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In-person and computer-mediated social support for international students at U.S. universities: Associations with acculturative stress and mental health

Aysha Siddika[a], Morgan E. Ellithorpe, PhD[a], Dar Meshi, PhD[b] and Samuel M. Tham, PhD[c]

[a]Department of Communication, University of Delaware, Newark, Delaware, USA; [b]Department of Advertising & Public Relations, Michigan State University, East Lansing, Michigan, USA; [c]Journalism and Media Communication, Colorado State University, Fort Collins, Colorado, USA

ABSTRACT

Objectives: The current study explored whether social support received from either mediated or in-person contact varied among international students depending on the level of social ties (stronger/weaker) with existing support groups. This study also examined whether in-person or computer mediated social support (CMSS) is a better predictor of acculturative stress which might influence mental health of international students. **Methods:** An online survey was conducted among 179 international students across three U.S. universities. **Results:** Results showed that international students perceive stronger online social ties compared to in-person social ties, $t(125) = -3.57$, $p < .001$. Stronger ties with CMSS significantly negatively influence acculturative stress compared to in-person social support for international students, ($b = -0.24$, 95% CI [-0.45, −0.03]). This indicates that as CMSS increases, acculturative stress decreases among international students. **Conclusions:** This study concludes that online social support groups can positively influence mental health of college student populations, particularly those who feel stressed out.

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International college students; in person social support; computer mediated social support; acculturative stress; mental health

Introduction

International students are nonimmigrant students enrolled in various educational programs in the United States from various countries around the world.[1] According to the National Association of Foreign Student Advisers (NAFSA), international students contributed nearly $34 billion to the U.S. economy in the 2021–2022 fiscal year and supported 450,000 jobs.[2] Based on the U.S. Immigration and Customs Enforcement (ICE) report, more than one million international students are enrolled in nearly 9,000 schools in the U.S.[3] International students are therefore a sizeable population who have overall positive impacts on the U.S. as their host country.

International students face various communication and cultural challenges at the beginning of their college life abroad. Socio-cultural differences and a lack of interpersonal communication skills in their new culture become the main obstacles for international students to build their social support group and engage with the surrounding community.[1,4] In particular, moving abroad affects international students' existing social ties with friends and family in their home country[4]. Therefore, international students tend to feel more psychologically distressed compared to domestic students.[5] Stress in general is associated with negative mental health outcomes such as anxiety and depression.[6,7]

Compounding this issue for international students is their new environment, which could lead to difficulties in social adjustment and may result in developing acculturative stress.[1,8] Acculturative stress is a state of psychological distress and is a part of the process of assimilating to a new culture.[1,9] Acculturative stress occurs when individuals are impacted by various stress factors resulting from cultural changes and cultural conflicts as well as difficulties adapting to a new environment.[9,10] Researchers have found that loneliness among college students can increase financial and isolation fear.[11] Additionally, among the other social factors, loneliness and lack of social connectedness worsen students' behavioral and mental health and increase suicidal tendencies among college students.[12] Additionally, acculturative stress has been found to be associated with worse academic performance in terms of grade point average (GPA).[13,14]

Stress-buffering hypothesis

The stress-buffering hypothesis posits that social support can be viewed as a protective factor that helps individuals against the negative effects of stress.[15,16] Social support can be defined as the emotional and psychological support individuals perceive and receive from their existing social ties and interpersonal relationships.[17] Social support is related to improving quality of life and lowering stress appraisals.[18–20]

Computer-mediated communication can be a resource to generate support, where communication can happen in the form of text, video messaging, social media, online gaming, or other social technologies to help cope with stressors.[21]

CONTACT Aysha Siddika asiddika@udel.edu Department of Communication, University of Delaware, 250 Pearson Hall, 125 Academy St., Newark, DE, 19716, USA.

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Computer mediated social support (CMSS) can be helpful for individuals to cope with stress following a transition, especially when the transition involves the loss of a social support group.[21] CMSS social support has also been identified as a self-help tool.[22] It is effective for various populations who have difficulties in accessing in-person social support groups, such as people with disabilities,[23] militaries,[24] and caregivers.[25] Therefore, there are some potential positives to the use of CMSS.

However, previous research on social support found that in-person support is superior to CMSS in terms of mental health outcomes.[26–30] CMSS has been described as somewhat inferior and weaker than real-life social support due to the limiting of social and emotional cues, as well as the inability to provide materialistic support.[21,31,32] However, this presumes that the population under study has many in-person ties. International students are a special population for whom their closest ties are likely to not be in-person – meaning social support for them is more likely to be mediated.

