Original Research

Impact of Social Support on the Physical Activity Behaviors of International College Students in the United States

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ABSTRACT

International Journal of Exercise Science 14(5): 1305-1319, 2021. Research has suggested that international students' transition to the United States is often correlated with less physical activity after arriving in the U.S). One reason might be related to reduced social support when living in a foreign environment. The purpose of this cross-sectional study was to assess the impact of social support on international college students' physical activity behaviors. Participants (N = 318) from five public universities in one Midwest state completed an electronic survey assessing self-reported physical activity behaviors and perceived social support for exercise (SSE). Data analyses included multiple linear regression, multinomial logistic regression, and multiple logistic regression to test the study's hypotheses. Region of origin, academic level, and friends' SSE were all significant predictors of unhealthy physical activity behaviors. Specifically, friends' SSE was positively associated with higher total physical activity behaviors (F (12, 305) = 4.2, p < .001, R^2 = .142) and was a significant predictor of participants' physical activity levels. Although research suggests international students' transition to the United States can impart negative impacts on their physical activity behaviors, we found that greater levels of friends' SSE was associated with increased physical activity behaviors. As university administrators and wellness programs explore interventions promoting positive physical activity behaviors among international students, they should consider including elements that focus specifically on friendship social support to motivate physical activity behaviors.

KEY WORDS: Exercise, fitness, foreign students

INTRODUCTION

The United States (US) is the leading destination for international students in higher education (21). According to the Institute of International Education, in partnership with the Bureau of Educational and Cultural Affairs at the US Department of State, international students account for more than five percent of the total college student population in the US (21). Additionally, the number of international students in the US has doubled in the previous decade and now includes over a million students as of the 2018-2019 academic year (21). These students represent

a significant financial market for the US higher education sector, supporting nearly a half-million jobs and contributing 39 billion dollars to the US economy (31).

As international students continue to migrate to the U.S., more information is needed to better understand their health concerns. International students may face changes to their day-to-day lifestyle activities and social support systems when they move to a new country. Specifically, they might face changes in the type of physical activities to which they are accustomed. In examining physical activity behaviors of the general college student population, researchers have noted a significant decline in physical activity participation (i.e., decrease in walking, moderate, and vigorous physical activity) and an increase in sedentary behavior during the college years (3, 7, 43). However, research specifically examining international students' physical activity behaviors is limited compared to research on the general college student population. In the limited published literature, researchers have suggested that international students' transition to life in the US may have some negative impact on their physical activity behaviors (i.e., they are less physically active after arriving in the US) (2, 11, 30).

Moreover, social relationships in early adulthood are predominantly formed with family members, and/or roommates and friends at college, which form the social networks through which students can receive social support (38). The importance of receiving social support from interpersonal relationships has been well documented in research (35, 40). Specifically, researchers have examined the effect of social support on the physical activity behaviors of individuals and reported that individuals with higher social support had higher mean physical activity scores compared to individuals with lower support (4, 29, 36).

Furthermore, multiple interrelated factors help to determine the physical activity behaviors of college students, and by using an ecological model approach, researchers can link individual and social behaviors with environmental determinants to reduce and prevent health problems (33). To change and improve college students' physical activity, it is important to understand the different levels of determinants relating to their physical activity behaviors, which include individual, social, environmental and policy factors (15, 23). Thus, social support is one part of the puzzle that needs to be considered. As international students move away from their home countries and into unfamiliar environments, they may lose important social support networks (24), leading to possible social isolation as they transition to academic life in the US (1, 9, 19, 44).

Some researchers have suggested a shift in focus from the direct promotion of health habits, such physical activity behaviors, to promoting programs specifically designed to enhance psychosocial factors—like social support—that indirectly increase positive health behaviors (16). Although there is limited research on the influence of social support on international student health, it is possible that the behavioral health impact would be as great, if not greater, for this group compared to the general college student population. Understanding the different ways families' and friends' social support roles function for international students is important in developing tailored and culturally appropriate intervention programs to promote positive physical activity behaviors. Accordingly, this study examined the different roles of family and

friends in influencing both health-promoting and health-impeding behaviors related to physical activity behaviors.

METHODS

Participants
Participants in this study were undergraduate and graduate international students (N = 318) categorized as nonresident aliens attending five public universities in one Midwest state. The five universities were selected via convenience, based on geographic location and/or large international student population. Thus, this population was selected based on students' nationality and university enrollment. To identify the sample size for the proposed study, the general standards of sample size determination for the multiple regression power calculation were used (8, 10). The power analysis conducted with the package 'pwr' in R (8) determined that 126 participants were needed in the present study for a power of 0.80, with an effect size of 0.15 and an a = 0.05.

