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Cyberbullying Victimization and Depression in International Students: The Role of Acculturative Stress

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Abstract

The primary objective of this study is to investigate the associations among cyberbullying victimization, acculturative stress, and depressive symptoms in international students. Specifically, the study assesses whether acculturative stress functions as a mediator in the pathway from cyberbullying to depression. The study sample consisted of 178 international undergraduates enrolled at a University in the northeastern region of the United States. The Cyberbullying and Online Aggression Instrument (COASI), the Center for Epidemiologic Studies Depression Scale-Short Form (CESD-SF) and Acculturative Stress Scale for International Students (ASSIS) were employed to gather the study data. Findings revealed a significant positive correlation between cyberbullying victimization and both acculturative stress and depression. Moreover, the analysis demonstrated that acculturative stress serves as a partial mediator in the association between cyberbullying experiences and depressive symptoms. These findings highlight the intertwined influence of digital victimization and cultural adjustment challenges on psychological well-being. Consequently, higher education institutions should develop culturally responsive counseling services and preventive programs that simultaneously address online safety and acculturation processes to support this diverse student population.

Key Words

Acculturative stress • Cyberbullying victimization • Depression • International students

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Introduction

Over the last twenty years, the mobility of international students has emerged as an essential element of the higher education landscape. Major educational destinations like the United States, Canada, United Kingdom and Australia attract millions of international students and have established varied frameworks to enhance the quality of services for them (Institute of International Education, 2023; UNESCO, 2023). However, this increase poses significant challenges not only in the field of education but also in terms of psychological adjustment, cultural transition, and social integration (Smith & Khawaja, 2011). In addition to their academic achievements, international students' attempts to adjust to the cultural norms, language, and social structure of the host nation may result in a multifaceted process of psychological stress (Yeh & Inose, 2010). Recent longitudinal studies highlight that regardless of the growing incidence of mental health challenges within this demographic, service utilization rates often remain disproportionately low compared to domestic students, indicating a gap between need and support (Zhai et al., 2025) This may increase psychological vulnerability, especially among first-year students (Koo et al., 2021; Lari et al., 2025). Although the adaptation process experienced by international students is linked to individual awareness, the insufficient institutional and social support systems make this process more difficult (Forbes-Mewett & Sawyer, 2016). Therefore, understanding the factors influencing the psychological well-being levels of these students is crucial for the counseling practices of higher education institutions.

Acculturative stress is defined as psychosocial challenges that emerge from the conflict between the individual's effort to maintain his/her own cultural identity and the need to adapt to the host culture (Sandhu & Asrabadi, 1994). This form of stress significantly influences the mental state of international students and may be accompanied by feelings of loneliness, isolation, inadequacy, and failure (Mori, 2000). Theoretical frameworks suggest that these negative outcomes often stem from "identity gaps" the discrepancy between how international students perceive themselves and how they are perceived by the host society which exacerbates depressive symptoms during cultural adaptation (Amado et al., 2020). Studies show that acculturative stress is significantly associated with depression, anxiety disorders, and diminished life satisfaction (Mesidor & Sly, 2016; Shadowen et al., 2019). Research particularly in North America indicates that international students have heightened depressive symptoms as a result of acculturative stress (Wei et al., 2007). The findings indicate that acculturative stress affects individual psychological well-being not merely as a short-term adjustment issue but also as a determinant of long-term academic and social performance. A comprehensive understanding of the influence of acculturative stress on psychiatric symptoms is essential for enhancing support systems for this student demographic (Smith & Khawaja, 2011). In culturally varied university settings, counselors are required to cultivate a nuanced approach to this process.

