frequency distribution of the reported anxiety levels among students, with 185 students scoring below 10 and 303 students scoring 10 or above. Notably, 62.09 % of participants scored 10 or

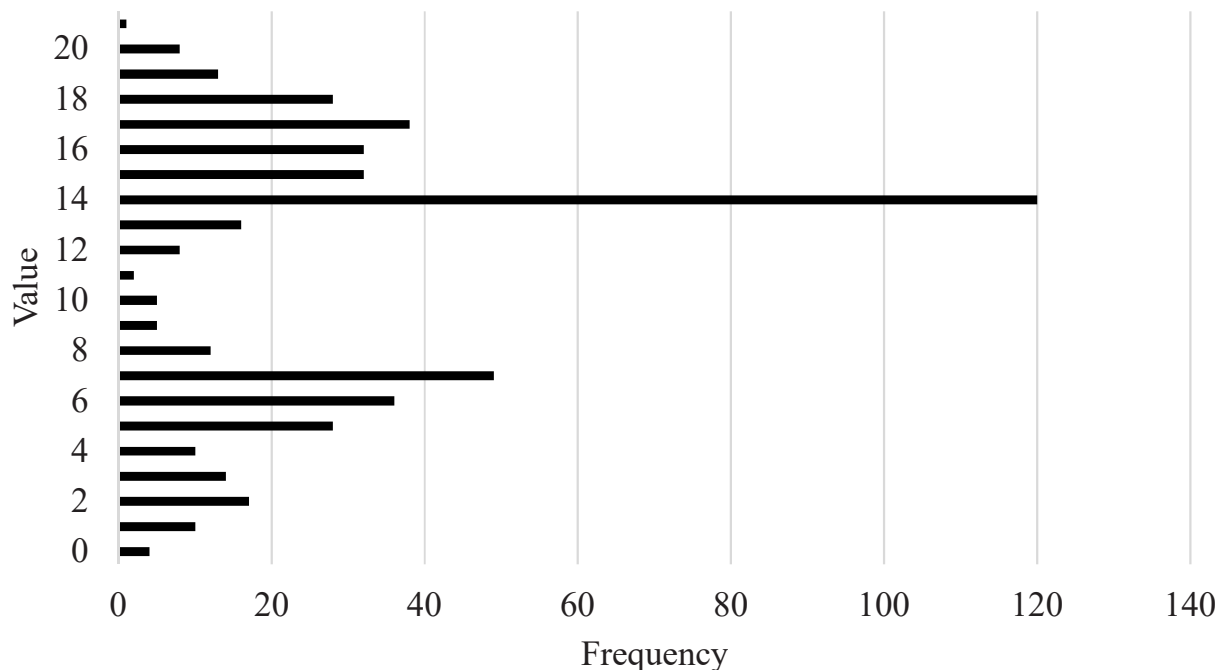


Fig. 2. The frequency distribution of anxiety levels “Author’s Creation”.

higher, indicating that a significant proportion of students experience moderate-high anxiety.

Measurement model assessment (first order)

The first-order measurement model was assessed reflectively to ensure items accurately represented their latent constructs by evaluating all nine constructs for internal consistency and reliability. Table 2 reports the item loadings, composite reliability (CR), Cronbach's alpha (CA), and average variance extracted (AVE). The anxiety item "Feeling nervous, anxious, or on edge" was excluded due to a factor loading below 0.50. All remaining items showed loadings above 0.70, except for three adaptation-related items, which were retained because their loadings exceeded 0.50 and their removal did not improve other reliability metrics (Sarstedt et al., 2019). Both CR and CA values exceeded the recommended threshold of 0.70, indicating satisfactory internal consistency and reliability for all constructs (Hair et al., 2019). Convergent validity was supported by AVE values above 0.50 (Hair et al., 2019).

Discriminant validity was verified using the Heterotrait-Monotrait Ratio (HTMT) in Table 3, with all values below 0.85 (Henseler et al., 2015). Overall, the model meets the required standards for reliability and validity, making it suitable for the second order analysis.

Table 2

Reflective measurement model assessment "Generated Using SmartPLS".

