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The International Friendly Campus Scale: Development and psychometric evaluation



Kenneth T. Wang*, Feihan Li, Yuting Wang, Elizabeth N. Hunt, Grace C. Yan, David E. Currey

University of Missouri, Columbia, MO, USA

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ABSTRACT

The International Friendly Campus Scale (IFCS) was developed with a sample of 501 international students. The 18-item IFCS includes five subscales: International Center Services ($\alpha = .85$), Social Engagement ($\alpha = .70$), Academic Support ($\alpha = .84$), Identification with Institution ($\alpha = .86$), and Campus Discrimination ($\alpha = .75$). The factor structure was examined and cross-validated with two randomly split samples. Moreover, multigroup confirmatory factor analyses results indicated measurement and structural invariance of the IFCS between men and women. The construct validity of the IFCS was supported by its associations with life satisfaction, positive affect, negative affect, social connection with mainstream society, academic stress, and two forms of discrimination (i.e., racial/national and language) in the expected directions. Moreover, the IFCS total score and four subscale scores added significant incremental variance in predicting life satisfaction over and above positive and negative affect. The initial psychometric evaluation indicates that the IFCS is a promising measure that could be further used to assess the international friendliness of university campuses.

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The number of international students studying in the United States (U.S.) has grown dramatically over the past few decades as the U.S. has undergone economic challenges. As a result, international students have been a source of financial support for U.S. higher education institutions. One admissions official at a public university described this influx of international students as “pretty much revenue-driven” because the “the domestic market is just not as large as the international market” (McMurtrie, 2011). To illustrate, international students contributed over \$24 billion through tuition and daily expenses to the U.S. economy during the 2012–2013 academic year (Institute of International Education, 2013). Therefore, many institutions have invested more heavily in recruiting international students while also developing international collaborations to increase the enrollment of international students (Rovai & Downey, 2010). In addition, the growing number of international students has contributed to the globalization of U.S. campuses and has provided a more diverse experience for U.S. students (Leask, 2009).

Despite the cultural diversity international students bring, this group faces a variety of challenges in adjustment. Misra, Crist, and Burant (2003) identified three major areas of challenges that international students encounter—academic,

* Corresponding author at: Department of Educational, School, and Counseling Psychology, 16 Hill Hall, Columbia, MO 65211, USA.
Tel.: +1 573 882 9246; fax: +1 573 884 5989.

E-mail addresses: wangk@missouri.edu, kennethwang@gmail.com (K.T. Wang), fly2@mail.missouri.edu (F. Li), ywm9b@mail.missouri.edu (Y. Wang), enhf3d@mail.missouri.edu (E.N. Hunt), yanc@missouri.edu (G.C. Yan), currey@missouri.edu (D.E. Currey).

emotional and social difficulties. Other researchers have reported that international students also experience difficulties in adjusting to cultural differences, language challenges, and the U.S. educational system (Olivas & Li, 2006). Poyrazli and Grahame (2007) indicated that students' ability to adjust does not simply depend on the individual, but also the environment students are in. They suggested using an ecological framework (Bronfenbrenner, 1979) to understand the well-being of international students and stress the responsibilities of institutions in providing resources and support.

Bronfenbrenner's (1979) ecological model emphasizes on the evolving systemic process of interaction between the human and the environment. Therefore, when people transition across cultural contexts, it is important to understand how individuals with different cultures derive meaning from or make sense of their environmental contexts. Institutions of higher education need to constantly evaluate the context into which they recruit and educate international students, especially during this period of rapid increase of international student enrollment. It is insufficient to focus solely on individual concerns. Attention must be given to different aspects of the social system that foster or inhibit these students' adjustment. More specifically, a basic issue that universities should consider is the capacity with which a campus can accommodate students without compromising their experiences as well as the quality of their education. Moreover, an issue more salient than logistical considerations is the reactions of faculty, staff, and domestic students to the influx of international students. It is also imperative to consider whether campuses can foster an international friendly environment that results in positive experiences for these students. In other words, there is a need to provide a positive learning and living experience for these students beyond offering admission to study in the US.