Protocol
This cross-sectional study examined relationships between international college students' perceived family and friend social support for exercise (SSE) and their physical activity behaviors. Following approval from the Human Subjects Committees and/or Institutional Review Boards of each of the five public universities, coordinators from the centers for international education at the participating universities were contacted to assist in student recruitment. Participants were recruited via email using the centers for international education listserv and students from the participating universities were sent the link to the study's online survey. Previously validated instruments (13, 14, 17, 18, 22, 23, 32) were combined into one survey to measure international students' perceptions of family and friend SSE as well as their self-reported physical activity behaviors.

Demographic information collected included gender, age, country of origin, level of education, self-reported height, weight, family status (i.e., currently living with immediate family members or not), and period of time spent in the US. The region of origin variable was generated based on participants' country of origin and included six categories (i.e., East Asia, Middle East, Africa, South America, South Asia and Europe / North America).

The 13-item SSE scale was used to measure participants' perceived social support as related to their physical activity habits (32) Participants responded to a 5-point scale, ranging from none '1' to very often '5', to measure their perceived social support for physical activity behaviors from family and friends. One example from the scale is "during the past three months, my family (or members of my household) or friends exercised with me." The scale provides separate scores on family's and friends' social support for participating in exercise as well as a combined total score to describe overall level of social support for physical activity. Total raw scores were calculated by summing the numerical ratings for each response and re-scoring negative items, and higher scores indicated higher levels of exercise social support. These summary scores were calculated separately for family and friend SSE.

Participants also completed the 7-item International Physical Activity Questionnaire short form (IPAQ-SF) to measure their physical activity behaviors (22). The IPAQ-SF's items are structured to provide separate scores on walking, moderate-intensity, and vigorous-intensity physical activity as well as a combined total score to measure overall level of physical activity. For example, participants are asked "on average, how many hours per week do you spend on vigorous physical activity such as heavy lifting, digging, aerobics, or fast bicycling?" To describe participants' total physical activity levels, multiples of the resting metabolic rates "Metabolic Equivalent of Task" (METs-min/week) were calculated for each student. Participants' physical activity level was categorized by MET-min/week count into one of three levels of physical activity: inactive; minimally active; or health enhancing physical activity (HEPA), wherein participants exceeded minimum public health physical activity recommendations.

Statistical Analysis
Data analyses were conducted in RStudio, which included a calculation of descriptive statistics to summarize characteristics of the participants and use of inferential statistics to test the study's hypotheses corresponding to each research question. First, the study used multiple linear regression analyses to predict participants' exercise habits based on perceived SSE habits and demographic variables, which yielded three regression models (i.e., the dependent variables in these models were the physical activity behaviors of participants, as measured by the IPAQ-SF, which included, total physical activity, vigorous physical activity, and moderate physical activity). Additionally, a multinomial logistic regression analysis was conducted to assess the odds of international students being in a higher physical activity level based on their family's and friends' perceived SSE habits. The independent variables for these analyses included demographic characteristics, family SSE habits, and friend SSE, whereas the dependent variables were each participant's physical activity level, as measured by the IPAQ-SF scale.

Second, multiple logistic regression was used to examine whether or not demographic variables were predictors of international college students' family and friend SSE habits. For this model a dummy variable was created with the value of "1" if the total family SSE habits was higher than friends' SSE habits and a value of "0" if friends' SSE habits was higher than family SSE habits (i.e., friends' SSE habits served as the reference variable). Independent variables included participants' demographic characteristics and the dependent variables were family's and friends' SSE habits. To determine statistical significance, probability level < .05 was used for all analyses.

RESULTS

Participant Characteristics: A total of 318 international college students (M age = 25.59, SD = 5.71) completed the full survey, of whom 56% (*n* = 178) were female, 69.5% (*n* = 221) had never been married, and 72.6% (*n* = 231) were graduate students. Additionally, most participants (84.6%) did not have any immediate family members (i.e., spouse, parents, children, and/or siblings) currently living with them. Their average stay in the US was 39 months (Table 1).

