



Examining how positive intergroup contact and intercultural sensitivity facilitate sociocultural adaptation of international students by reducing intergroup anxiety

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ABSTRACT

Studying abroad offers many benefits for international students, but their intercultural contact with the host society can also lead to prejudice and anxiety, which may hinder successful adaptation. To explore this dynamic, we conducted a cross-sectional study to investigate the role of positive intergroup contact and intercultural sensitivity in promoting sociocultural adaptation by reducing intergroup anxiety. The study involved 447 international students, who completed a set of self-report questionnaires to measure the key variables. Pearson's correlation, hierarchical multiple regression, and mediation analyses were performed using SPSS v.26 and the jAMM module (medmod) software. Our findings revealed that both positive intergroup contact and intercultural sensitivity were significant predictors of sociocultural adaptation. Additionally, the study confirmed the hypothesis that intergroup anxiety partially mediated the relationship between the predictors and sociocultural adaptation, suggesting that both intergroup contact and intercultural sensitivity have direct and indirect effects on adaptation through intergroup anxiety. These results highlight the paramount importance of positive intergroup contact and intercultural sensitivity in facilitating sociocultural adaptation among international students. Therefore, university communities should take these factors into account when fostering sociocultural adjustment of their students.

1. Introduction

Over the past few decades, the internationalization of higher education has significantly accelerated international student mobility and expanded cross-border connections. According to a UNESCO report, the number of international students worldwide increased from 2 million in 2000 to 6.36 million by 2020 (Gutema et al., 2024). Countries like the United States, the United Kingdom, Canada, China, Australia, France, Russia, Germany, Japan, and Spain were the top destinations for these students in 2019 and 2020 (Ke et al., 2022; Tang & Zhang, 2023). The rapid growth of international students has unlocked a new area of research for many scholars investigating the intercultural transitions of these students in the new cultural, social, and academic environments of their host countries (Aresi et al., 2021). While studying abroad offers many benefits, such as personal and professional development, multicultural exposure, and development of intercultural competence (Zhang & Noels, 2024), the intercultural transition of international students is

often accompanied by numerous challenges, including homesickness, culture shock, fear, discrimination, and poor multicultural competence (Andrade, 2006; Liu et al., 2016; Mahmud et al., 2010; Reynolds et al., 2024; Sandhu & Asrabadi, 1994), financial problems, language barriers, cultural differences, and a lack of understanding from the broader community (Araujo, 2011; Mesidor & Sly, 2016; Yusoff, 2011; Zhang & Noels, 2024), depression, isolation, suicide (Hishida et al., 2024), intergroup anxiety and conflict (Pettigrew et al., 2007).

Considering these inherent intercultural adjustment challenges, intercultural researchers have been actively seeking and identifying factors that promote the intercultural adaptation of students while shielding them from negative adjustment outcomes. As a result, several factors have been recognized as significant antecedents of sociocultural adaptation, including cultural empathy, intercultural competence (Zhang & Noels, 2024), self-efficacy, length of stay, personality (Wilson et al., 2013; Zhang & Goodson, 2011), stress, acculturation strategies (Bierwiazzonek & Waldzus, 2016; Mao, 2024; Sam, 2024; Zhang &

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Goodson, 2011), psychological capital (Prasath et al., 2022), multicultural personality (Yakunina et al., 2012), online social networking (Wong & Liu, 2024), cultural distance, social integration, cultural distance (Ayoob et al., 2015; Bierwiazzonek & Waldzus, 2016; Malay et al., 2024), social support system, intercultural training, motivation, and host language proficiency (Bierwiazzonek & Waldzus, 2016; Mao, 2024; Pekerti et al., 2020; Zhang & Goodson, 2011). In addition to these predictors of adjustment outcomes, intergroup contact (Ortiz, 2020; Zhang & Goodson, 2011), and intercultural sensitivity (Elijah et al., 2024; Vaccarino et al., 2021) are thought to facilitate the intercultural competence and sociocultural adaptation of international students by reducing the devastating effects of intergroup anxiety. However, the existing literature on the effects of intergroup contact and intercultural sensitivity on sociocultural adaptation, mediated through intergroup anxiety in the international student population, is significantly limited and underrepresented (Berry & Grigoryev, 2022). Further, Bierwiazzonek and Waldzus (2016), in their systematic review, found that the existing literature on international students is fragmented, and inconsistent, suggesting the need for further research.

Another notable limitation of previous intergroup or intercultural studies is their overemphasis on groups that may be ethnically, racially, or culturally different but share the same language, such as White and Black Americans (Aberson & Haag, 2007) and Hindus and Muslims in Bangladesh (Islam & Hewstone, 1993). This focus overlooks the frequent intercultural contact between international and domestic students who speak different primary languages, resulting in insufficient literature (Mak et al., 2014). Moreover, intergroup contact between international students and members of the host society is deeply shaped by the cultural norms, values, and social expectations of both parties. Because these cultural dynamics vary significantly across different host societies, findings from one context may not be readily applicable or generalizable to others. This cultural specificity highlights the critical need for context-sensitive research that examines intergroup contact within particular host societies. Such research is essential for gaining a nuanced understanding of how intergroup interactions unfold in different settings and how they influence international students' adaptation processes in culturally distinct environments. In response to these identified gaps, we conducted a cross-sectional study to examine how intergroup contact and intercultural sensitivity influence the sociocultural adaptation of international students in Hungary through the mediating effect of intergroup anxiety. While previous intergroup contact studies have focused on ethnic groups within the same society, our research extends this to international students, who differ significantly from local groups due to their distinct cultural and language backgrounds. Therefore, this study is crucial as it substantiates the essential role of intergroup contact and intercultural sensitivity in promoting sociocultural adaptation of international students by reducing intergroup anxiety. The findings are also expected to offer practical guidance for higher education institutions to promote adaptation through social contact and cultural sensitivity.

2. Literature review

2.1. Positive intergroup contact and sociocultural adaptation

Within the broader field of intercultural adaptation, the concept of adaptation pertains to individuals' psychological state and their ability to adjust to the sociocultural environment (Sam & Berry, 2010). Intercultural adaptation encompasses two distinct yet interrelated domains: psychological adaptation and sociocultural adaptation (Searle & Ward, 1990). Psychological adaptation pertains to the affective or emotive outcomes of adaptation, including psychological well-being, self-esteem, happiness, satisfaction, and depression. In contrast, sociocultural adaptation refers to the behavioral aspects of intercultural adjustment (Ward & Kennedy, 1994; Ward & Rana-Deuba, 1999). These two domains necessitate different theoretical approaches; psychological

adaptation is framed within the context of psychological stress and a stress-coping paradigm, while sociocultural adjustment is best understood through a cultural learning approach (Ward et al., 2005). According to culture learning theory, sociocultural challenges arise from the limited capacity of sojourners, immigrants, or refugees to effectively navigate daily sociocultural encounters. This perspective posits that individuals encounter intercultural complications when they lack the requisite sociocultural skills to function appropriately within a multicultural environment (Masgoret & Ward, 2006).