Constructs	Subdimensions	Items	Loadings	CA	CR	AVE
Identity development	Commitment making	I have decided on the direction I am going to follow in my life.	0.808	0.839	0.885	0.606
		I have plans for what I am going to do in the future.	0.741			
		I know which direction I am going to follow in my life.	0.802			
		I have an image about what I am going to do in the future.	0.741			
		I have made a choice on what I am going to do with my life.	0.776			
	Exploration in breadth	I think actively about different directions I might take in my life.	0.762	0.864	0.902	0.650
		I think about different things I might do in the future.	0.850			
		I am considering a number of different lifestyles that might suit me.	0.794			
		I think about different goals that I might pursue.	0.878			
		I am thinking about different lifestyles that might be good for me.	0.746			
	Exploration in depth	I think about the future plans I already made.	0.772	0.810	0.868	0.568
		I talk with other people about my plans for the future.	0.770			
		I think about whether the aims I already have for life really suit me.	0.794			
		I try to find out what other people think about the specific direction I decided to take in my life.	0.740			
		I think about whether my future plans match with what I really want.	0.701			
	Identification with commitment	My plans for the future match with my true interests and values.	0.756	0.800	0.862	0.555
		My future plans give me self-confidence.	0.767			
		Because of my future plans, I feel certain about myself.	0.716			
		I sense that the direction I want to take in my life will really suit me.	0.741			
		I am sure that my plans for the future are the right ones for me.	0.739			
Adaptation	Satisfaction with curriculum	I am satisfied with the number and variety of courses available at university	0.778	0.802	0.872	0.632
		I am satisfied with the number or the caliber of courses available at university	0.835			
		I am satisfied with my program of courses for this semester	0.790			
	Studying	I am quite satisfied with the professors I have now in my courses	0.522	0.720	0.826	0.549
		I'm not working as hard as I should at my classes	0.657			
		I really haven't had much motivation for studying lately	0.827			
	Social Adjustment	I am satisfied with the level at which I am performing academically	0.871	0.796	0.867	0.620
		I have not been very efficient in the use of study time lately	0.810			
		I have several close social ties at university	0.840			
		I feel that I have enough social skills to get along well in the university setting	0.821			
		I have some good friends or acquaintances at university with whom I can talk about any problems I may have	0.786			
	Anxiety	I am quite satisfied with my social life at university	0.695	0.928	0.939	0.698
		Feeling nervous, anxious, or on edge	0.366			
		Not being able to stop or control worrying	0.844			
		Worrying too much about different things	0.866			
		Trouble relaxing	0.845			
Self-esteem		Being so restless that it is hard to sit still	0.867	0.872	0.929	0.657
		Becoming easily annoyed or irritable	0.836			
		Feeling afraid as if something awful might happen	0.738			
		At times I think I am no good at all	0.873			
		All in all, I am inclined to think that I am a failure	0.794			
		I feel I do have much to be proud of	0.789			
		On the whole, I am satisfied with myself	0.840			
		I take a positive attitude toward myself	0.750			

Measurement model assessment (second order)

Identity development and adaptation are conceptualized as second-order formative constructs. To ensure the relevance and significance of their subdimensions, the disjoint two-stage approach by Sarstedt et al. (2019) was applied. In the first stage, latent variable scores were generated using the PLS algorithm and saved for subsequent analysis. In the second stage, these latent variable scores were used to represent the second-order formative constructs: identity development (commitment making, exploration in breadth, exploration in depth, and identification with commitment) and adaptation (Studying, satisfaction with curriculum and social adjustment).

To validate these higher-order formative constructs, collinearity was first ruled out, and then the significance and relevance of factor weights (Table 4) were assessed using bootstrapping. While the weights for all other dimensions were significant, the weights for social adjustment of adaptation and identification with commitment of identity development were found to be insignificant. Therefore, their loadings were examined and found statistically significant, supporting their inclusion and relevance in both models (Sarstedt et al., 2019). Consequently, the model is deemed valid and reliable, enabling the progression to structural model testing, where the proposed hypotheses are evaluated.

Structural model assessment

To determine the strength and significance of the hypothesized relationships and evaluate their contribution to the model's explanatory power, the structural model was tested using the PLS algorithm, followed by bootstrapping with 5000 subsamples to calculate path coefficients, p-values, and corresponding t-values (Table 5) (Hair et al., 2019).

The direct relationships show strong support for all hypotheses (H1-H6), with no significant changes between models with or without CVs except for H1 and H6. H1 (Identity development->Adaptation) remains supported, but its effect size decreases from moderate [$\beta = 0.458$, $f^2 = 0.236$] in the model without CVs to small [$\beta = 0.307$, $f^2 = 0.026$] in the model with CVs.