International students mainly socialize within their conational community and host nationals. Social support received from home country sources such as friends and family vs. social support received from host country sources such as fellow classmates differ widely in terms of availability and quality of social support. Social support received from home country sources are mainly emotional and psychological components that can be used to manage stress. Emotional and psychological support are important components of the mental well-being of international college students and found to be effective in reducing acculturative stress.[33] In the absence of in-person contact with home country sources, these emotional and psychological supports can be channeled using computer mediated communication. Social support from host country sources can be found both online and in person, however, it is indicated to be not as effective as social support received from home country sources to mitigate stress for international students.[33]

The role of social ties in social support

Previous studies have demonstrated that strong social ties benefit mental health.[34,35] According to Thoits in 2011,[36] "social ties refer to connections to and contacts with other people through membership in primary and secondary groups" (p. 146). Primary groups include family members and significant others, while secondary groups consist of friends and relationships from broader contexts.[36] Strong and weak social ties indicate the level of interaction with primary and secondary groups which depend on the amount of time spent together, intimacy or mutual disclosure, intensity, and emotional involvement of the relationship.[36,37] Studies have found that strong social ties are associated with better mental health outcomes,[38] whereas individuals with small social networks and fewer close relationships are more prone to psychological distress.[39] Thus, social tie strength is directly implicated in the quality of support and the mental health outcomes people experience from that support.

The current study predicts that social support received by international students varies depending on having stronger or weaker social ties with available social support which may influence acculturative stress. Therefore, the purpose of this study is to determine whether the effectiveness of social support varies based on the level of social ties examining in-person versus CMSS groups. Also, this study aims to determine whether mediated versus in-person social support affects acculturative stress and influences international students' mental health such as symptoms of depression, anxiety, and isolation and their academic goal achievement. Based on the above-described literature regarding social tie strength, social support, mental health, school performance, we predict the following:

H1: International students will report stronger CMSS social ties compared to in-person social ties.

H2a: CMSS social tie strength will be positively associated with CMSS.

H2b: In-person social tie strength will be positively associated with in-person social support.

RQ1: Will CMSS and/or in-person social support or social tie strength be associated with acculturative stress?

H3: Acculturative stress will be positively associated with symptoms of (a) depression, (b) anxiety, and (c) social isolation.

H4: Acculturative stress will be negatively associated with school performance.

Method

Participants

Participants were recruited through university participant pools and through authors' social networks for an online survey about international student experiences. Participants were international students recruited across three large public universities in the United States: one Mid-Atlantic (53% of the sample), one Midwest (36%), and one Southwest (11%). Two of the universities allowed the restriction of access to only those who identified themselves as international students in a participant pool prescreen survey, but at the third this was not available. Our final sample consisted of 179 participants, after removing respondents who were not actually international students from the university where it could not be restricted ($n = 180$), those who were not currently residing in the United States ($n = 21$), and those who claimed to be an international student but then reported their home country as the United States ($n = 9$). Participant ages ranged from 18 to 36 years ($M = 22.21$, $SD = 3.37$), and participants identified their gender as 43.93% men, 36.42% women, 1.16% non-binary or other, and 18.50% did not respond to our gender question. Our sample included participants from 48 countries and all six residential continents, with China being the most numerous (31.79%) followed by India (5.78%) and Canada (3.47%).

Procedure

Participants answered questions about their home countries, including how long they have lived in the United States and when they last visited their home country. They then completed the below-described measures of acculturative stress, social tie strength, social support, mental health, and school performance. After completing the survey, participants who we recruited through participant pools received course credit. This study was determined exempt (category 2) by the Institutional Review Boards at all three institutions where data was collected.

Measures

Social tie strength

Social tie strength[40,41] was measured by asking participants to provide a first name (or initials/nickname) for up to 10 people, before indicating their closeness to each named person by using a scale with seven pairs of overlapping circles, with "self" in one and "other" in the other. The scale begins with completely separate circles (rating = 1), and they progressively overlap more as the scale increases, so the scale ends with near completely overlapping circles (rating = 7). The average of the rated closeness across all named individuals is used as a measure of a participant's overall tie strength. For *in-person social tie strength* the prompt was, "Looking back over the last 6 months, who are the people who are especially significant in your life in an in-person, face to face context right now while you are living in the U.S.? Please do not count anyone who is located outside of the U.S. who you do not see in-person while you are here at school." ($M = 3.98$, $SD = 1.39$, Cronbach α=.83). For *mediated social tie strength* the prompt was, "Looking back over the last 6 months, who are the people who are especially significant in your life primarily through online channels, such as text or video messaging, social media, online gaming, or other social technologies? This can count people who you do or do not see in-person while you are here at school and can include people who are not located in the U.S." ($M = 4.34$, $SD = 1.44$, Cronbach α=.88).