Cross-cultural researchers argue that intercultural adaptation is a complex, multidimensional process influenced by a myriad of multicultural factors, asserting that no single personal or situational variable determines the acculturative outcome (Mesidor & Sly, 2016; Smith & Khawaja, 2011). This suggests that a range of personal and situational factors influence the success of sociocultural adaptation, one of which is positive intergroup contact. Pettigrew and Tropp (2006), conceptualize intergroup contact as "actual face-to-face interaction between members of clearly defined groups" (p. 754). As a well-established research area in social psychology, intergroup contact is recognized as a significant mechanism for reducing prejudice. In his seminal work, *The Nature of Prejudice*, Gordon Allport developed the contact hypothesis, which posits that when members of different groups of equal status collaborate toward a shared goal, they are more likely to develop a sense of closeness, crucial for prejudice reduction, particularly when supported by institutional authorities (Allport, 1954). Intergroup contact theory suggests that interactions among members of various groups can diminish intergroup bias. Building on this theory, several studies have explored the relationship between intergroup contact and various outcomes, such as positive attitudes, intergroup anxiety, and prejudice, with the nature of this relationship varies based on the quality of the contact (Pettigrew & Tropp, 2006).

Similarly, studies focusing on international students have demonstrated that developing intercultural relationships with local individuals, communities, and places is crucial for their intercultural adjustment within the host society. For instance, Terry et al. (2006) investigated the intergroup predictors of cultural adjustment among international students, finding that at high levels of legitimacy, perceptions of permeable group boundaries were associated with improved psychological, sociocultural, and academic adjustment. Additionally, Bethel et al. (2020) suggested that international students' contact with members of the host country may facilitate their psychological and sociocultural adaptation by alleviating transition stress and helping them cope with cultural differences. In another study involving international students in China, host-national friendships were positively and significantly correlated with both psychological and sociocultural adaptation, whereas co-national friendships negatively impacted psychological adaptation (Sheng et al., 2022). Conversely, friendships within one's in-group (co-national friendships) may hinder the psychological adaptation of international students by limiting their intergroup contact with locals (Sheng et al., 2022). A recent study by Gao et al. (2024) further emphasizes that positive intergroup contact between international and domestic students in Japan enhances their willingness to engage in interactions. This study also underscores that positive intergroup contact has a more substantial predictive power for integration willingness than negative contact (Gao et al., 2024).

In conclusion, the existing literature highlights a positive relationship between intergroup contact and the sociocultural adaptation of international students. Frequent and meaningful interactions between international students and local people can significantly enhance their adaptation to the host society. Consequently, the present study proposes the following guiding hypothesis:

Hypothesis 1. International students with a greater level of positive intergroup contact will achieve better sociocultural adaptation.

2.2. Intercultural sensitivity and sociocultural adaptation

The emergence of the global village marked by cultural diversity is one of the most significant features of the 21st century, necessitating that individuals develop intercultural sensitivity to thrive in this interconnected world (Figueroa & Hofhuis, 2024). Intercultural sensitivity is defined as “an individual's ability to develop a positive emotion towards understanding and appreciating differences that promote appropriate and effective behavior in intercultural communication” (Chen & Starosta, 1997, p. 5). This dynamic concept comprises six important factors: self-esteem, self-monitoring, open-mindedness, empathy, interaction involvement, and non-judgment (Chen & Starosta, 1997). Various researchers suggest that intercultural sensitivity is crucial for the effectiveness and success of intercultural adaptation. For example, Rodríguez-Izquierdo (2022) studied international experiences and intercultural sensitivity among 1645 university students, reporting a positive correlation between intercultural sensitivity and both mobility experiences and intercultural friendships. Similarly, a study of international students in Malaysia found that higher intercultural sensitivity facilitated sociocultural adjustment, indicating that these students achieved better adaptation in their interactions (Awang-Rozaimie et al., 2013). Kağrıncı (2012) also explored the predictive role of multicultural factors on international students' adjustment in Turkey, providing substantial evidence that social initiatives, emotional stability, cultural empathy, and open-mindedness significantly influenced aspects of adjustment, including social, emotional, and academic adaptation. The findings suggest that effectively managing emotions during stress, actively engaging with diverse individuals, and remaining open to different cultures enhance intercultural adjustment.

Furthermore, students with higher levels of intercultural sensitivity experienced better academic socialization and intercultural competence (Kim, 2019) both of which are essential aspects of sociocultural adaptation. Likewise, international students with intercultural sensitivity demonstrated better academic adaptation through their ability to actively interact and collaborate with people from different cultural backgrounds (Takyi Mensah et al., 2024). Hapsari and Hamamah (2020) also observed that components of intercultural sensitivity (i.e., interaction engagement and confidence) were significantly associated with certain constituents of sociocultural adaptation, including interpersonal communication and academic performance. However, when the total scores for intercultural sensitivity and sociocultural adaptation were summed, these variables were not statistically related, indicating that more empirical evidence is needed to clarify their relationship (Hapsari & Hamamah, 2020). In summary, the evidence presented in this section collectively suggests that intercultural sensitivity plays a crucial role in facilitating the sociocultural adaptation of international students. Students who are able to understand and appreciate cultural differences tend to have better intercultural adjustment in their new sociocultural environment. In line with this research, the present study formulates the following guiding hypothesis:

Hypothesis 2. International students with higher levels of intercultural sensitivity will experience better sociocultural adaptation.

2.3. Intergroup contact, intergroup anxiety, and sociocultural adaptation

Previous studies suggest that the relationship between intergroup contact and cross-cultural adaptation is not always straightforward. In this context, intergroup anxiety is recognized as a potential mediator in the relationship between intergroup contact and the intercultural adaptation of international students. Intergroup anxiety is defined as “a type of anxiety that people experience when anticipating or engaging in intergroup interactions” (Stephan, 2014, p. 2). It is more specific than social anxiety, as it pertains solely to intergroup situations. According to the intergroup anxiety theory proposed by Stephan (2014), intergroup anxiety can mediate the relationship between personal experiences (e.g.,

contact experiences) and various affective (e.g., fear, anger, and hatred), behavioral (e.g., ineffective group contact, avoidance of group contact, and offensive group contact), and cognitive variables (e.g., intergroup attitudes, stereotypes, and perceived homogeneity of an outgroup). This theoretical argument is supported by substantial empirical evidence indicating that intergroup anxiety serves as a mediating variable between contact experiences and various affective, behavioral, and cognitive outcomes. For instance, Mak et al. (2014) examined the attitudes of Australian domestic undergraduate students toward international students, focusing on the mediating effects of intergroup anxiety and intercultural communication emotions. Their results revealed that intergroup anxiety and intercultural communication mediated the relationship between the quality of contact and intergroup attitudes. Similarly, Shim et al. (2012) provided evidence of the significant role intergroup anxiety plays in the relationship between intergroup contact and Koreans' affective and behavioral attitudes toward Americans.