H2 (Identity development->Anxiety) holds, with a negative small effect [$\beta = -0.117$, $f^2 = 0.016$]. H3 (Anxiety-> Adaptation) is supported with [$\beta = -0.080$, $f^2 = 0.040$], suggesting a small but negative relationship. H5 (Identity development->Self-esteem) is supported, with moderate positive effect [$\beta = 0.443$, $f^2 = 0.211$].

H6 (Self-esteem->Adaptation) becomes significant in the model with CVs, showing a negligible positive effect [$\beta = 0.244$, $f^2 = 0.010$], whereas it was not supported in the model without CVs [p-value = 0.059, $\beta = 0.070$, $f^2 = 0.006$]. The relationship strengthens after adding CVs, suggesting that they helped isolate the true effect of the independent variable, as explained by Atinc et al. (2012). This analysis reveals a significant, though negligible, effect of self-esteem on adaptation.

While the CVs in H8 and H9—previous travel experience [$\beta = 0.140$, $f^2 = 0.011$] and proficiency level [$\beta = 0.299$, $f^2 = 0.057$]—showed significant positive effects on adaptation, with negligible and small effect sizes, respectively, H10 regarding the effect of length of stay on adaptation was not supported [$p = 0.396 > 0.05$], indicating no statistically significant relationship.

The explanatory power of the model was assessed using R^2 values, which represent the proportion of variance in the dependent variables explained by the independent variables (Hair et al., 2019). The model initially explains 29.1 % of the variance in adaptation, and after adding CVs, the R^2 increased by 9.6–38.7 %, thereby improving the model's fit. This implies that the CVs significantly contribute to explaining the outcome and provide additional explanatory value (Atinc et al., 2012).

PLSPredict

The PLSPredict algorithm, applied with 10-fold cross-validation and 10 repetitions, demonstrated strong predictive capability, with no substantial differences observed between the two models. All Q^2_{predict} values were positive, fulfilling Shmueli et al.'s (2016) criteria for predictive relevance by indicating that the model outperformed a naïve mean-based benchmark. Crucially, the consistently lower root mean squared error values (RMSE) values from the PLS-SEM model compared to those of the linear model (LM) reinforced its superior predictive accuracy. Additionally, the cross-validated predictive ability test (CVPAT) further validated the model's robustness: PLS loss values for adaptation and the overall model were significantly lower than both the indicator average loss and the LM benchmark (with $p < 0.05$). Together, these results confirm the model's high predictive validity, in line with the standards proposed by Sharma et al. (2022).

Table 3
HTMT "Generated Using SmartPLS".

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) Anxiety									
(2) Commitment making	0.126								
(3) Exploration in breadth	0.119	0.841							
(4) Exploration in depth	0.095	0.323	0.325						
(5) Identification with commitment	0.052	0.678	0.716	0.360					
(6) Studying	0.157	0.486	0.514	0.293	0.370				
(7) Satisfaction with curriculum	0.129	0.379	0.408	0.189	0.330	0.707			
(8) Social Adjustment	0.305	0.544	0.541	0.284	0.406	0.834	0.817		
(9) Self-esteem	0.049	0.290	0.279	0.481	0.269	0.265	0.143	0.278	

Table 4
Formative constructs assessment "Generated Using SmartPLS".

Constructs	Factors	VIF	Weight	T-statistics	P-values	Loadings	T-statistics	P-values
Identity development	Commitment making	2.327	0.427	4.461	0.000	0.838	20.425	0.000
	Exploration in breadth	2.440	0.354	3.609	0.000	0.819	20.074	0.000
	Exploration in depth	1.118	0.472	6.695	0.000	0.697	11.628	0.000
	Identification with commitment	1.700	0.037	0.422	0.336	0.633	11.229	0.000
Adaptation	Studying	2.030	0.273	3.404	0.000	0.818	22.249	0.000
	Satisfaction with curriculum	1.782	0.026	0.315	0.376	0.670	12.335	0.000
	Social adjustment	2.745	0.775	9.592	0.000	0.979	76.571	0.000

Assessment of the mediation effect

To assess the mediation effect, Preacher and Hayes's (2004) method was employed using a bootstrapping procedure with 5000 samples to analyze the β , p-values, and 95 % confidence intervals (CI) (Hair et al., 2019). The bootstrapping analysis revealed (Table 6) that H4 (Identity development->Anxiety->Adaptation) indicates mediation in both models, with no changes when CVs are included [95 %CI= 0.007,0.037]. Partial mediation is present, as H1 is supported.