Social support

Social support was measured using the 12-item perceived social support scale,[42] measured on an 11-point −5 (strongly disagree) to +5 (strongly agree) scale. The scale was measured once with the prompt "please rate your agreement with the following statements about your real-life, in-person relationships of those who are physically located in [campus town]" for *in-person social support* ($M = 2.28$, $SD = 2.10$, Cronbach α=.95) and again with "people in the online/social media environment (people who are not physically in [campus town])" for *CMSS* ($M = 2.44$, $SD = 2.00$, Cronbach α=.93). The two versions were asked in random order.

Acculturative stress

Acculturative stress was measured using the 26-item Acculturative Stress Scale for International Students.[9] While the scale can be used with six subscales (discrimination, homesickness, rejection, fear, culture shock, and guilt), it can also be used as a single scale and that is how it was used in the present analysis. It was measured on an 11-point −5 (strongly disagree) to +5 (strongly agree) scale (M=-0.90, $SD = 1.93$, Cronbach α=.95).

Mental health

Mental health symptoms were measured using the short forms of the Patient-Reported Outcomes Measurement Information System (PROMIS) scale.[43,44] The PROMIS is a widely used tool to measure individuals self-reported assessment of emotional well-being. The measure includes 4-items, ranging from 1 (never) to 5 (all the time), for *depression* ($M = 2.27$, $SD = 0.91$, Cronbach α=.88), *anxiety* ($M = 2.57$, $SD = 0.90$, Cronbach α=.87), and *social isolation* ($M = 2.59$, $SD = 0.94$, Cronbach α=.87).

Academic performance

Academic performance was measured in two ways. First, by asking participants to self-report their *grade point average (GPA)*, which at the universities in question were on a 0.0 to 4.0 scale ($M = 3.43$, $SD = 0.48$, min = 1.78, max = 4.0). Second, it was also measured as *self-reported performance* using two items[45] by asking students to evaluate on a 1 (very poor) to 7 (very good) scale about their personal academic performance and their academic performance compared to other students. These two items were combined into a single measure ($M = 4.64$, $SD = 1.31$, Pearson's $r = 0.76$).

Covariates

How long the participant has lived in the United States was measured using an ordinal scale with six levels: less than one year (19.65%), one year to less than two years (13.87%), two years to less than three years (15.03%), three years to less than four years (14.45%), four years to less than five years (9.25%), and five or more years (19.65%), with a further 8.09% who did not respond to this item. *How long since the participant last visited their home country* was measured using an ordinal scale with four levels: less than three months ago (20.81%), three months to less than six months ago (20.23%), six months to less than one year ago (19.08%), and one year ago or more (31.21%), with a further 8.67% who did not respond to this item.

Analysis

Hypothesis 1 was tested using a paired samples t-test to compare relative tie strength within the sample. The remaining hypotheses and research questions were tested using path analysis in Stata 18, using full information maximum likelihood to account for patterns of missing values. In-person and mediated social tie strength were set to predict their respective social support (in-person and mediated). Both types of ties and social support then were set to predict acculturative stress, controlling for how long they have lived in the United States because previous research has

found an association between time spent in the host country and acculturative stress,[46] and controlling for how long since they last visited home (which could exacerbate home sickness). Ties, social support, and acculturative stress then were set to predict symptoms of depression, anxiety, social isolation, GPA, and self-reported academic performance. How long they have lived in the United States (U.S.) was included as a covariate predicting GPA and academic performance, to account for experience with U.S. testing norms and indirectly for English language proficiency for those from non-native English-speaking backgrounds. Mediated and in-person tie strength were allowed to covary, as were the error terms of mediated and in-person social support, and of the five mental health and performance outcomes – this was done to reduce error by accounting for covariation of related outcomes.

Results

A full sample description can be found in Table 1.