Moreover, intergroup anxiety significantly mediated the relationship between interpersonal mindfulness and intercultural communication effectiveness among international students studying in Russia (Khuhlaev et al., 2022). The Anxiety/Uncertainty Theory (AUT) posits that managing anxiety and uncertainty is crucial for effective communication in interpersonal and intergroup encounters (Gudykunst, 1995). Conversely, AUT suggests that poor management of anxiety and uncertainty can lead to negative intercultural adaptive outcomes, such as diminished psychological well-being and reduced intercultural competence. Contrary to the general assumption that high direct contact enhances positive intergroup outcomes by reducing intergroup anxiety (Stephan & Stephan, 1985), a study on Chinese students found that intergroup anxiety served as a mediator only for those with low direct contact and their global competence, but not for students with high direct contact (Cao & Meng, 2020). This finding suggests that Chinese students with minimal direct contact with international students exhibit lower levels of intergroup anxiety, resulting in improved global competence. It highlights that the mediating effect of intergroup anxiety on the relationship between intergroup contact and cross-cultural adaptation requires further investigation.

Taken together, despite some contradictory results, much of the literature reviewed here indicates both empirical and theoretical support for the potential mediating role of intergroup anxiety in the link between intergroup contact and sociocultural adaptation. This means that establishing and maintaining intercultural contact and friendships with local people tends to help international students experience less anxiety, which, in turn, contributes to successful sociocultural adaptation. Based on this review, the following hypothesis has been formulated to guide the present study.

Hypothesis 3. Intergroup anxiety will act as a mediator in the relationship between intergroup contact and sociocultural adaptation of international students.

2.4. Intercultural sensitivity, intergroup anxiety, and sociocultural adaptation

There appears to be a dearth of empirical studies examining the mediating effect of intergroup anxiety on the relationship between intercultural sensitivity and the psychological and sociocultural adaptation of international students. However, some general studies have identified the mediating effect of intergroup anxiety. For instance, a study conducted in Turkey revealed that intergroup anxiety significantly mediated the relationship between intercultural sensitivity and positive attitudes. Specifically, Turkish individuals who are more interculturally sensitive tend to experience lower levels of intergroup anxiety, which, in turn, contributes to more positive attitudes toward Syrians (Sari & Yalçınkaya-Alkar, 2022). Moreover, several researchers have reported that negative expectations regarding intergroup interactions, such as fear of rejection and beliefs that outgroup members are hostile, are

positively associated with intergroup anxiety (Britt et al., 1996; Brown, 2007; Butz & Plant, 2007). These findings suggest that individuals' feelings of intergroup anxiety are exacerbated by their psychological anticipation of negative outcomes during intergroup interactions. According to Stephan and Stephan (1985), intergroup anxiety stems from four types of feared negative consequences: negative psychological outcomes (e.g., frustration, loss of control), negative behavioral outcomes (e.g., exploitation, verbal derogation), negative evaluations by outgroup members (e.g., negative stereotyping, disdain), and negative evaluations by in-group members (e.g., disapproval or rejection for interacting with the outgroup). Thus, the affective and cognitive aspects of intergroup anxiety appear to be crucial in shaping experiences of anxiety during intergroup interactions.

Intercultural sensitivity is presumed to mitigate negative emotional and psychological expectations in intercultural interactions. For example, individuals with high intercultural sensitivity tend to possess greater self-esteem, enabling them to evaluate intercultural interactions positively rather than anticipating negative experiences (Chen & Starosta, 1997). Additionally, the self-esteem and open-mindedness components of intercultural sensitivity foster positive emotions, facilitating an accurate understanding and acceptance of cultural differences during intercultural encounters. Chen and Starosta (1997) also argue that when individuals approach intercultural interactions without judgment, they are more likely to enjoy their interactions with people from different cultures. Therefore, based on previous studies and theoretical frameworks regarding intergroup anxiety and intercultural sensitivity, it can be anticipated that self-esteem, self-regulation, open-mindedness, empathy, interaction involvement, and suspending judgment components of intercultural sensitivity may be important psychological attributes in reducing intergroup anxiety and promoting the psychological and sociocultural adaptation of international students.

To conclude, the available literature indicates that intergroup anxiety may play a mediating role between intercultural sensitivity and sociocultural adaptation of international students. This suggests that international students who possess key qualities of intercultural sensitivity, such as self-esteem, empathy, self-monitoring, open-mindedness, interaction involvement, and non-judgment, are less likely to experience feelings of fear and apprehension during their intercultural interactions with the locals. As a result, these students may achieve better sociocultural adaptation. In light of this insight, the present study proposes the following hypotheses.

Hypothesis 4. Intergroup anxiety will mediate the relationship between intercultural sensitivity and sociocultural adaptation of international students.

3. Methods

3.1. Participants

The sample of the study consisted of international students ($N = 447$) pursuing their undergraduate and postgraduate studies in Hungary. The study was open to all regular adult international students enrolled at the university (Bachelor's, Master's, and PhD levels). However, international students under the age of 18 and exchange program students were excluded from the study. Participants were selected using a convenience sampling strategy. The demographic characteristics of the respondents, summarized in Table 1, indicated that there were 215 males and 232 females, with a mean age of 23.17 years. The average length of stay at the university was 24 months. The study included participants from all educational levels: bachelor ($n = 248$; 55.70 %), master ($n = 154$; 34.50 %), and doctorate ($n = 44$; 9.80 %). Regarding their sources of financial support, 224 participants (50.90 %) were scholarship holders, while 223 (49.10 %) were self-supporting. In terms of geographical distribution, the majority of the students were from Asia ($n = 231$; 52.40 %) and Africa ($n = 180$; 40.80 %), with some from Europe ($n = 19$; 4.30 %).

Table 1

Frequency distribution of characteristics of the participants.

Variable	<i>n</i>	%	<i>N</i>
Sex			447
Male	215	48.10	
Female	232	52.90	
Educational level			447
Bachelor	249	55.70	
Master	154	34.50	
Doctorate	44	9.80	
Source of financial support			447
Scholarship	224	50.90	
Self-support	223	49.10	
Hungarian Language Skill			447
Poor	263	58.80	
Fair	154	34.50	
Good	26	5.80	
Very good	4	0.90	
Continent			441
Africa	180	40.80	
Asia	231	52.40	
Europe	19	4.30	
North America	3	0.70	
South America	7	1.60	
Oceania	1	0.20	

There were also a few participants from North America ($n = 3$; 0.70 %), South America ($n = 7$; 1.60 %), and from Oceania ($n = 1$; 0.2 %). While most students had poor to fair Hungarian language skills, a small number reported good skills. Participants of the study were from 84 countries, including China, India, Russia, Egypt, Ghana, Uganda, Lebanon, Palestine, Nigeria, Syria, Iran, Germany, Canada, the US, Qatar, the United Arab Emirates, the UK, Jordan, Iraq, France, Pakistan, Israel, Italy, Georgia, Albania, Sudan, Eritrea, Vietnam, South Korea, Paraguay, Panama, Peru, Kazakhstan, Uzbekistan, Ukraine, Montenegro, Kosovo, Bosnia and Herzegovina, Japan, and Indonesia.