H7 is supported in the model with CVs [95 %CI = 0.005,0.068, P-value= 0.028], as the CI does not include zero, whereas it is not supported without CVs [95 %CI= -0.003,0.061, P-value= 0.063]. Despite this, the beta coefficient, which represents the strength and direction of the relationship, remains similar [β = 0.030 vs. β = 0.036] between the two models, suggesting that the inclusion of CVs improves the clarity of the relationship by reducing variability or confounding effects, leading to more reliable and interpretable results without altering the direction or magnitude of the relationship (Atinc et al., 2012).

Discussion

The aim of this research was to assess the anxiety levels of international students and examine the mediating roles of self-esteem and anxiety in the relationship between identity development and adaptation. This objective was addressed by developing a predictive model informed by established theoretical frameworks, logical reasoning, and empirical evidence (e.g., Branje et al., 2021; Luyckx et al., 2008). The first key finding revealed that anxiety among international students in Turkey is generally moderate to high, with 62.09 % of participants reporting such levels. This rate appears higher than among Turkish college students, as reported in Kaya's (2023) study, where 20 % exhibited symptoms of moderate to severe anxiety and 43 % reported at least mild anxiety. The heightened anxiety levels among international students may stem from ongoing language barriers, limited institutional support, and negative interactions with academic staff. These factors intensify social isolation and create uncertainty in navigating both academic demands and daily life (Gebbru & Yüksel-Kaptanoğlu, 2020; Özoğlu et al., 2015). Mesidor and Sly (2016) further suggest that international students experience stress not only from academic performance pressures but also from the challenges of adapting to a new cultural environment, which may help explain their elevated anxiety levels.

The analysis confirmed H1, demonstrating a positive association between identity development and adaptation. This finding aligns with acculturation theory, which argues that a strong sense of identity provides a foundation for managing cultural differences and fostering a sense of belonging, thereby facilitating smoother adaptation (Berry, 1997; Ward et al., 2020). It also supports prior research showing that identity formation and adaptation are reciprocal processes, with a stable and well-formed identity enhancing adjustment to new cultural contexts (Branje et al., 2021; Luyckx et al., 2008). These results suggest that international students with a well-established identity are better prepared to navigate sociocultural challenges, build meaningful relationships, and integrate more effectively into academic and social environments.

The results further indicated that exploration in depth, commitment making, and exploration in breadth had the strongest influence on identity development, while identification with commitment played a minimal role. These findings align with Luyckx et al. (2006, 2008), who highlighted the significance of active exploration and commitment formation in identity development. For international students, these three processes are particularly important, as they reflect the active engagement, adaptability, and decision-making needed to navigate new academic and sociocultural settings. In contrast, identification with commitment was less influential, likely due to the tentative, externally influenced, and emotionally provisional nature of commitments formed during cultural transition. As Luyckx et al. (2006) noted, such fluctuations are typical of ongoing evaluative processes, making this dimension inherently less stable over time.

Regarding adaptation, social adjustment emerged as the most significant factor, while studying-related adaptation was less significant, and curriculum satisfaction showed minimal impact. This aligns with Liga et al. (2022), who found that Italian students with higher social engagement experienced greater adaptation than those relying on academic adjustment, and curriculum satisfaction played a smaller role. Both social and academic adjustment have been identified as important for international student's adaptation (Gong et al., 2021; Mesidor & Sly, 2016), likely because psychological adaptation is more strongly linked to social connectedness and environmental inclusiveness than to specific academic or curricular factors (Bethel et al., 2020). In Turkey, academic dissatisfaction is generally not a major concern; instead, international students face more immediate challenges related to daily life, cultural differences, communication, and social integration. These include adapting to differences in norms and values, unfamiliar food, dormitory life, nonverbal cues, and language barriers, which affect social functioning more than academic performance (Gebbru & Yüksel-Kaptanoğlu, 2020; Özoğlu et al., 2015).

Table 5

Structural model assessment "Generated Using SmartPLS".