Although most of the studies examining international students have focused on how individual characteristics (e.g., self-esteem, language proficiency, personality) are associated with their adjustment outcomes (e.g., Wang et al., 2012), acculturation and cross-national models (e.g., Berry, 1997; Heppner, Wang, & Heppner, 2012) have also highlighted the importance of environmental factors. In Berry's model, he emphasized that acculturation is a two-way process between international students and their host society. For example, social support and societal attitudes were listed among factors that moderated one's acculturation experiences in Berry's model. Heppner et al. noted the level of support or hostility of the immersion environment and relationships within the host culture as factors influencing one's development of cross-national cultural competency. In addition, other acculturation-related models [e.g., Interactive Acculturation Model (IAM; Bourhis, Moise, Perreault, & Senecal, 1997), Multidimensional Individual Differences Acculturation Model (MIDA; Safdar, Lay, & Struthers, 2003), Concordance Model of Acculturation (CMA; Piontkowski, Rohmann, & Florack, 2002), Relative Acculturation Extended Model (RAEM; Navas et al., 2005)] have all emphasized the host society's role in the acculturation of individuals. More specifically, the IAM accentuates government's role on immigrants' acculturation process; the MIDA includes social support from out-group as a dimension, the CMA outlines four concordance outcomes (consensual, culture-problematic, contact-problematic, and conflictual), based on match or mismatch between host and migrant acculturation attitudes; and the RAEM depicts several sociocultural domains across the acculturation attitudes preferred and adopted by the host and immigrant interaction. Many of these models were developed focusing on immigrant populations, which have similarities and differences to international students. Thus, limitations may exist on their generalizability to international students, but it also highlights the need for more research addressing the international student population. In sum, the climate of campus environments cannot be overlooked when studying the adjustment of international students.

Campus climate, an important social environmental factor that has an impact on students' university experiences, has been defined broadly by scholars. Cress (2002) focused on the interpersonal interaction aspect of campus climate to distinguish it from campus culture. Rankin and Reason (2008) defined campus climate as the current attitudes, behaviors, standards, and practice that employees and students have in an institution, which are usually linked to specific social groups. Many researchers conceptualized campus climate as a multidimensional concept (Hurtado, Milem, Clayton-Pedersen, & Allen, 1998; Merson, 2012; Peterson & Spencer, 1990). Hurtado et al. suggested four dimensions of campus climate, which included institutional historical legacy, structural diversity, psychological climate, and behavioral dimensions. Based on Hurtado et al.'s study, Hutchinson, Raymond, and Black (2008) further confirmed that a multidimensional model of campus climate consists of psychological and behavioral dimensions that apply to undergraduate and graduate students across race and gender.

Besides its multidimensionality, campus climate has also been measured by researchers with various cultural identity domains, such as gender, race/ethnicity, and religion (e.g., Harwood, Hunt, Mendenhall, & Lewis, 2012; Park, 2012; Vaccaro, 2010). For example, a campus climate assessment instrument was developed by Rankin (1998) and further used to evaluate the campus climate perceived by students from different racial groups (Rankin & Reason, 2005). In addition, Yost and Gilmore (2011) conducted an LGBTQ campus climate survey to examine how the campus climate influenced LGBTQ students' academic performance. In their study, LGBTQ campus climate was assessed through the prejudice LGBTQ students perceived from others as well as the campus and classroom environment they experienced. Moreover, factors like education satisfaction, perception of discrimination, and racial conflict were measured by other researchers to learn more about campus climate for deaf students (Parasnis, Samar, & Fischer, 2005).

Despite the diverse campus climate studies, there is a lack of empirical data that examined campus climate for international students. Phongsuwan (1997) indicated that international students' communicative language ability contributed to their satisfaction of campus climate. However, there is little research focusing on how external factors influence the campus comfort level of international students. No published measure was found to evaluate the international friendliness of campuses.

Outside of research scholars, university officials have attempted to assess campus climate for international students. For example, Purdue University's Division of Student Affairs assessment team conducted several surveys to investigate international students' first year college experiences (Zehner, 2012). They found that international students reported lower satisfaction with and commitment to the university compared to U.S. students. Campus services and co-curricular activities were more difficult for international students to approach. Physical safety was another concern for international students, especially women. Based on these findings, the report suggested increasing attention given to the needs of international students and improving services from international programs and organizations. Thus, there appears to be a significant and urgent need for a measure to evaluate the external environment that influence international students' experience, which could assist universities with providing a more friendly campus for international students.

To determine the dimensions of campus climate related to international students, we conducted a literature review of measures that assessed campus climate related to various cultural dimensions (e.g., race, sex, social class, religion, sexual orientation, disability), challenges that international students encounter during their studies, and items from needs assessment of International Student and Scholar Services (ISSS) offices. Discrimination, a factor significantly and negatively related to students' perceptions and experiences with campus environment (Vaccaro, 2010; Worthington, Navarro, Loewy, & Hart, 2008), was most commonly linked with campus climates. Discrimination at an institutional level can be understood as one that engenders negative behaviors that prevents disfavored groups from accessing the same privileges afforded to others (Hanassab, 2006). In university settings, hostile campus environments impact international student adjustment as well as their psychological health (Hanassab, 2006). Research indicates that international students experience some level of discrimination in their interactions with faculty, staff, and students (Wei, Wang, Heppner, & Du, 2012).