3.2. Measures

3.2.1. Sociodemographic variables

Data related to the sociodemographic background of the students were gathered using self-developed questions. The sociodemographic variables include age, sex, country of origin, language proficiency (specifically in the language of the host country), length of stay in the host country, and educational qualification.

3.2.2. Sociocultural adaptation

The revised version of the Sociocultural Adaptation Scale (SCAS-R), developed by Wilson (2013), was used to measure the sociocultural adaptation or competence of the students. This 21-item self-report questionnaire employs a Likert-type scale ranging from 1 (*Not at all competent*) to 5 (*Extremely competent*). Sample items include 'Building and maintaining relationships', 'Managing my academic responsibilities', and 'Accurately interpreting and responding to other people's emotions'. The total computed scores range from 21 to 105, with higher scores indicating greater behavioral competence or sociocultural adaptation. The SCAS-R is a highly reliable instrument, with a Cronbach's alpha of 0.92 (Wilson, 2013). The current study also indicated that the scale has a strong reliability coefficient of $\alpha = 0.88$.

3.2.3. Intergroup contact

To assess intergroup contact, the General Intergroup Contact Quantity and Quality (CQCQ) scale developed by Islam and Hewstone (1993) was utilized. This scale measures both the quantity and the quality dimensions of intergroup contact. The quantity dimension reflects the number of friends that international students have from the host culture and the frequency of their interactions with local members (Hungarians) in various settings (e.g., campus). The quality dimension assesses aspects

such as equality, motivation, and the nature of relationships with host culture members (e.g., 'I had a positive experience during my interactions with Hungarians'). The scale consists of 10 self-report items based on a Likert-type scale ranging between 1 (*not at all*) and 7 (*a great deal/more often*). Some example item statements from the scale are: 'How much contact do you have with Hungarians as close friends?', 'How often have you engaged in informal conversations with your Hungarian friends?', and 'To what extent did you experience the contact with Hungarian as equal'. To tailor the items to the context of the current study, minor wording adjustments were made (e.g., 'outgroup members' were modified to 'Hungarian people'). Higher overall scores indicate greater general intergroup contact experience between international students and nationals of the host country. Previous studies have reported that the scale demonstrates good internal consistency and reliability (Ye et al., 2023). The reliability coefficient of the scale in the current study was also high ($\alpha = 0.87$).

3.2.4. Intercultural sensitivity

The Intercultural Sensitivity Scale (ISS), initially authored by Chen and Starosta (2000) and condensed by Wang and Zhou (2016) was employed to measure the intercultural sensitivity of international students. The scale consists of 15 items in a Likert-type format, ranging from 1 (strongly disagree) to 5 (strongly agree). The scale contains items such as 'I enjoy interacting with people from different cultures', 'I avoid those situations where I will have to deal with culturally distinct persons', and 'I am very observant when interacting with people from different cultures'. An overall score can be computed by totaling all the item values, with higher scores indicating a greater level of intercultural sensitivity. Several studies have validated that the measure demonstrates high internal consistency and good validity (Chen & Starosta, 2000; Lulan et al., 2020; Wang & Zhou, 2016). Similarly, the present study yielded a high reliability coefficient of 0.83 for the scale.

3.2.5. Intergroup anxiety

To assess the intergroup anxiety of international students, the Intergroup Anxiety Scale (IAS) developed by Stephan and Stephan (1985) was used. The scale comprises 11 items that assess the following adjectives: certain (reverse coded), awkward, accepted (reverse coded), self-conscious, confident (reverse coded), happy (reverse coded), defensive, irritated, impatient, suspicious, and careful when interacting with outgroup members. Based on the adjectives, international students were asked to rate their feelings when interacting with Hungarians. Some representative items from the scale include 'I feel awkward during my interaction with Hungarians', 'I feel happy during my interaction with Hungarians', and 'I felt accepted during my interaction with Hungarians'. Minor wording adjustments were made in the item statements to align with the context of the current study (e.g., 'interaction with outgroup members' was modified to 'interaction with Hungarian people'). The items are rated on a 10-point scale ranging from 1 (*not at all*) to 10 (*extremely*). The scale was found to have good internal consistency (Gudykunst & Nishida, 2001; Khuhlaev et al., 2022). The internal consistency of the IAS in this study was also strong ($\alpha = 0.77$).

3.3. Data collection procedure

First, the study obtained approval from the university's institutional review board. Printed self-report questionnaires were then distributed to participants in their classrooms, dormitories, study rooms, and hostels. Since the participants possessed adequate English language proficiency, the questionnaire was administered in English. Following the American Psychological Association guidelines, participation was voluntary and based on informed consent. Verbal consent was obtained during data collection, and an informed consent declaration was provided on the first page of the questionnaire, where students indicated their consent by selecting 'Yes' or 'No'. We assured participants that their responses would remain confidential and would only be used for this research.

3.4. Data analyses

Initially, 500 questionnaires were distributed, and 468 were returned. The response rate was 93.6%. Questionnaires with substantial missing data in the key study variables were excluded from the analysis. After excluding 21 incomplete responses, 447 valid responses were included in the final data analysis. Data were entered into SPSS Version 26, where we calculated descriptive statistics, including means and standard deviations, to summarize the information. Next, Pearson product-moment correlation analysis was conducted to explore the bivariate relationships among the study variables. Hierarchical multiple regression analyses were performed to assess the predictive effects of intergroup contact and intercultural sensitivity on psychological and sociocultural adaptation while controlling for sociodemographic variables. Finally, the jAMM Module (medmod) in jamovi software was used to investigate the mediational effects of intergroup anxiety on the relationship between intergroup contact and intercultural sensitivity with sociocultural adaptation. The basic assumptions for correlation and regression analyses, including normality, multicollinearity, homoscedasticity, and outliers, were assessed, and no violations were identified in the datasets.

4. Results

4.1. Descriptive statistics of the study

Table 2 presents the descriptive statistical values, including the mean, standard deviation, minimum, maximum, reliability coefficients, skewness, and kurtosis. The reliability of the study's variables was evaluated using Cronbach's alpha, a widely used measure of internal consistency in educational and behavioral science research (Edelsbrunner et al., 2025). The Cronbach alpha values for all study variables indicated strong internal consistency, exceeding the threshold of 0.70 (Edelsbrunner et al., 2025; George & Mallery, 2003). Additionally, the skewness and kurtosis were used to assess the normality of the data sets, and all calculated values fell within the acceptable range of -2 to $+2$ (Gravetter & Wallnau, 2014; Hair et al., 2022), showing that the assumption of normality was not violated across all data sets.