For international students, digital platforms are not just communication tools but vital lifelines to their home countries; however, this high digital dependency also exposes them to online risks. The expansion of technology, including social media, online messaging applications, and digital learning platforms, has enhanced communication among students while also introducing novel kinds of violence (Kowalski et al., 2014). Cyberbullying refers to deliberate, persistent, and damaging behaviors using digital tools and is predominantly observed among young populations (Patchin & Hinduja, 2015). It has been reported that individuals subjected to such behaviors exhibit an

elevated risk of acquiring depression, anxiety disorders, low self-esteem, and suicidal ideation (Hinduja & Patchin, 2010; Kowalski et al., 2019; Patchin & Hinduja, 2010; Schenk & Fremouw, 2012; Schenk et al., 2013; Selkie, Kota, Chan, & Moreno, 2015; Tokunaga, 2010). Moreover, sexual and ethnic minority students are often at a "double disadvantage," facing higher risks of cyberbullying victimization which directly correlates with more severe mental health outcomes compared to their peers (Luo et al., 2025). International students may be more vulnerable to online assaults due to inadequate social support networks, cultural isolation, and language barriers (Wang et al., 2012). Therefore, understanding how their adjustment process intersects with both offline and online risks is essential.

The effects of cyberbullying should be considered not only at the individual psychological level but also in relation to the wider contextual stressors experienced by students. While studies examining the direct relationship between cyberbullying and acculturative stress are limited in the literature, it may be asserted that these two variables indicate comparable psychosocial risks for international students. In this context, both the cultural transition process and negative interactions in digital environments may simultaneously threaten students' psychological resilience. For example, Cheung, Bhowmik, and Hue (2020) found that emotional regulation difficulties experienced during the cultural adjustment process heightened depressive symptoms. Similarly, McLoughlin et al. (2019) showed that depressive symptoms increased with decreasing social connectedness in cyberbullying victims. This suggests a compounding effect where digital victimization may dismantle the very sense of belongingness required to navigate acculturation successfully (Su et al., 2025). These findings suggest that the effects of cultural context and digital threats on mental health are not independent of each other. Therefore, research addressing these two stressors simultaneously is essential for guiding the development of university counseling services with a more comprehensive approach.

Existing literature demonstrates that these psychosocial variables are associated with significant mental health outcomes, such as depression, both independently and in interaction with each other. However, how these variables are structurally linked to each other, specifically whether acculturative stress mediates the effect of cyberbullying on depression, is still addressed by a limited number of studies. Çimşir and Ünlü Kaynakçı's (2024) meta-analysis identified acculturative stress as one of the significant predictors of depression among international students; however, there is limited data on the impact of digital stressors such as cyberbullying on this relationship. In a similar vein, while recent structural models confirm that acculturative stress acts as a critical mediator for international students' well-being (Su et al., 2025), the specific pathway triggering this stress through digital victimization remains underexplored in the current literature. While direct links are established, the mechanism by which cyberbullying penetrates the cultural adaptation process remains unclear. Furthermore, most of these studies presuppose that the international student population is homogeneous and ignore how cultural differences are experienced at the individual level. However, the process of cyberbullying and cultural adaptation may also be influenced by an individual's ethnicity, gender, and social position. Therefore, not only research that reveals general trends but also studies that address individual and contextual variables together are necessary.

In sum, understanding the psychosocial difficulties faced by international students requires an integrated examination of multidimensional factors such as acculturative stress and cyberbullying. It is important to clarify the

effects of these variables on depression, both in designing individual psychological interventions and in developing digital well-being policies for universities (Matos Fialho et al., 2025). Gaps in the literature highlight the need for more empirical studies, particularly those examining how cyberbullying victimization and acculturative stress interact within a structural framework. Therefore, the development of culturally responsive practice models based on studies supported by advanced statistical analyses is essential both to support the mental health of international students and to strengthen counseling practices. In line with this objective, the current study investigates the associations between cyberbullying victimization, acculturative stress, and depression. Specifically, it assesses whether acculturative stress acts as a mediator in the impact of cyberbullying on depression among international students.