Table 1. Demographic Characteristics of Study Participants (*N* = 318).

	n	(%)
Gender		
Male	140	(44.0)
Female	178	(56.0)
Region of Origin		
South Asia	109	(34.3)
East Asia	99	(31.1)
Europe & North America	33	(10.4)
Middle East	26	(8.2)
Africa	28	(8.8)
South America	23	(7.2)
Currently Living with Immediate Family Members		
Yes	49	(15.4)
No	269	(84.6)
Academic Level		
Undergraduate	87	(27.4)
Graduate	231	(72.6)
Relationship Status		
Single and never married	221	(69.5)
Married	58	(18.2)
Single but cohabiting with a significant other	27	(8.5)
Separated	2	(0.6)
Divorced	1	(0.3)
Other	9	(2.8)
	Mean	SD
Age	25.59	5.71
Number of Months Spent in the U.S.	39.13	26.48

Physical Activity Habits: The results from the IPAQ-SF indicated that the average vigorous-intensity activity METs-min/week was 1556.6 (SD = 2092.1), moderate-intensity METs-min/week was 785.7 (SD = 1270.3), and walking METs-min/week was 1554.5 (SD = 1622.3). The average total score of physical activity behaviors METs-min/week was 3896.8 (SD = 3508.02). Participants' physical activity levels were categorized according to their MET-min/week count into three levels of physical activity: inactive (less than 600 MET-min/week), minimally active (between 600-2999 MET-min/week), and health enhancing physical activity (HEPA) (more than 2999 MET-min/week). A plurality of participants (47.5%; *n* = 151) were categorized as being in the health enhancing physical activity (HEPA) level. Additionally, 44% (*n* = 140) of survey responders were categorized as being minimally active, and 8.5% (*n* = 27) were categorized as being inactive. Additionally, scores obtained from the IPAQ-SF were used to calculate the percentage of participants who met the U.S. Department of Health and Human Services (HHS) 2018 Physical Activity Guidelines for Americans recommendation for aerobic activity (i.e., 150 minutes or more of moderate-intensity physical activity per week or 75 minutes of vigorous-

intensity physical activity or the equivalent combination) (38). Of the 318 participants, over a third ($n = 111$; 34.91%) did not meet these guidelines.

Social Support for Exercise Habits: The average total score of family SSE habits was 20.8 (SD = 9.33), whereas the average total score of friend SSE habits was 22.94 (SD = 9.01). A paired sample t-test was conducted to determine if there was a significant difference in the total score means of participants' family vs friend SSE habits. The results showed a significant difference in the average total score of SSE habits among participants, with friends' SSE habits being higher (M = 22.94, SD = 9.01) than family's SSE habits (M = 20.8, SD = 9.33), t (317) = 3.52; $p < 0.05$ (Table 2).

Table 2. Social Support for Exercise.

Variable	Mean	SD	t	p-value*
Family Support for Exercise Participation	20.8	9.33		
Friends Support for Exercise Participation	22.94	9.01	3.52	.0001*
Note. * $p < 0.05$				

Family and Friend Social Support for Exercise Habits: A multiple linear regression analysis was calculated to predict participants' exercise habits (i.e., total physical activity MET count, vigorous physical activity, and moderate physical activity) based on perceived SSE habits (i.e., for both family and friends) and demographic variables (i.e., region of origin, gender, age, academic level, family status, and time spent in the US). This analysis yielded three regression models.

First, a significant regression equation was found, with participants' region of origin, academic level, and friends' SSE emerging as significant predictors of total physical activity behaviors. Friends' SSE (i.e., ranging from 5 to 50) was positively associated with higher total physical activity MET counts. Second, a significant regression equation was found, with participants' region of origin, academic level, and friends' SSE emerging as significant predictors of vigorous physical activity behaviors. Friends' SSE was positively associated with higher vigorous physical activity MET counts. Finally, a significant regression equation was found, with participants' region of origin and friends' SSE emerging as the only statistically significant predictors of moderate physical activity behaviors. Friends' SSE was positively associated higher moderate physical activity MET counts. A complete breakdown of the regression results for demographic and perceived SSE predictors of physical activity behaviors are presented in Table 3.

Table 3. Demographic and Social Support Predictors of Participants' Physical Activity Behaviors.