4.2. Bivariate relationships between the study variables

Pearson Product-Moment correlation was utilized to examine the bivariate relationships among the study variables, revealing that all variables were significantly correlated (see Table 3). Intergroup contact and intercultural sensitivity demonstrated significant positive associations with sociocultural adaptation ($r = 0.34, p < .001$; $r = 0.36, p < .001$, respectively), while intergroup anxiety exhibited a negative correlation with sociocultural adaptation ($r = -0.27, p < .001$). Moreover, intergroup contact and intercultural sensitivity were negatively correlated with intergroup anxiety ($r = -0.36, p < .001$; $r = -0.44, p < .001$, respectively). Furthermore, intergroup contact and intercultural sensitivity were positively and significantly related to each other ($r = 0.12, p < .05$).

4.3. Hierarchical multiple regression analyses

4.3.1. The effects of intergroup contact and intercultural sensitivity on sociocultural adaptation

Hierarchical multiple regression, a variant of multiple linear regression, is used to assess how different sets of predictors contribute to the variance in the outcome variable (Field, 2009). Therefore, multiple hierarchical regression analyses were conducted to assess how well intergroup contact and intercultural sensitivity predict international students' sociocultural adaptation while controlling for sociodemographic variables such as age, gender, educational level, length of stay, source of financial support, and language proficiency. The predictors

Table 2
Descriptive statistics (N = 447).

Variables	Min	Max	M	SD	Items	α	Sk	Ku
Intergroup contact	10.00	70.00	28.72	11.72	10	0.87	0.65	0.26
Intercultural sensitivity	35.00	75.00	60.04	8.57	15	0.83	-0.56	-0.43
Intergroup anxiety	10.00	50.00	25.26	6.32	10	0.77	0.08	0.22
Sociocultural adaptation	24.00	105.00	68.21	12.89	21	0.88	-0.01	0.24

Note. Sk = skewness; Ku = Kurtosis.

Table 3
Bivariate relationships between the study variables (N = 447).

Variables	1	2	3
1. Intergroup contact			
2. Intercultural sensitivity	0.12*		
3. Intergroup anxiety	-0.36**	-0.44**	
4. Sociocultural adaptation	0.34**	0.36**	-0.27**

Note. 0. * $p < .05$, ** $p < .001$.

were entered sequentially: sociodemographic variables were included in the first model, followed by intergroup contact and intercultural sensitivity in the second and third models, respectively. The regression results of the study were reported following standard guidelines for statistical interpretation (Field, 2009; Pallant, 2020). Hence, as shown in Table 4, the sociodemographic variables accounted for 6 % of the variance in sociocultural adaptation ($R^2 = 0.06$, $F_{(6, 440)} = 4.91$, $p < .001$). Among these, Hungarian language proficiency was a significant positive predictor ($\beta = 0.17$, $p < .001$). When intergroup contact was added in the second step, the model explained a total of 14 % of the variance ($R^2 = 0.14$, $F_{(7, 439)} = 10.52$, $p < .001$), with intergroup contact uniquely contributing an additional 8 % (R^2 change = 0.08, $F_{(1, 439)} = 41.46$, $p < .001$). The inclusion of intercultural sensitivity in the third step improved the model's explanatory power, accounting for 25 % of the variance in sociocultural adaptation ($R^2 = 0.25$, $F_{(8, 438)} = 18.67$, $p < .001$). After controlling for sociodemographic variables and intergroup contact, intercultural sensitivity contributed an additional 11 % of the variance (R^2 change = 0.11, $F_{(1, 438)} = 64.96$, $p < .001$). Both intergroup

Table 4
Regression results for predictors of sociocultural adaptation.

Predictors	B	SEB	β	Model				
				R	R^2	ΔR^2	F	df
Model 1				0.25	0.06		4.91***	6, 440
Gender	2.09	1.20	0.08					
Age	0.30	0.16	0.11					
Educational level	-1.78	1.40	-0.07					
Source of fund	1.01	1.33	0.04					
Length of stay	0.02	0.03	0.03					
Language proficiency	3.32	0.95	0.17***					
Model 2				0.38	0.14	0.08	10.52***	7, 439
Gender	1.19	1.16	0.05					
Age	0.22	0.15	0.08					
Educational level	-1.42	1.34	-0.06					
Source of fund	0.31	1.27	0.01					
Length of stay	-0.00	0.03	-0.00					
Language proficiency	2.47	0.92	0.12*					
Intergroup contact	0.33	0.05	0.30***					
Model 3				0.50	0.25	0.11	18.67***	8, 438
Gender	2.40	1.09	0.09					
Age	0.20	0.14	0.07					
Educational level	-1.38	1.25	-0.05					
Source of fund	-0.71	1.20	-0.03					
Length of stay	0.01	0.03	0.02					
Language proficiency	2.69	0.86	0.14*					
Intergroup contact	0.28	0.05	0.25***					
Intercultural sensitivity	0.51	0.06	0.34***					

Note. Dummy variables were coded as: Gender: Male = 1, Females = 0; Educational Level: Undergraduate = 1, Postgraduate = 0; Source of financial support: Scholarship holders = 1, Self-support = 0. * $p < .05$, *** $p < .001$.

contact ($\beta = 0.30$, $p < .001$) and intercultural sensitivity ($\beta = 0.34$, $p < .001$) were positively and significantly associated with international students' sociocultural adaptation.

4.3.2. The prediction effect of intergroup anxiety on sociocultural adaptation

Hierarchical multiple regression analyses were conducted to examine the predictive effect of intergroup anxiety on sociocultural adaptation while controlling for demographic variables. Two blocks of sequential regression models were developed for this analysis. The first block included demographic variables, while intergroup anxiety was added in the second block. As shown in Table 5, the first block significantly explained a portion of the variance in the outcome variable. The addition of intergroup anxiety in the second block improved the model's explanatory power, accounting for 12 % of the variance ($R^2 = 0.06$, $F_{(6, 440)} = 8.80$, $p < .001$). Furthermore, after controlling for the variables in the first block, intergroup anxiety explained an additional 6 % of the variance in the outcome variable (R^2 change = 0.06, $F_{(1, 439)} = 30.19$, $p < .001$). Intergroup anxiety was negatively and significantly associated with sociocultural adaptation ($\beta = -0.26$, $p < .001$).

4.4. Mediation analyses

4.4.1. The mediated effect of intergroup contact on sociocultural adaptation through intergroup anxiety

The jAMM Module (medmod) of Jamovi software was used to perform the mediation analyses. Separate simple mediation analyses were conducted to examine the mediated effect of intergroup contact on

Table 5
Regression results for the effect of intergroup anxiety on sociocultural adaptation.