Hypothesis	Relationships	VIF	β	P-values	t-values	95 %C	f^2		R^2	Decision
H1	Identity development→Adaptation	2.147	0.307	0.000	6.660	[−0.218, −0.098]	0.026	> Adaptation	0.387	Supported
H2	Identity development→Anxiety	1.000	−0.117	0.005	2.604	[−0.205, −0.054]	0.016	>Anxiety	0.016	Supported
H3	Anxiety→Adaptation	1.078	−0.080	0.013	2.218	[0.090, 0.282]	0.040			Supported
H5	Identity development→Self-esteem	1.000	0.443	0.000	12.265	[0.357, 0.484]	0.211	>Self-esteem	0.174	Supported
H6	Self-esteem→Adaptation	1.187	0.244	0.000	5.926	[0.035, 0.234]	0.010			Supported
H8	Travel_experience→Adaptation	2.858	0.140	0.011	2.300	[0.200, 0.407]	0.011			Supported
H9	Language_proficiency→Adaptation	2.724	0.299	0.000	4.782	[0.013, 0.157]	0.057			Supported
H10	Length_of_stay→Adaptation	3.311	0.018	0.396	0.068	[−0.098–0.127]	0.000			Rejected

Table 6
Mediation effect assessment "Generated Using SmartPLS".

Hypotheses	Relationships	β	P-values	t-values	95 %CI	Decision
H 4	Identity development→Anxiety→Adaptation	0.020	0.013	2.216	[0.007,0.037]	PM
H 7	Identity development→Self-esteem→Adaptation	0.036	0.028	1.910	[0.005,0.068]	PM

Note. PM=Partial mediation

The current study confirmed H2–H4, demonstrating that anxiety is negatively associated with both identity development and adaptation and partially mediates their relationship. This finding is consistent with previous research suggesting that a well-developed identity provides psychological stability, helping reduce anxiety and facilitates adjustment in unfamiliar environments (Branje et al., 2021). This can be further explained by the idea that identity uncertainty increases vulnerability to anxiety and emotional distress, which in turn hinder successful adaptation (Luyckx et al., 2008). These results suggest that a stable sense of identity enhances students' ability to navigate the uncertainties of a new environment by reducing anxiety. Lower anxiety levels, in turn, support better adjustment by enabling students to form meaningful relationships, participate more fully in academic and social settings, and integrate more effectively into the host culture.

The PLS analysis results indicated that hypotheses H5–H7 were supported, showing that self-esteem is positively associated with both identity development and adaptation, while partially mediating this relationship. This is consistent with prior research highlighting the important role of identity in shaping self-worth and psychological resilience needed to face life's challenges (Luyckx et al., 2008; Branje et al., 2021), as well as with studies showing that high self-esteem boosts motivation and social engagement—key factors that help students build relationships and manage stress, which are essential for successful sociocultural adjustment (Crocker & Park, 2004; Quinton, 2020). These findings suggest that for international students in Turkey, who often face cultural and social uncertainties, a well-developed sense of identity fosters higher self-esteem. This, in turn, enhances their confidence in navigating academic and social settings and motivates adaptive behaviors that facilitate smoother adjustment. This dynamic is further supported by Gebregergis et al. (2020), who found that international students with greater self-efficacy tend to experience elevated self-esteem, thereby promoting their social and cultural adaptation.

The results showed that H10 was rejected, indicating that length of stay does not significantly influence adaptation, contrary to earlier findings (Berry, 1997; Ward and Kennedy, 1999). In contrast, previous travel experience and language proficiency (H8–H9) play a significant role in adaptation, aligning with findings on international migrants (Schwartz et al., 2010). This is also consistent with prior research showing that language barriers and cultural unfamiliarity hinder international students' ability to form relationships and feel culturally included, thereby impeding adaptation (Gong et al., 2021; Bethel et al., 2020). In the Turkish context, the dominance of the Turkish language and distinct social norms may intensify these difficulties. As emphasized by Smith and Khawaja (2011), mitigating these challenges facilitates both academic and social adjustment among students, supporting smoother integration into the host environment.

Theoretical and practical implications

This research makes a significant contribution by being first, to the best of the researcher's knowledge, to assess anxiety levels among international students in Turkey. While earlier studies (e.g., Gebru & Yuksel-Kaptanoğlu, 2020; Özoğlu et al., 2015) have explored students' motivations for choosing Turkey and the cultural challenges they face, they did not examine how the psychological factors studied in this research influence their adaptation. Addressing this gap, this study not only enhances understanding of international student experiences in Turkey—a growing global education hub—but also presents a novel model that examines the mediating roles of self-esteem and anxiety between identity development and adaptation.