Variable	Model 1 (Total PA MET Count)			Model 2 (Vigorous MET Count)			Model 3 (Moderate MET Count)		
	B	SE	*P*-value	*B*	SE	*P*-value	*B*	SE	*P*-value
Family SSE	30.9	22	0.16	8.8	13.3	0.51	2.7	8.2	0.74
Friends SSE	81.1	22.5	< .001***	39.1	13.6	0.004**	22.7	8.4	0.007**
Gender	-233.3	386.5	0.55	109.7	232.8	0.65	-89.6	144.5	0.54
Age	-1.9	46.3	0.97	12.82	27.9	0.64	0.09	17.3	0.99
Academic Level	-1115.3	486.7	0.02*	-635.8	293.1	0.03*	-10.6	181	0.95
Family Status	-212	629.6	0.74	-55.5	379.2	0.88	-419.5	235.4	0.08
Time Spent in the US	4.7	7.7	0.54	5.9	4.6	0.20	1.3	2.9	0.66
Region of Origin									
East Asia	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Middle East	1533.0	774.8	0.04*	1059.7	466.7	0.02*	147.8	289.7	0.61
Africa	2021.4	748.2	0.007**	311.2	450.7	0.49	973.5	279.8	< .001***
South America	1019.3	793.7	0.2	556.1	478.1	0.25	129.02	296.8	0.66
South Asia	1457.3	480.7	0.003**	422.2	289.5	0.15	218.1	179.7	0.23
Europe and North America	3255.5	671.6	< .001***	1910.01	404.5	< .001***	617.3	251.1	0.01*
Intercept	2689	1966.7	0.17	457.6	1184.5	0.7	833.03	735.3	0.26
R²	.141			.125			0.085		
Adjusted *R²*		0.11			0.0902			0.05	
F		4.2***			3.62***			2.36**	

Note. *p < .05. **p < .01. ***p < .001; B= adjusted multiple linear regression coefficients; SE= standard error; SSE= social support for exercise; PA= physical activity; MET= Metabolic Equivalent of Task.

Social Support Predictors of Participants' Physical Activity Level: A multinomial logistic regression analysis was conducted to assess the odds of international students' physical activity levels (i.e., inactive, minimally active or health enhancing physical activity "HEPA") and their families' and friends' SSE. According to the Nagelkerke *R²* statistic, the model explained 10.3% of the variance in participants' physical activity levels and their families' and friends' SSE (12). Participants' friends' SSE emerged as the only statistically significant predictor of this model. Friends' SSE significantly increased participants' likelihood of HEPA compared to inactivity. A complete breakdown of the regression results for demographic and perceived SSE predictors of physical activity level are presented in Table 4.

Table 4. Multinomial logistic regression for Demographic and Social Support Predictors of Participants' Physical Activity Level.

Variable	(Inactive vs. Minimally Active)			(Inactive vs. HEPA)		
	B	SE	*P*-value	*B*	SE	*P*-value
Family SSE	003	0.02	0.8	0.013	0.02	0.6
Friends SSE	0.046	0.03	0.12	0.075	0.03	0.01*
Gender	0.15	0.45	0.74	0.43	0.45	0.35
Age	0.02	0.051	0.75	0.01	0.052	0.92
Academic Level	-0.67	0.66	0.31	-1.17	0.66	0.08
Family Status	0.19	0.67	0.78	0.13	0.68	0.85
Time Spent in the US	0.002	0.009	0.86	0.004	0.009	0.63
Region of Origin						
East Asia	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Middle East	-0.83	0.83	0.32	0.013	0.85	0.99
Africa	-0.62	0.81	0.44	0.43	0.82	0.60
South America	0.77	1.13	0.50	0.68	1.18	0.57
South Asia	-0.46	0.56	0.40	0.61	0.57	0.29
Europe and North America	-1.25	0.83	0.13	0.77	0.78	0.32
Intercept	1.44	2.23	0.61	0.37	2.26	0.87

Note. *$p < .05$. **$p < .01$. ***$p < .001$; *B* = adjusted multinomial regression coefficients; SE = standard error; HEPA = health enhancing physical activity, SSE= social support for exercise.

Demographic Predictors of Family vs. Friend Social Support for Exercise Habits: A multiple logistic regression analysis was used to examine if demographic variables were predictors of international college students' family and friend SSE habits. According to the Nagelkerke R^2 statistic, the model explained 15.8% of the variance in family vs. friend SSE (12). Participants' family status (i.e., currently living with immediate family members) emerged as the only statistically significant predictor of this model. Participants' family status significantly decreased someone's likelihood of having higher friends' SSE. A complete breakdown of the regression results for demographic and perceived family vs. friend SSE predictors are presented in Table 5.

Table 5. Demographic Predictors of Family vs. Friend Social Support for Exercise.