First, a paired samples t-test was used to test H1 that international students would report stronger mediated ties compared to in-person ties. This hypothesis was supported, in that mediated tie strength ($M = 4.43$, $SD = 1.42$) was significantly higher than in-person tie strength ($M = 4.00$, $SD = 1.42$), $t(125) = -3.57$, $p < .001$.

Second, structural equation modeling was used to test the full model for H2-H4 and RQ1 (see Figure 1 for the conceptual model). Full statistical results for the path model can be found in Table 2. Model fit was acceptable,[47] $\chi^2(14) = 28.39$, $p = .01$, CFI = .97, RMSEA = .080, 90% CI (0.036, 0.123). Strength of mediated ties was significantly positively associated with CMSS, while strength of in-person ties was marginally ($p = .051$) positively associated with in-person social support, providing support for H2a and weak support for H2b. RQ1 asked whether either type of social support would be associated with acculturative stress. Only CMSS was significantly associated with acculturative stress, such that as CMSS increased acculturative stress decreased – indicative of a protective effect of mediated support. In-person social support was not significantly associated with acculturative stress. This answers RQ1. H3 predicted that acculturative stress would be associated with mental health symptoms, while H4 predicted that it would be associated with school performance. Acculturative stress was significantly positively associated with symptoms of depression, anxiety, and social isolation, indicating that it is associated with worse mental health for international students and supporting H3. Acculturative stress was not, however, significantly associated with academic performance, either measured as GPA or as self-reported performance, indicating that H4 was not supported.

Table 1. Descriptive statistics of the sample.

Variables	Percentages %	*M*	*SD*
Participants ($n = 179$)			
Mid-Atlantic	53%		
Midwest	36%		
Southwest	11%		
Age (18–36)		22.21	3.37
Gender			
Men	43.93%		
Women	36.42%		
Non-binary	1.16%		
Not responded	18.50%		
Countries (total = 48)			
China	31.79%		
India	5.78%		
Canada	3.4%		

Discussion

The current study explored whether social support received from either mediated or in-person contact varied among international students depending on the level of social ties (stronger/weaker) with existing support groups. This study also examined whether in-person or CMSS is a better predictor of acculturative stress which might influence mental health, such as symptoms of depression, anxiety, isolation, and additionally overall academic goal achievement. Our results found that international students perceive stronger online social ties compared to in-person social ties. The results also revealed that stronger ties with CMSS significantly negatively influence acculturative stress compared to in-person social support for international students. This indicates that as CMSS increases, acculturative stress decreases among international students. This finding is also supported in other studies such that online social support groups can positively influence the mental health of college student populations, particularly those who feel stressed out.[48]

Our analysis also revealed a significant positive association between acculturative stress and symptoms of depression, anxiety, and isolation for international students. Increased symptoms of depression, anxiety, and isolation culminates to significant negative mental health impact on consistent with prior literature.[49–51] However, academic performance was not significantly associated in the present study with acculturative stress. This indicates that while CMSS may play a role in protecting international students' mental well-being, their school performance might not be as affected. The research on acculturative stress and school performance has previously found a relationship such that acculturative stress is negatively associated with performance;[13,14] however, other research has found relationships between acculturative stress and mental health but not with school performance.[52,53] Therefore, the current research appears to be mixed overall, and the present study adds to that by finding no significant relationship between acculturative stress and academic performance.

Previous research has demonstrated that only in-person support and not CMSS is protective of mental health.[26–30] Crucially, the results of the present study provide an alternative narrative to those found with samples that are composed of mostly domestic students. International students are a group for whom in-person support might be lower quality compared to their mediated support, due to the fact that their strongest social ties are located physically far away in their home countries. The supposition that CMSS could