From a practical standpoint, the findings are highly relevant for universities, researchers and policymakers working to enhance international students' experiences—particularly in countries like Turkey, which has become a growing destination for higher education (Lewis & Lüküslü, 2024). Based on the results, Turkish universities should prioritize fostering healthy identity development, strengthening self-esteem, and addressing anxiety to promote better adaptation and help students manage sociocultural challenges more effectively—ultimately benefiting both international students and host institutions.

While many Turkish universities offer counseling services, these often fail to address the unique needs of international students. Multilingual counseling, along with stress-management workshops, peer support groups, and proactive programs such as resilience and life skills training, can provide both immediate and long-term support—especially for students from conflict-affected regions who may need trauma-informed care. Since mental health stigma persists in some cultures of these students, awareness campaigns and peer-led efforts—like mental health ambassadors—can normalize help-seeking and foster an inclusive environment where students feel safe sharing their struggles. Such initiatives can ultimately foster a stronger sense of belonging, identity, and adaptation among students, while also reducing anxiety and enhancing self-esteem.

The results also indicate that social adaptation plays a more significant role than academic adjustment in the overall adaptation process. While some Turkish universities have introduced multicultural events like annual International Student Days, such initiatives are often limited in depth and frequency. Incorporating regular cultural exchange activities—such as food festivals, collaborative student projects, and art exhibitions—into institutional programming can promote inclusivity, build self-confidence, and strengthen connections between international and local students. These efforts not only support emotional well-being but can also enhance academic performance by fostering a stronger sense of community. Moreover, inclusive extracurricular activities such as trips and

camping contribute to language learning and improving, forming friendships and cross-cultural understanding, which are key to both social and academic integration. Nonetheless, communication and language barriers remain an ongoing challenge for these students even after some social adaptation, which can lead to isolation, difficulty accessing important information, and limited interaction with institutional resources (Özoğlu et al., 2015). To mitigate this, Turkish universities should provide multilingual support, including translated academic materials, policy documents, and administrative communications in commonly spoken languages among international students. Establishing writing centers, tutoring services, and language-integrated instructional models can also further ease students' transition into Turkish-language academic environments. Additionally, building partnerships with industry leaders will allow universities to align their curricula with labor market needs, providing practical learning experiences that improve both career readiness and satisfaction with the educational programs.

Finally, universities must invest in comprehensive training for both administrative and academic staff. Some international students in Turkey have reported negative experiences in their interactions with staff, which can result in confusion, frustration, and even withdrawal from their studies (Gebri & Yuksel-Kaptanoglu, 2020). These challenges often contribute to social and academic isolation, particularly when students face difficulties accessing study groups, peer support, or institutional services—even after some level of cultural adjustment. To address this, staff should receive culturally sensitive training to support students through structured multilingual orientation programs, clear communication strategies, and accessible support systems. These measures will help students navigate institutional processes, academic expectations, and social norms from the outset.

Limitations and future research

This study has several limitations, including its cross-sectional design, which limits the ability to track changes over time. Future research could use longitudinal or mixed-method approaches to monitor opinion shifts and develop long-term strategies to support student adaptation. The sample was limited to international students in Ankara; thus, testing the model in other settings, such as European or American universities, is recommended. Including local students would enable group comparisons and support targeted interventions. No significant differences were found in the multigroup analysis, possibly due to imbalanced age and education distributions. Future studies should ensure more balanced subgroups to improve statistical power and enhance robustness and generalizability. This study did not examine moderators, so future research should consider factors like social support, resilience, cultural intelligence, and coping strategies for a more comprehensive understanding. Further attention to acculturative stress, language anxiety, intercultural competence, perceived discrimination, and ruminative exploration in identity development is also needed to deepen insight into student adaptation.

CRediT authorship contribution statement

Faten AlQaifi: Writing – review & editing, Writing – original draft, Visualization, Software, Methodology, Investigation, Formal analysis, Conceptualization.

Declaration of Generative AI and AI-assisted technologies in the writing process

During the proofreading of this work, the author used ChatGPT in order to enhance the clarity and accuracy of the text. After using this tool, the author reviewed and edited the content as needed and takes full responsibility for the content of the publication.

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