Variable	Family SSE Vs. Friend SSE 95% CI for odds ratio (OR)		
	aOR	Lower	Upper
Gender	0.73	0.42	1.02
Age	1.1	0.996	1.15
Academic Level	0.7	0.36	1.34
Family Status	0.21*	0.08	0.52
Time Spent in the US	0.99	0.98	1.01
Region of Origin			
East Asia	Ref.	Ref.	Ref.
Middle East	0.45	0.14	1.34
Africa	0.41	0.12	1.23
South America	0.78	0.27	2.18
South Asia	0.74	0.39	1.40
Europe and North America	0.40	0.13	1.02
Intercept	10.7	0.77	162.01

Note. *$p < .05$.; aOR = adjusted odds ratio; CI = confidence intervals; SSE = social support for exercise

DISCUSSION

Using the IPAQ-SF, we formed a physical activity profile by measuring participants' exercise behaviors. Less than half of the participants (47.5%; $n = 151$) were categorized as being at the health enhancing physical activity (HEPA) level, 44% ($n = 140$) were categorized as being minimally active, and 8.5% ($n = 27$) were categorized as being inactive. Additionally, about two-thirds of participants met the U.S. HHS 2018 Physical Activity Guidelines for Americans for aerobic exercise (38). These figures are consistent with the American College Health Association's national college survey that indicated 67.6% of college students met the physical activity guidelines for adults, a percentage slightly higher than the current study's findings among international students (i.e., 65.09%) (3). These results also are consistent with previous research and demonstrate the broader problem of physical inactivity trends among college students (which includes international students) in institutions across the United States (3, 7, 42).

This study also highlighted the different roles that participants' families' and friends' social support can play in either promoting or impeding their health behaviors (i.e., relating to physical activity). The findings indicated that friends' SSE was positively associated with higher moderate activity, vigorous activity, and total physical activity METs-min/week counts. That is to say, having friends who more strongly support healthy exercise habits might promote international students to adopt more physical activity behaviors. Additionally, participants' friends' SSE was a significant predictor of physical activity level (i.e., inactive, minimally active, and health enhancing physical activity or "HEPA"), implying that having friends who strongly support exercise might increase international students' likelihood of engaging in health enhancing physical activity. In other words, social support—specifically friends' SSE—is an important predictor of international college students' physical activity behaviors.

These findings, too, are consistent with previous research suggesting social support factors play an important role in shaping college students' physical activity behaviors. Researchers have reported that college students with high levels of social support are more likely to meet physical activity recommendations for adults (i.e., 150 min of the physical activity per week) and report engaging in more healthy physical activity behaviors (6, 15, 23). Our study found that participants currently living with their families were less likely to have higher friend SSE. This disparity may be due to students' family obligations that can limit interactions with their friends' social networks. One of these obligations might be parenthood. Previous research indicated that having a child significantly decreases physical activity among young parents (20). Although both family and friend support contribute to physical activity behaviors, friend support was shown to have a stronger effect (6). Similarly, friend SSE was also shown to be a significant predictor of positive physical activity behaviors in the present study.

Friends' SSE can also help in cross-cultural transition and acclimation into the US culture (1, 2, 28). The relationship between social support networks and physical activity behaviors among international students can be viewed as a reciprocal relationship: by engaging in physical activity and group sport activities, international students can develop and strengthen their social interactions and social networks, and having a supporting network of family and friends (i.e., especially friends) can similarly motivate individuals to engage in more positive physical activity behaviors. Thus, social support—specifically friends' SSE—is an important factor that needs to be considered by program planners as they develop intervention programs for the promotion of healthy physical activity behaviors among international college students.

Finally, it is important to note that social support is just one part of the puzzle that needs to be considered, and multiple other factors help to determine the physical activity behaviors of college students (15, 23, 33). Additionally, in our study, participants' gender and age were not associated with physical activity behaviors, a finding inconsistent with previous research. Researchers have reported that male college students tend to participate in more leisure and vigorous physical activities than female students (5, 15, 41) and that students older than 30 years old are less likely to engage in vigorous activities than those who are younger than 30 years old (27, 34). To change and improve college students' physical activity behaviors, it is important to understand the different levels of determinants relating to students' physical activity behaviors using a socio-ecological perspective. One of these levels deals with environmental/policy factors which also need to be considered when developing health behavior change interventions. Our findings indicated that having a supporting network can motivate individuals to engage in more positive physical activity behaviors. Colleges can implement polices during orientation that aim to inform and connect international students to different student groups or local organizations that can help them maintain or improve their physical activity behaviors (e.g., sport groups, international student clubs, local gyms and fitness organizations).