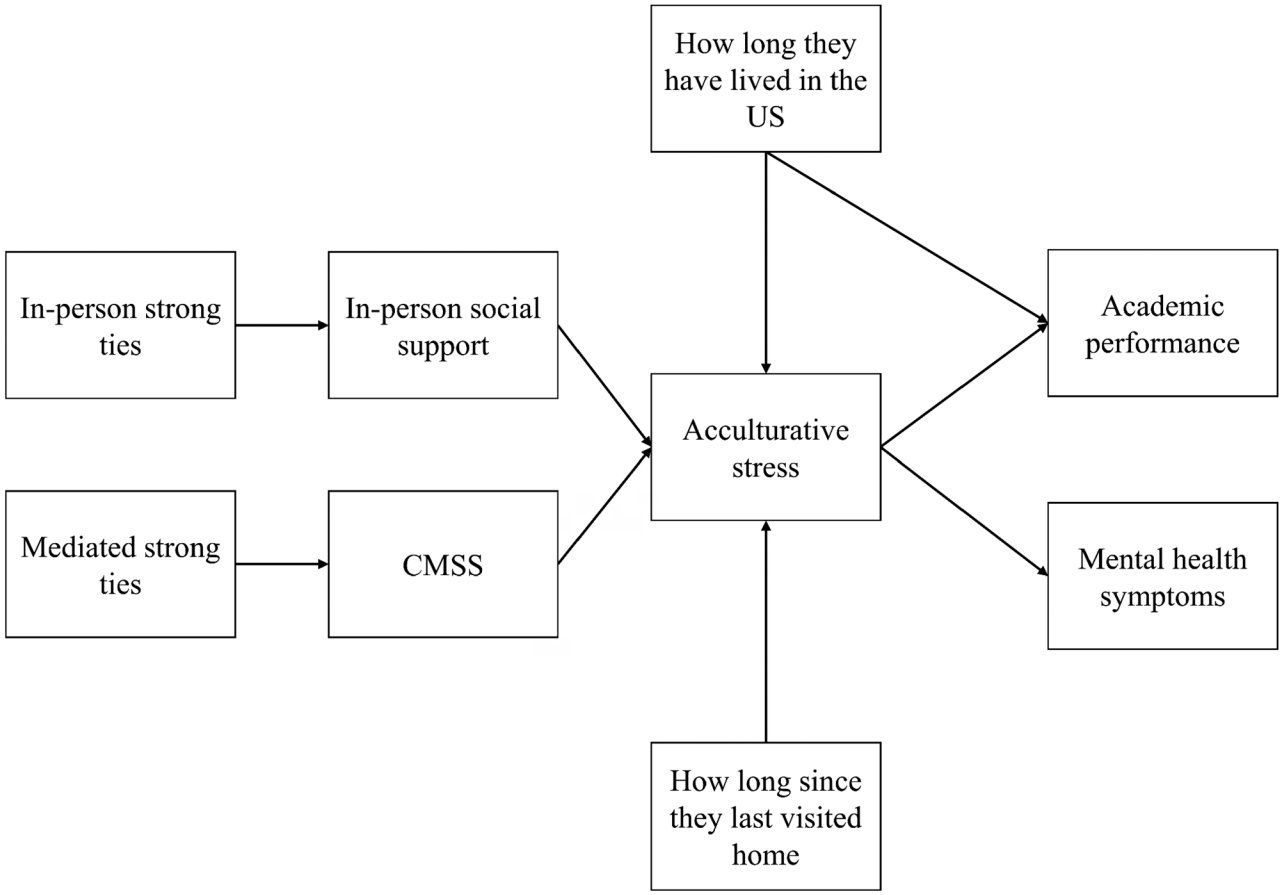


Figure 1. Conceptual model for structural equation modeling. Note: For parsimony, not shown are covariances between exogenous variables and between the error terms of endogenous variables that are parallel in the model, as well as direct paths from earlier model variables to later (e.g., from CMSS directly to mental health symptoms).

Table 2. Path model results. Note: coefficients reported are standardized, and significant coefficients at $p < .05$ are **bolded** for ease of interpretation.

	Mediated social support		In-person social support		Acculturative stress	
Variable	*b*	95% CI	*b*	95% CI	*B*	95% CI
Mediated Tie Strength	**0.14**	**0.01, 0.28**			0.19	−0.01, 0.39
In-person Tie Strength			0.13	−0.002, 0.27	−0.16	−0.36, 0.04
Mediated Social Support					**−0.24**	**−0.45, −0.03**
In-person Social Support					−0.15	−0.36, 0.06
Acculturative Stress						
Time in U.S.					0.06	−0.10, 0.21
Time Since Home Visit					0.12	−0.03, 0.28
R^2	0.02		0.02		0.16	

Table 2. Path model results, continued.