Predictors	B	SEB	β	Model				
				R	R ²	ΔR^2	F	df
<i>Model 1</i>				0.25	0.06		4.91***	6, 440
Gender	2.09	1.20	0.08					
Age	0.30	0.16	0.11					
Educational level	-1.78	1.40	-0.07					
Source of fund	1.01	1.33	0.04					
Length of stay	0.02	0.03	0.03					
Language proficiency	3.32	0.95	0.17***					
<i>Model 2</i>				0.35	0.12	0.06	8.80***	7, 439
Gender	2.12	1.16	0.08					
Age	0.17	0.16	0.06					
Educational level	-1.79	1.35	-0.07					
Source of fund	0.14	1.29	0.01					
Length of stay	0.03	0.03	0.05					
Language proficiency	3.24	0.92	0.16***					
Intergroup anxiety	-0.52	0.10	-0.26***					

Note. Dummy variables were coded as: *Gender*: Male = 1, Females = 0; *Educational Level*: Undergraduate = 1, Postgraduate diploma; *Source of financial support*: Scholarship holder = 1, Self-support = 0. * $p < .05$, ** $p < .001$

sociocultural adaptation through intergroup anxiety. In these analyses, intergroup contact served as the independent variable, intergroup anxiety as the mediator, and sociocultural adaptation as the dependent variable. As illustrated in Table 6, all regression paths were statistically significant. Intergroup contact was significantly related to both intergroup anxiety and sociocultural adaptation. Additionally, intergroup contact negatively and significantly predicted sociocultural adaptation. To test the statistical significance of the indirect effect, a bias-corrected bootstrapping method with a resample of 5000 was applied, which is a widely used and recommended approach in mediation analysis (Igartua & Hayes, 2021). The results were statistically significant, as the 95 % confidence interval did not contain zero ($\beta = 0.07$, 95 % CI = 0.03, 0.11), which is a standard criterion in mediation analysis (Igartua & Hayes, 2021). According to Baron and Kenny (1986), full mediation occurs when the predictor's effect on the outcome becomes non-significant after including the mediator, whereas partial mediation occurs when the effect is reduced but remains significant. Therefore, the current mediation effect of intergroup anxiety was partial since the direct effect of intergroup contact on adaptation was also statistically significant ($\beta = 0.28$, 95 % CI = 0.19, 0.42).

4.4.2. The mediated effect of intercultural sensitivity on sociocultural adaptation via intergroup anxiety

Similarly, the jAMM Module (medmod) of Jamovi software was used to assess the mediated effect of intercultural sensitivity on sociocultural adaptation through intergroup anxiety. In conducting the analyses, intercultural sensitivity served as the independent variable, intergroup anxiety as the mediator, and sociocultural adaptation as the dependent variable. The results of the mediation analyses are presented in Table 7. All the regression paths were statistically significant: Intercultural sensitivity → intergroup anxiety ($\beta = -0.44$, $p = .001$), intercultural sensitivity → sociocultural adaptation ($\beta = 0.30$, $p = .001$), and intergroup anxiety → sociocultural adaptation ($\beta = -0.14$, $p = .005$). The

Table 6
Direct, indirect, and total effects.

Type of effect	Path	B	SE	95 % CI		β	Z	p
				Lower	Upper			
Indirect Component	IGC ⇒ IGA ⇒ SCA	0.07	0.02	0.03	0.11	0.07	2.95	.003
	IGC ⇒ IGA	-0.19	0.03	-0.24	-0.14	-0.36	-7.36	<.001
	IGA ⇒ SCA	-0.34	0.10	-0.53	-0.14	-0.17	-3.35	<.001
Direct	IGC ⇒ SCA	0.31	0.06	0.19	0.42	0.28	5.28	<.001
Total	IGC ⇒ SCA	0.37	0.05	0.26	0.47	0.34	6.93	<.001

Note. IGC = Intergroup Contact; IGA = Intergroup Anxiety; SCA = Sociocultural Adaptation.

statistical significance of the indirect effect was tested using a bias-corrected bootstrap method with a sample of 5000, yielding a statistically significant effect, as the 95 % confidence interval did not contain zero ($\beta = 0.06$, 95 % CI = 0.02, 0.16). However, it is important to note that the mediation effect was partial, as the direct effect was also statistically significant ($\beta = 0.28$, 95 % CI = 0.19, 0.42).

5. Discussion

This study aimed to examine the antecedents of sociocultural adaptation among international students in Hungary. Specifically, it investigated the direct and indirect effects of intergroup contact and intercultural sensitivity on sociocultural adaptation mediated through intergroup anxiety. In the discussion section, we highlighted four key findings: 1) Positive intergroup contact has a direct positive effect on sociocultural adaptation; 2) Intergroup contact significantly impacts sociocultural adaptation; 3) There is an indirect effect of intergroup contact on sociocultural adaptation through intergroup anxiety; and 4) Intercultural sensitivity indirectly affects sociocultural adaptation via intergroup anxiety.

5.1. The direct effect of positive intergroup contact on sociocultural adaptation

Drawing on the contact hypothesis of Allport (1954), we proposed that positive intergroup contact would be positively and significantly related to the sociocultural adaptation of international students. Our study's data confirmed this hypothesis, showing that international students who frequently engaged in high-quality contact with host nationals demonstrated better sociocultural adaptation in the host country. The results reiterate the findings of previous studies that highlight positive intergroup contact as a predictor of sociocultural adaptation, not only for international students but also for immigrants in general (e.

Table 7
Direct, indirect, and total effects.

Type of effect	Path	B	SE	95 % CI		β	Z	p
				Lower	Upper			
Indirect Component	ICS \Rightarrow IGA \Rightarrow SCA	0.09	0.03	0.02	0.16	0.06	2.66	.008
	ICS \Rightarrow IGA	-0.32	0.03	-0.38	-0.26	-0.44	-10.41	<.001
	IGA \Rightarrow SCA	-0.28	0.10	-0.47	-0.08	-0.14	-2.79	.005
Direct	ICS \Rightarrow SCA	0.45	0.07	0.31	0.60	0.30	5.99	<.001
Total	ICS \Rightarrow SCA	0.54	0.07	0.39	0.66	0.36	7.82	<.001

Note. ICS = Intercultural Sensitivity; IGA = Intergroup Anxiety; SCA = Sociocultural Adaptation.

g., Berry & Grigoryev, 2022; Bethel et al., 2020; Gao et al., 2024; Meleady et al., 2021; Meng et al., 2022; Sheng et al., 2022). This outcome can be interpreted within the framework of intergroup contact theory. According to intergroup contact theory, frequent and quality intergroup interactions foster positive attitudes and behaviors toward others (Allport, 1954). For international students, such interactions provide a deeper understanding of the host culture's norms, values, and practices, facilitating adaptation. Positive contact also promotes interpersonal relationships, language proficiency, community engagement, ecological adaptation, and academic performance, which are key aspects of sociocultural adjustment.