Limitations: Some limitations should be considered when interpreting the findings from this study. The method of nonprobability sampling technique used in this study limits the generalizability of the findings. Also, recruiting students from different institutions can be a

limitation itself, due to possible differences in students' environments and university policies in each university. Given that participation in the study was voluntary, and random assignment methods were not used, some differences may exist between respondents and non-respondents. However, a review of the findings relating to participants' countries of origin indicated that demographic characteristics of the participants were consistent with those published by national institutions such as the Institute of International Education (21). Additionally, recall bias is another potential limitation. The study survey asked participants to recall their exercise habits for the last week, and thus it is possible some participants may have inflated/misrepresented their actual physical activity behaviors. Finally, international students with less understanding of English may have not fully understood the questions and instructions of the survey, which would result in data collection inaccuracies and reduce the internal validity of the study. However, most participants (86.1%) reported English fluency, thus minimizing this concern. Future research dealing with the same population should consider including multiple language options to ensure participants understand the survey and its instructions.

Recommendations: The current study highlights the important roles social networks (i.e., family and friends' social support) play in influencing individuals' health behaviors. Based on the findings of the study, we can recommend a few suggestions for future research to improve physical activity among international students. First, psychosocial factors, such as social support networks, need to be considered when developing health promotion programs. This is especially true when dealing with international students, who have been shown repeatedly to be negatively impacted by social isolation in their transition to academic life in the United States (1, 9, 19, 42). College wellness programs should consider developing and promoting programs that indirectly increase positive health behaviors by focusing specifically on the enhancement of psychosocial factors (e.g., social support) rather than direct promotion of health habits (16). Addressing social support networks is critical in developing health intervention programs that can promote the health of students on campus. Second, the study's findings indicate that friends' support for exercise has a positive association with physical activity behaviors. Friends' social support for exercise can also have a reciprocal relationship and help students in their cross-cultural transition and the acclimation into United States culture (1, 2, 33). Using international student organizations to identify and engage social support networks can help practitioners motivate students to engage in positive physical activity behaviors. Furthermore, members of these organizations should be included in the program planning process both to promote community buy-in of the programs and to ensure program materials and strategies are culturally competent. Lastly, these student groups can use social media platforms (e.g., Twitter, Instagram, Facebook, WhatsApp, and YouTube), many of which they are already likely using, to supplement their in-person events to disseminate information and motivate students to improve their health behaviors (25, 39). Third, researchers should develop interventions that can improve physical activity behaviors in this subset of the student population that can be formally evaluated for effectiveness. Having evidence-based, culturally-tailored interventions can give college health organizations the rationale to implement interventions that can both directly and indirectly impact physical activity and improve overall student health. Fourth, universities and college wellness programs need to consider developing policies that aim to help and guide international students in adopting healthy physical activity behaviors during their transition to

life in the US. These policies can include simplification of communication between international students and colleges that can help students connect to different organizations to ultimately assist them in improving their physical activity behaviors. Finally, future research should employ longitudinal approaches to examine changes to physical activity and social support throughout international students' transition to the US, and by using qualitative research methods, researchers can better understand the mechanisms underlying these changes. Collectively, this additional research can inform interventions and policies to ensure international students remain active.

Conclusions: Despite an increasingly large international student population in US universities, there is limited research on the influence of social support on international student health. Understanding how family and friend social support functions for international students' physical health is important when developing tailored and culturally appropriate interventions that promote positive physical activity behaviors. Our study highlights the important roles of social networks in influencing international students' health behaviors related to physical activity. Given that friends' SSE was positively associated with physical activity behaviors, it is possible that this relationship can be also be reciprocal, i.e., that increased opportunity for physical activity can help students in their cross-cultural transition and acclimation into US culture (1, 2, 28).

Engaging in group physical activities, such as sports with friends, can help international students develop and strengthen their social networks, which can, in turn, help motivate them to engage in more positive physical activity behaviors. One way this reciprocal relationship can be developed and nurtured is through international student organizations and student clubs. Many international students rely on student organizations to help them establish social networks with other students from their nations or from other cultures. The existing networks within these student organizations can be leveraged to help implement health behavior change programs that aim to improve physical activity by motivating students to engage in positive physical activity behaviors.

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