Method

Research Design

Structural Equation Modeling (SEM) was employed to analyze the interrelations among cyberbullying, acculturative stress, and depression within the international student population. In the hypothesized framework, cyberbullying victimization served as the predictor, depression as the outcome, and acculturative stress as the mediating mechanism. To validate this structure, path analysis was conducted to assess the statistical significance of both direct and indirect pathways.

Study Group

The study sample consisted of 178 international undergraduate students from 43 distinct nationalities attending a university in the northeastern United States. Eligibility criteria required participants to hold F-1 (individual funding) or J-1 (exchange) visa status and to have completed a minimum of one academic semester. Graduate students and those enrolled in distance learning programs were excluded. In terms of gender distribution, the sample was nearly balanced, comprising 91 females (51.1%) and 87 males (48.9%). Participants ranged in age from 18 to 25 years (M = 21.26, SD = 2.006). Regarding academic standing, the sample included 22.5% freshmen, 20.6% sophomores, 21.7% juniors, and 34.9% seniors."

Research Instruments

Demographic Data Form

A brief demographic survey was developed specifically for this research to compile participant profiles. The instrument collected data on personal background variables, including age, gender, nationality, and native language, as well as the duration of residency in the United States. In terms of educational context, participants were asked to report their grade level, field of study, and whether they had attended an English preparatory program.

Cyberbullying and Online Aggression Scale

To operationalize digital victimization, the study employed the victimization subscale of the Cyberbullying and Online Aggression Scale (Hinduja & Patchin, 2015). This instrument comprises eight items that query the frequency of specific online mistreatments (e.g., posting insults or spreading rumors) occurred within the preceding 30 days.

Responses are rated on a 5-point Likert-type matrix, yielding a cumulative score between 0 and 36; higher values denote greater severity of victimization. The scale is well-established in the literature, with prior research reporting internal consistency coefficients ranging from .89 to .94. In the current analysis, the subscale demonstrated excellent reliability .92.

Acculturative Stress Scale for International Students

Sandhu and Asrabadi's (1994) Acculturative Stress Scale for International Students (ASSIS) was selected to assess the difficulties students face during cultural adjustment. This 36-item instrument utilizes a 5-point Likert-type scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Cumulative scores fall between 36 and 180, where higher totals signify more severe levels of acculturative stress. The scale's psychometric robustness is well-documented, with prior research establishing high internal consistency .94 and construct validity through associations with depression (Constantine et al., 2004; Poyrazli et al., 2010). In the current analysis, the scale demonstrated exceptional reliability .97.

Center for Epidemiological Studies-Depression Scale Short Form

Depressive symptoms were evaluated utilizing the Center for Epidemiologic Studies Depression Scale—Short Form (CESD-SF), a condensed 10-item measure validated by Cole et al. (2004). This instrument gauges the frequency of depressive affect experienced during the preceding week. Participants rate items on a 4-point scale from 0 (*never*) to 3 (*most or all of the week*), yielding a cumulative score between 0 and 30; elevated scores correspond to a higher risk of depression. The scale includes two reverse-scored items to control for response bias. Previous research has established its concurrent validity, noting a strong correlation with the Beck Depression Inventory r = .74 and acceptable internal consistency.75–.82 (Cole et al., 2004). In the current study, the reliability coefficient was calculated as .88.

Procedure

Upon securing ethical approval, recruitment was initiated through the International Education Office and student organization leaders, who disseminated the study invitation via email. The correspondence contained a direct link to the online instrument, where digital informed consent including the age stipulation (18–25) was mandatory prior to access. Participants then completed the demographic section and the assessment batteries for cyberbullying, depression, and acculturative stress.