According to cultural learning theory, successful sociocultural adaptation of individuals involves acquiring sociocultural knowledge and developing cultural skills (Masgoret & Ward, 2006). The theory suggests that international students must actively engage in social interactions and learn the cultural values, rules, norms, and language of the host country to adapt and thrive in the new social and cultural environment. Therefore, the quantity and quality of intergroup contact play a crucial role in facilitating cultural learning, which leads to successful sociocultural adaptation. Positive social interaction with host nationals allows international students to gain firsthand experience of the host culture, understand social norms, and build meaningful relationships, all of which are essential for successful adaptation (Pettigrew & Tropp, 2006; Teng et al., 2024). Over time, positive intergroup contact is believed to enhance individuals' knowledge, attitudes, and behaviors, thereby facilitating their adaptation to the intercultural context (Bagci et al., 2020; Berry & Grigoryev, 2022). Similarly, Marinucci et al. (2021) assert that intimate intergroup contact fosters trust, cooperation, and intergroup relations, which are critical components of successful sociocultural adaptation.

5.2. The direct effect of intercultural sensitivity on sociocultural adaptation

The present study also confirmed the expectation that intercultural sensitivity positively predicted sociocultural adaptation. This means that international students with high intercultural sensitivity achieve better sociocultural adaptation in the host country. This finding is consistent with previous studies that have reported a positive association between intercultural sensitivity and sociocultural adaptation (e.g., Awang-Rozaimie et al., 2013; Hapsari & Hamamah, 2020). Based on the theoretical conceptualization of intercultural sensitivity, it can be argued that international students who are sensitive to cultural differences and exhibit positive emotional responses during intercultural interactions are more likely to enjoy and appreciate these interactions and, ultimately, achieve better sociocultural adaptation. According to Chen and Starosta (1997), intercultural sensitive individuals are characterized by high self-esteem, open-mindedness, self-monitoring, involvement, empathy, and non-judgment. Therefore, international students who possess these five qualities are more likely to adapt successfully to the sociocultural environment.

Students with higher levels of intercultural sensitivity are also better equipped to navigate the challenges of living in a culturally diverse environment. For instance, an international student with high self-

esteem is likely to maintain a positive outlook, facilitating smoother intercultural interactions and socialization with host nationals (Quinton, 2020). Similarly, students need the ability to self-monitor their intercultural interactions, allowing them to regulate their behaviors when facing intercultural difficulties or constraints and apply appropriate behavioral skills to address such challenges (Chen & Starosta, 1997). International students with strong self-monitoring skills are aware of the relevance of their social behaviors and self-presentation in intercultural settings. Additionally, open-minded international students are thought to be open to cultural diversity (Yakunina et al., 2012). They are also willing and eager to present themselves authentically and to recognize and accept the self-descriptions of others in a multicultural environment (Chen & Starosta, 2000). Another key attribute of intercultural sensitivity that is believed to facilitate adaptation is empathy. When international students can put themselves in others' shoes and experience situations from their perspective, they are more likely to achieve better sociocultural adjustment (Zhang & Noels, 2024).

5.3. The indirect effect of intergroup contact on sociocultural adaptation via intergroup anxiety

The mediation hypothesis that intergroup anxiety mediates the relationship between positive intergroup contact and sociocultural adaptation has been supported. The findings suggest that international students who experience high levels of positive intergroup contact tend to have lower intergroup anxiety, which, in turn, leads to better sociocultural adaptation. This implies that intercultural sensitivity can reduce the fear and discomfort associated with cross-cultural interactions, fostering more positive and effective engagement with the host culture (Stephan & Stephan, 1985). The partial mediation result indicates that positive intergroup contact exerts both direct and indirect effects on sociocultural adaptation. The intergroup theory generally posits that positive intergroup contact reduces negative experiences such as fear, intergroup anxiety, perceived threat, intergroup hostility, and prejudice (Allport, 1954; Pettigrew & Tropp, 2006). Several prior studies conducted in the general population support the idea that intergroup anxiety is a critical mediating variable in the context of intergroup contact (Marletta et al., 2017; Stephan, 2014).

Drawing from intergroup contact theory, it seems plausible that the reduction of intergroup anxiety through positive intergroup contact can enhance intercultural outcomes, such as intercultural adaptation, in the international academic context. International students may have frequent contact (quantity of intergroup contact) and a greater circle of friendships (quality of intergroup contact) with domestic students due to their equal status and shared academic responsibilities (e.g., group assignments). This can reduce feelings of intergroup anxiety and improve intercultural adaptation. Ye et al. (2023) highlight that frequent intergroup contact and sufficient cultural knowledge among students from different ethnic groups can foster positive cognition and emotions toward one another, thereby minimizing negative feelings and intergroup anxiety. Intercultural contact between international and domestic students can be challenging, anxiety-provoking, and stressful due to cultural differences (Mostafaei & Nosrati, 2018; Quinton, 2020; Vaccarino et al., 2021). Nonetheless, when international students learn to establish

and maintain effective positive intercultural contact with domestic students, they are more likely to manage these negative affective and cognitive experiences, ultimately thriving in their sociocultural adaptation.

5.4. The indirect effect of intercultural sensitivity on sociocultural adaptation via intergroup anxiety

Finally, the sample of the present study provides evidence for the second mediational hypothesis that intergroup anxiety significantly mediates the relationship between intercultural sensitivity and sociocultural adaptation. The findings of the study highlight that international students who demonstrate high intercultural sensitivity toward local people, characterized by engagement in interactions, respect for cultural differences, confidence in interactions, enjoyment of interactions, and attentiveness, experience lower levels of intergroup anxiety, which in turn leads to better sociocultural adaptation in the host culture. High levels of intergroup anxiety can result in avoidance behaviors, such as withdrawing from social situations or limiting contact with host nationals, which can impede the adaptation process (Stephan, 2014). Within the context of international students, such avoidance can prevent them from gaining the necessary cultural knowledge and social connections needed for successful adaptation. Intercultural sensitivity plays a crucial role in mitigating this anxiety. It influences sociocultural adaptation not only directly but also indirectly by reducing intergroup anxiety.

According to Bennett (2004), intercultural sensitivity is conceptualized as an array of cognitive, affective, and behavioral skills that are vital for the success of intercultural or intergroup interaction. The application of this set of skills in intercultural contexts can help international students develop better sociocultural adaptation by reducing their negative emotional experiences of fear, threat, and anxiety that may arise from intercultural contact. One reason for intergroup anxiety is that individuals may be concerned about the potential negative psychological consequences they might face during intercultural interactions, such as embarrassment, confusion, fear, irritation, frustration, rejection, or feelings of incompetence (Stephan, 2014). Such experiences can interfere with the effectiveness of intercultural adaptation. Nevertheless, interculturally sensitive international students tend to exhibit higher self-esteem in their intergroup interactions and are less likely to be overly concerned about the perceived negative psychological outcomes of these interactions. Instead, they apply their open-minded and non-judgmental psychological attributes to view the challenges of intergroup contact as opportunities to learn and develop intercultural knowledge and skills, which helps them thrive in multicultural settings. Likewise, when international students are more confident in their ability to navigate cultural differences, they are less likely to experience the anxiety that could otherwise hinder their adaptation (Masgoret & Ward, 2006).