	Depression		Anxiety		Social isolation		GPA		Self-reported performance	
Variable	*b*	95% CI	*B*	95% CI	*B*	95% CI	*b*	95% CI	*b*	95% CI
Mediated Tie Strength	0.02	−0.16, 0.21	0.15	−0.03, 0.32	0.13	−0.05, 0.30	−0.25	−0.51, 0.003	0.08	−0.12, 0.28
In-person Tie Strength	0.06	−0.13, 0.25	−0.01	−0.19, 0.17	−0.07	−0.25, 0.11	0.02	−0.22, 0.27	−0.01	−0.21, 0.20
Mediated Social Support	−0.13	−0.34, 0.09	−0.03	−0.24, 0.19	−0.06	−0.27, 0.15	0.15	−0.10, 0.40	−0.02	−0.26, 0.21
In-person Social Support	−0.08	−0.29, 0.12	−0.18	−0.38, 0.02	−0.18	−0.37, 0.02	−0.02	−0.26, 0.22	0.15	−0.08, 0.37
Acculturative Stress	**0.35**	**0.20, 0.50**	**0.37**	**0.23, 0.52**	**0.40**	**0.26, 0.54**	−0.02	−0.21, 0.17	−0.16	−0.33, 0.01
Time in U.S.							−0.13	−0.32, 0.05	−0.06	−0.22, 0.10
R^2	0.21		0.25		0.29		0.08		0.07	

be higher quality for this population is supported by the present study. Thus, it is important for researchers assessing the relative role of CMSS in mental health in the future to consider social tie strength as an important predictor for whether in-person or mediated support is likely to be more impactful.

Limitations and future research

A cross-sectional survey with a small sample of a hard-to-reach population of international students has some limitations in its utility. Therefore, causal inferences must be made with caution. However, a strength of the study is in the representation of three different geographic areas in the U.S., as well as the high variability in home country represented among the international students in the sample. These aspects of the sample help to increase the generalizability of the findings to U.S. international students more broadly. Additionally, some of the models within the path analysis indicated a relatively small amount of variance explained. Small effects are common in the field of media psychology, and there are arguments for why such small effects should not be ignored in the case of a highly repeated and lifelong activity.[54] Of note, there remains a large component of variance left unexplained by our model that future research could explore. Relatedly, we might have missed some important covariates that are driving the results. We did measure and include in analysis the students' duration of living in the U.S. and duration since their last visit to their home country as covariates, but there could be other mechanisms at play that were not measured. Additionally, this study did not include domestic students as a direct comparison group. However, it is known from previous research that domestic students tend to benefit more from in-person social support and not from CMSS.[26–30] Future studies could consider domestic or other student groups to compare with international students.

Conclusion

Social support is crucial for mental health, but the source and medium such as whether it is in-person or mediated can matter for its effectiveness. Much of the literature to date has been conducted with populations for whom their strongest social ties are located in the same physical location, or at least the same country, as the respondent. Such previous research finds that in-person, but not mediated, social support is protective for mental health.[26–30] However, international students represent a special population for whom the strongest social ties are more likely to be located in another country far from where the student resides when at college. Therefore, social support that is mediated versus in-person might be different for them, and that supposition is supported by the results of the present study, which found that mediated support, but not in-person support, reduces acculturative stress and this in turn ameliorates mental health challenges for international students. It is also possible that the findings of the present study are more broadly applicable outside of the international student context, and instead indicate that wherever strong ties most exist, they will be helpful for mental health. Usually, this manifests as a positive impact of in-person support, because most people have their strongest social ties in person. But, to the extent that someone's strongest ties are not physically located nearby, CMSS might become just as if not more effective as in-person support. Institutional and professional focus is necessary to support international students to develop social support groups by increasing community outreach programs and social events to ensure international students find adequate social support, as well as ensuring that international students are able to keep in contact with their strong ties in their home countries.

Conflict of interest disclosure

The authors have no conflicts of interest to report. The authors confirm that the research presented in this article met the ethical guidelines, including adherence to the legal requirements, of the United States, and received approval from the Institutional Review Board of the University of Delaware.

Ethical approval

This study was submitted to the Institutional Review Board (IRB) of [University] for ethical approval and determined as exemption category # (2i) status, Exempt id: [1884746-1]. A written informed consent was gathered from each respondent before participating in the study. The IRB determined low risk involved to the human participants and the study will protect the privacy of the respondents and will not disclose identifying information.

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ORCID

Aysha Siddika http://orcid.org/0009-0007-6462-8146
Morgan E. Ellithorpe http://orcid.org/0000-0002-0317-9267
Dar Meshi http://orcid.org/0000-0003-0772-037X
Samuel M. Tham http://orcid.org/0000-0002-4188-387X

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