Data Analysis

Data analysis was conducted in two stages using IBM SPSS and AMOS software. Initially, descriptive statistics were computed to summarize participant profiles, including age, gender, nationality, and academic background, as well as the frequency of cyberbullying victimization. Subsequently, path analysis was employed to test the hypothesized structural relationships. The analysis examined direct and indirect effects among the variables, reporting standardized coefficients, multiple correlations, and total effects with a significance threshold of $p < .001$. The structural model was specified as a 'saturated model,' containing all possible paths between variables. As noted by methodological experts (Hayes, 2018; Kline, 2016), saturated models are particularly advantageous for mediation

analyses with limited variables. Since such models inherently achieve perfect fit, traditional goodness-of-fit indices (e.g., χ^2, RMSEA, CFI, and TLI) were not reported. Instead, model validity was established based on the statistical significance and magnitude of the individual structural paths. Furthermore, although the sample size (N = 178) is slightly below the traditional rule-of-thumb of 200, it is considered methodologically sufficient for this specific model structure. Given the low model complexity, the participant-to-parameter ratio comfortably exceeds the acceptable 10:1 threshold for reliable parameter estimation (Kline, 2016). Additionally, Monte Carlo simulation studies demonstrate that sample sizes in this range provide adequate statistical power and minimize parameter bias for simple mediation models with moderate effect sizes (Wolf et al., 2013).

Results

Descriptive Statistics

The study sample comprised 178 international undergraduates with a nearly equal gender ratio of 51.1% females (n=91) and 48.9% males (n=87). Participants ranged in age from 18 to 25 years (M=21.26, SD=2.006). The largest age cohort consisted of 20-year-olds (20.2%), followed by those aged 21 and 23 (15.2% each), while the remaining participants were distributed across ages 18, 19, 22, 24, and 25. Regarding national origin, the sample represented 43 distinct countries. The most prominent groups hailed from Saudi Arabia (23.6%), China (15.2%), India (12.9%), and Oman (10.1%), with the remaining 68 students classified under 'Other'. Other subset included participants from East, South, and Southeast Asia (n=23, 12.9%), Latin America and the Caribbean (n=12, 6.7%), Europe and Central Asia (n=11, 6.2%), the Middle East and North Africa (n=11, 6.2%), Sub-Saharan Africa (n=10, 5.6%), and Oceania (n=1, 0.6%). Academically, seniors constituted the largest group (34.3%), followed by freshmen (22.5%), juniors (21.3%), and sophomores (20.2%). In terms of field of study, Business and Management was the most common major (27.0%). Other significant disciplines included Engineering (10.7%), Health Professions (8.4%), and Computer Services (8.4%), while smaller proportions were enrolled in Physical Sciences, Social Sciences, and Education. A substantial portion (25.8%) pursued degrees in diverse fields such as Fashion Design and Pre-Medicine, categorized as 'Other'. Detailed information regarding participants' descriptives are included in Table 1.

Table 1

Sample demographic characteristics (N = 178)

Characteristic	Category	n	%
Gender	Female	91	51.1
	Male	87	48.9
Age (years)	18	15	8.4
	19	22	12.4
	20	36	20.2
	21	27	15.2
	22	25	14.0
	23	27	15.2
	24	12	6.7
	25	14	7.9
Country of Origin	Saudi Arabia	42	23.6
	China	27	15.2
	India	23	12.9
	Oman	18	10.1
	Other	68	38.2
Grade Level	Freshman	40	22.5
	Sophomore	36	20.2
	Junior	38	21.3
	Senior	61	34.3
Field of Study	Business and Management	48	27.0
	Engineering	19	10.7
	Health Professions	15	8.4
	Computer & Information Services	15	8.4
	Physical Sciences	13	7.3
	Social Sciences	12	6.7
	Education	6	3.4
	Other	46	25.8

Cyberbullying experiences among international students were assessed using three items. The first two items asked about personal experiences: “In my lifetime, I have been cyberbullied” and “In the last 30 days I have been cyberbullied.” The third item, “I have seen other people being cyberbullied,” focused on their observations of others' experiences. Regarding lifetime experiences, 46.5% (n = 81) reported being cyberbullied at least once. Specifically, 18.5% (n = 33) had been cyberbullied once, 19.7% (n = 35) a few times, 6.7% (n = 12) several times, and 0.6% (n = 1) many times. For cyberbullying experiences in the past 30 days, 20.7% (n = 37) reported at least one incident. Among them, 11.8% (n = 21) experienced it once, 5.6% (n = 10) a few times, 2.2% (n = 4) several times, and 1.1% (n = 2) many times. When asked about witnessing cyberbullying, 74.1% (n = 132) reported seeing others being

cyberbullied. Of these, 10.1% (n = 18) witnessed it once, 39.3% (n = 70) a few times, and 24.8% (n = 44) either several or many times. Detailed information regarding participants' cyberbullying experiences can be found in Table 2.