Collectively, the findings of this study suggest that intergroup contact and intercultural sensitivity significantly contribute to the sociocultural adaptation of international students, helping them reduce feelings of fear, threat, and apprehension in the new academic and sociocultural environment. The direct and indirect effects of intergroup contact and intercultural sensitivity on adaptation, mediated by intergroup anxiety, demonstrate that these factors not only directly facilitate positive adaptation but also serve as crucial psychosocial resources for coping with the intercultural challenges arising from intergroup interactions. Therefore, this study advances our theoretical understanding of the dynamics between these constructs and provides practical insights for designing intervention programs and supporting international students' adaptation to the host society. The following section elaborates on both the theoretical contributions and the practical implications of these findings.

6. Theoretical and practical implications of the study

6.1. Theoretical contributions

While prior research on intergroup contact has largely concentrated on ethnic and racial groups within a shared societal context, specific populations such as international students have received comparatively less scholarly attention. Bridging this gap, the present study offers a theoretical contribution to the body of scientific knowledge by examining the critical roles of positive intergroup contact and intercultural sensitivity in facilitating adaptation. It further elucidates the mechanisms through which intergroup contact and intercultural sensitivity influence adaptation by exploring intergroup anxiety as a partial mediator. The findings also support the basic theoretical assumptions of several established theories. First, the study empirically affirms the core proposition of intergroup contact theory (Allport, 1954), showing that frequent and high-quality interactions between groups foster positive intergroup outcomes and reduce negative intergroup experiences. Second, the results align with culture learning theory (Ward et al., 2005), which emphasizes that intercultural interactions between people of different cultural backgrounds promote the acquisition of cultural knowledge and the development of intercultural skills, both of which are essential for successful adjustment. Third, the findings provide empirical support for the AUM Theory (Gudykunst, 1995) that positive intergroup contact and higher intercultural sensitivity reduce feelings of intergroup anxiety. Finally, our study reinforces the stress and coping theory, which posits that intercultural contact involves life changes that can be stressful and anxiety-provoking, requiring individuals to have resources to cope with these challenges (Ward et al., 2005). Thus, relationships with host nationals and intercultural sensitivity, have been shown to be effective resources for managing these challenges.

6.2. Practical implications

Practically, the findings can guide higher education institutions, curriculum developers, university lecturers, and international students in taking practical steps to promote intercultural sensitivity and foster positive intergroup relations. Universities could organize various activities, such as cultural exchange programs, sports events, campus clubs, alumni groups, peer mentoring, tutoring initiatives, welcome ceremonies for newcomers, language exchange sessions, developing campus social networking platforms, student excursions, and potluck events, which are essential for increasing intergroup contact and cultural sensitivity during intercultural interactions, ultimately contributing to successful sociocultural adaptation by reducing anxiety in intergroup or intercultural encounters (e.g., Beilmann & Lutterbach, 2020; Huang et al., 2024; Rodríguez-Izquierdo, 2022; Wong & Liu, 2024). These activities not only enhance the quantity and quality of interactions between local and international students but also promote the development of meaningful friendships, positive attitudes, and improved language skills within the host society (Vaccarino et al., 2021). Furthermore, these activities foster appreciation and acceptance of cultural differences, enhancing students' intercultural communication competence and integration.

An additional effective strategy for promoting intergroup contact involves integrating international and local students in shared living arrangements, such as mixed dormitory assignments. Such arrangements encourage daily interactions and the formation of close friendships, while segregated housing can hinder intergroup interaction, language development, and overall intercultural adaptation. Participation in extracurricular activities with local peers, combined with tutoring programs and mixed housing, has been shown to effectively enhance intergroup contact and build friendships (Hendrickson, 2018). It has also been suggested that the formation of clubs at the university fosters interpersonal relationships and serves as a source of social support and information for freshman international students (Yakunina et al., 2012),

particularly when these clubs include both international and local students. Additionally, educational interventions, such as group projects, short training sessions, seminars, and workshops, along with host language and culture courses, can further improve intercultural interaction and competence. For example, Cruickshank et al. (2012) emphasize that group work in both classroom settings and the broader university environment significantly fosters intergroup interaction and learning. By implementing these strategies, universities can foster positive intergroup contact and intercultural sensitivity, alleviating negative experiences such as intergroup anxiety during intercultural interactions and ultimately facilitating the sociocultural adaptation of their students.

7. Conclusion, limitations and future directions

Given the increasing concerns regarding the intercultural adjustment difficulties faced by international students, our study aimed to identify and understand the potential factors that enhance their sociocultural adaptation to the new social, cultural, and academic environments of the host society. While our data are based on correlational evidence and do not establish causality, they suggest that positive intergroup contact and intercultural sensitivity are effective strategies for enhancing international students' sociocultural adaptation by alleviating intergroup anxiety. The finding of the partial mediating role of intergroup anxiety indicates that intergroup contact and intercultural sensitivity influence sociocultural adaptation both directly and indirectly. Therefore, these psychosocial factors are essential components of the intercultural adaptation process of international students, and university communities should consider them when developing strategies to support students' adjustment.

Despite the theoretical and practical contributions of the study, several limitations should be acknowledged for future research. First, the study employed a cross-sectional design, where all variables were assessed at a single point in time. Second, our study employed self-report questionnaires as the means of data collection, and participants' social desirability bias may have affected the accuracy of the results. Third, while the predictive effects of intergroup contact and intercultural sensitivity on sociocultural adaptation are supported by correlational evidence, the study did not provide experimental evidence or establish a cause-and-effect relationship between these variables. Fourth, although international students can engage in various forms of social contact, such as with host nationals, co-nationals, and other international students, this study focused only on their intergroup contact with host nationals. Lastly, notwithstanding the study's sample size was reasonably representative, it was confined to participants from one higher education institution, which may restrict the applicability of the findings to students at other institutions in the host country.

Considering the aforementioned limitations, the study recommends the following directions for future research. (1) As intergroup contact, intercultural sensitivity, intergroup anxiety, and sociocultural adaptation may change over time, a longitudinal design could be adopted in future studies to better capture trends and changes in these constructs over time. (2) Future researchers are recommended to address the limitation of self-report questionnaires by employing multiple data collection methods, such as interviews, participant observation, and focus group discussions. (3) Experimental designs should be used in future research to validate the correlational findings of the current study. (4) Future research could benefit from examining all types of social contact (e.g., contact with co-nationals and other international students) and comparing their respective contributions to adaptation outcomes. (5) Future studies are recommended to recruit participants from multiple host institutions to enhance the generalizability of the findings.

CRedit authorship contribution statement

Werede Tareke Gebregergis: Writing – review & editing, Writing – original draft, Visualization, Validation, Methodology, Investigation,

Formal analysis, Data curation, Conceptualization. Csilla Csukonyi: Writing – review & editing, Visualization, Validation, Supervision, Methodology.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Data availability

Data will be made available on request.

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