Table 2

Frequency of cyberbullying experiences

Frequency	**In my Lifetime**		**In the Last 30 Days**		**I Have Seen Others**	
	n	**%**	**n**	**%**	**n**	**%**
Never	95	53.4	139	78.1	45	25.3
Once	33	18.5	21	11.8	18	10.1
A few times	35	19.7	10	5.6	70	39.3
Several times	12	6.7	4	2.2	22	12.4
Many times	1	0.6	2	1.1	22	12.4
Valid total	176	98.9	176	98.9	177	99.4
Missing	2	1.1	2	1.1	1	0.6
Total	178	100.0	178	100.0	178	100.0

Path Analysis

To investigate the relationships between cyberbullying victimization, acculturative stress, and depression, a path analysis was conducted. The results indicated that cyberbullying victimization had a significant and positive effect on acculturative stress ($\beta = .418$, $p < .001$). Similarly, cyberbullying victimization was found to be positively and significantly associated with depression ($\beta = .293$, $p < .001$). Furthermore, acculturative stress had a significant positive effect on depression ($\beta = .351$, $p < .001$). These findings suggest that experiences of cyberbullying among international students not only directly increase depression levels but also elevate acculturative stress, which in turn contributes to depressive symptoms. Details can be found in Figure 1 and Table 3.

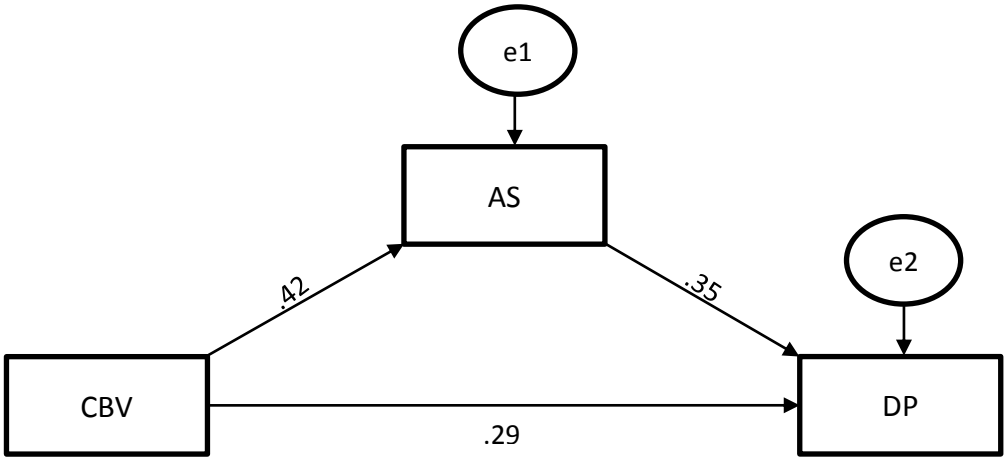


Figure 1. Path analysis results. Values represent standardized regression weights. ($p < .001$)

Table 3

Standardized regression weights for the structural model (N = 178)

Predictor	Outcome	Standardized Estimate (β)	p-value
Cyberbullying Victimization (CBV)	Acculturative Stress (AS)	.418	< .001
Cyberbullying Victimization (CBV)	Depression (DP)	.293	< .001
Acculturative Stress (AS)	Depression (DP)	.351	< .001

The mediation analysis revealed that acculturative stress partially mediated the relationship between cyberbullying victimization and depression. The total effect of cyberbullying victimization on depression was found to be β = .440, with a direct effect of β = .293 and an indirect effect through acculturative stress of β = .147 ($p < .001$). Details can be found in Table 4.

Table 4

Standardized total, direct, and indirect effects (N = 178)

Predictor	Outcome	Total Effect (β)	Direct Effect (β)	Indirect Effect (β)
Cyberbullying Victimization (CBV)	Acculturative Stress (AS)	.418	.418	.000
Cyberbullying Victimization (CBV)	Depression (DP)	.440	.293	.147
Acculturative Stress (AS)	Depression (DP)	.351	.351	.000

This indicates that experiences of cyberbullying lead to heightened levels of acculturative stress, which subsequently increase depressive symptoms among international students. However, since the direct effect remained significant even after accounting for the mediation, it can be concluded that acculturative stress plays a partial, rather than full, mediating role.

Discussion, Conclusion & Suggestions

This study examined the relationships between cyberbullying victimization, acculturative stress, and depression among international students, and explored whether acculturative stress served as a mediator in these associations. Descriptive analyses indicated that nearly half of the international students reported experiencing cyberbullying at least once in their lifetime, underscoring the prevalence and seriousness of digital victimization within this population. This high prevalence is particularly concerning given recent longitudinal trends indicating that while mental health challenges are rising among international students, service utilization remains disproportionately low, suggesting that these digital experiences often go unreported and untreated due to structural and cultural barriers (Zhai et al., 2025).

The findings revealed that cyberbullying victimization significantly increased depressive symptoms both directly and indirectly through acculturative stress. Furthermore, acculturative stress was found to partially mediate this relationship. These results suggest that international students' psychological well-being is significantly influenced by both cultural adaptation challenges and online threats.

The results align with previous studies emphasizing that international students often face substantial psychosocial risks during the cultural adjustment process (Smith & Khawaja, 2011; Yeh & Inose, 2010). Acculturative stress has been linked to feelings of loneliness, social isolation, inadequacy, and perceptions of academic failure (Mori, 2000; Shadowen et al., 2019), and the present findings support these associations. Moreover, the findings reinforce the notion that acculturative stress arises not only from individual adjustment difficulties but also from environmental factors such as limited social support, language barriers, and cultural marginalization. Current literature elaborates on this mechanism, positing that "belongingness" acts as a critical buffer for well-being; when acculturative stress erodes this sense of belonging, students become significantly more vulnerable to psychological distress. Thus, the stress of adaptation is not merely an internal struggle but a reflection of disrupted social connectedness (Su et al., 2025).

Another key finding is the impact of cyberbullying victimization on psychological well-being. Prior research indicates that cyberbullying increases the risk of depression, anxiety, suicidal ideation and diminished self-esteem (Hinduja & Patchin, 2010; Kowalski et al., 2019; Patchin & Hinduja, 2010; Schenk & Fremouw, 2012; Schenk et al., 2013; Selkie, Kota, Chan, & Moreno, 2015; Tokunaga, 2010), and this risk may be particularly acute for international students due to weaker social support systems (Wang et al., 2012). This vulnerability is further exacerbated by the "double disadvantage" phenomenon, where minority status intersects with digital victimization. Sexual and ethnic minority students, in particular, face higher risks of cyberbullying, which leads to more severe mental health outcomes compared to their domestic peers (Luo et al., 2025). This study extends these findings by demonstrating that cyberbullying not only exerts a direct impact on depressive symptoms but also exacerbates stress related to cultural adaptation, thus compounding its effects.

Importantly, the identification of acculturative stress as a partial mediator highlights the interconnectedness of digital and cultural stressors. Consistent with prior findings that emotional regulation difficulties and diminished social connectedness contribute to depressive symptoms (Cheung et al., 2020), the present results emphasize that multiple stressors jointly shape mental health outcomes for international students. Theoretically, this mediation can be explained through identity gaps which is discrepancies between how students view themselves and how they are treated in the host environment. Cyberbullying likely widens these identity gaps, consuming the cognitive and emotional resources needed for cultural adaptation, thereby precipitating depressive symptoms. Consequently, negative digital interactions do not just cause momentary distress; they actively dismantle the acculturation process itself (Amado et al., 2020; Lari et al., 2025).

These findings underscore the necessity for university counseling services to adopt a more holistic, proactive, and culturally responsive approach. Rather than focusing solely on crisis interventions, universities should develop preventive programs that support students' cultural adjustment and protect them against digital threats (Kim & Zalaquett, 2025; Smith & Khawaja, 2011). Specifically, institutions should integrate digital well-being into their public health frameworks, fostering "digital citizenship" to create safer online environments (Matos Fialho et al., 2025). To achieve this, universities should establish anonymous and accessible cyberbullying reporting systems. As international students may hesitate to report victimization due to language barriers or fear of visa repercussions, an

anonymous mechanism would encourage help-seeking behaviors without the fear of stigma or legal consequences. Furthermore, culturally sensitive counseling interventions incorporating stress management techniques such as deep breathing, guided imagery, and assertiveness training have shown promise in helping international students navigate these transitional challenges by enhancing emotional regulation and resilience. This study contributes to the growing literature advocating for integrated intervention strategies that address both individual psychological resources and broader environmental stressors.

Conclusion

This study highlights the combined impact of cultural and digital stressors on the psychological well-being of international students. Cyberbullying victimization was found to increase depressive symptoms both directly and indirectly by intensifying acculturative stress. The partial mediating role of acculturative stress underscores the critical influence of cultural adaptation processes on mental health. These results imply that digital safety is inseparable from cultural adaptation; therefore, interventions aimed at promoting international students' well-being must simultaneously address cultural adjustment difficulties and online vulnerabilities. Strengthening both individual resilience and environmental support mechanisms is essential for fostering psychological well-being within this population.

Limitations and Future Research

Despite its contributions, this study has several limitations. First, data were collected from a single university and a relatively narrow age range. Furthermore, the sample exclusively comprises undergraduate students; excluding graduate students, who face distinct academic and cultural stressors, further limits the generalizability of the findings. Additionally, although the sample included students from 43 countries, the majority were from specific regions (e.g., Saudi Arabia, China), which may limit the generalizability of findings to all international student populations. Second, the cross-sectional design precludes causal inferences regarding the relationships among the variables. Additionally, the use of self-report measures raises the potential for response biases, such as social desirability effects.

Future research should include more diverse and representative samples of international students and employ longitudinal designs to capture changes over time. Investigating the moderating or mediating roles of individual factors such as self-regulation skills, perceived social support, and psychological resilience could offer deeper insights into these relationships. Moreover, examining the role of "digital belongingness" and how online communities can alternatively serve as a source of support for acculturation would provide a more balanced perspective Furthermore, qualitative studies examining how experiences of cyberbullying differ across cultural contexts would provide valuable nuances to the quantitative findings. Such research efforts would be instrumental in designing more targeted, culturally sensitive, and effective support programs for international students. Translating these findings into practical implications for the field of psychological counseling and guidance, universities should implement targeted, proactive interventions. For instance, integrating specific modules such as 'digital citizenship' and 'cultural safety in the cyber world' directly into international student orientation programs can equip students

with the necessary skills to navigate online environments, thereby mitigating the compounding effects of digital victimization on acculturative stress.

Ethic

The study protocol was approved by the Kent State University Institutional Review Board (IRB) under approval number 17-576. All procedures were conducted in accordance with the ethical standards of the 1964 Declaration of Helsinki and its subsequent revisions.

Author Contributions

The first author conducted the research, analyzed the data, and wrote the main manuscript text. The second author supervised the project, provided critical feedback, and edited the manuscript. All authors reviewed the manuscript.

Conflict of Interest

The authors declare no conflicts of interest.

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Author Note

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