In addition to discrimination, several factors can be seen as positive indicators of a friendly campus environment particularly for international students. One factor, sense of belongingness, is proved to be positively associated with students' experiences of diverse campus community (Nuñez, 2009). Social connection is also considered an important aspect that impacts the establishment of international friendly campus climate. Santos, Ortiz, Morales, and Rosales (2007) suggested that interactions and relationships with diverse peers contribute to students' positive experiences with campus environment. Academic support is another factor that is relevant to an international friendly campus climate. Students expressed that interaction with same-racial faculty, diverse curriculum, and safe class environment help provide a positive campus experience (Maramba, 2008). The last dimension is the university international student and scholar services. As Costa's (1997) research reported, student affairs administrators and services play a key role in fostering campus climate. Based on the literature review, we focused on five dimensions—Campus Discrimination, Identification with Institution (belongingness), Social Engagement/Connection, Academic Support, and International Center Services—as we developed a measure of campus climate for international students.

1. The current study

Clearly, there is the need for a way to measure campus climate for international students to better equip universities and professionals to foster environments that respect international diversity and actively seek to demonstrate their commitment (Altekruse, Harris, & Brandt, 2001). Therefore, the goal of this study is to develop a measure assessing the friendliness of campuses toward international students. Within the goals of developing this International Friendly Campus Scale (IFCS), we also identified different important dimensions related to international friendly campuses. Essentially, we hope this scale will have the potential to provide data to assess and inform campuses the areas of friendliness and lack thereof, and consequently reframe the burden of acculturation from solely on international students to their interactions with the institution environment.

To examine the construct validity of this scale, we incorporated measures of subjective well-being (i.e., life satisfaction, positive affect, and negative affect) in this study. We anticipated that students who perceive a friendlier campus environment would report higher life satisfaction, stronger positive affect, and lower negative affect. We further established the IFCS's validity through examining its correlations with conceptually linked constructs, such as social connectedness with mainstream society, academic stress, language discrimination, and racial/national discrimination. We hypothesized a friendlier perception of campus climate to be associated with a stronger sense of connectedness with mainstream society, and lower academic stress and discrimination.

2. Method

2.1. Participants

The sample of this study consisted of 501 international students (250 men, 249 women, 1 transgender, 1 did not report) from a large public university in the Midwest of the U.S. The students came from 65 different countries of origin: 42% were from China, 9% were from India, 7% were from South Korea, 4% were from Vietnam, and the remainder from 61 other countries. This sample was representative of the international student population of the institution where students from China consisted of 49%, India 7%, South Korea 9%, and Vietnam 3%. The majority (77%) were graduate students; the remaining participants were undergraduates and non-degree students. Engineering (31%), Arts and Science (23%), Agriculture, Food and Natural Resources (9%), Education (8%), and Journalism (8%) were among the most pursued majors. Participants' mean

age was 27.10 ($SD = 5.92$). These students had lived in the U.S. for an average of two years and nine months and had been at the current university for an average of a year and 11 months.

2.2. Item development process

Several steps were employed in the process of developing the item pool for the International Friendly Campus Scale. First, an initial meeting was held by an international faculty researcher, an ISSS director, and an ISSS staff who was in charge of assessing ISSS service satisfaction and international student needs. Five initial themes (i.e., ISSS unique services, social connection, identification with university, community climate, and academic support) emerged from the discussion with the goal of assessing (a) student academic and life adjustment, (b) student satisfaction, (c) ISSS services, (d) campus community. Following the meeting, our research team, which consisted of the international faculty and three international students, conducted a thorough literature review of the existing scales measuring campus climate.

Based on the summary of findings from the literature review, the research team modified the initial five themes from the meeting among the international faculty researcher, ISSS director and staff, and generated an initial item pool with 40 items on five modified dimensions: International Center Services, Social Engagement, Academic Support, Identification with Institution, and Campus Discrimination. The initial items were submitted to a panel of two doctoral international students in psychology and an ISSS advisor with a psychology background to examine the content validity. The expert reviewers were asked to examine the items on clarity and item-domain fit. After modifying the items based on the review results, the scale was piloted with ten international students. We refined the items based on the feedback from the pilot study, which resulted in a final item pool of 43 items on five domains.

Initial International Friendly Campus Scale (IFCS-Initial). The IFCS-Initial included 43 items that assessed the perceived friendliness of college campuses toward international students. Each item was rated on a 6-point Likert scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). The instructions to participants were: *Please read the following items and rate how much they fit with your experiences of being an international student at [University Name].*

2.3. Other measures used to examine validity

Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985). The SWLS includes 5 items that measure the general level of satisfaction with life. Each item was rated on a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Cronbach alphas ranged from .77 to .86 among international students (Wei, Wang, & Ku, 2012). The SWLS has been translated into many languages and widely used with adequate construct validity across nations (e.g., Abdallah, 1998; Clench-Aas, Nes, Dalgard, & Aarø, 2011; Ye, 2007).

Positive and Negative affect schedule (PANAS; Watson, Clark, & Tellegen, 1988). The PANAS assesses positive and negative activation including words to assess positive affect (PA; enthusiastic, interested, determined, excited, inspired, alert, active, strong, proud and attentive) and negative affect (NA; scared, afraid, upset, distressed, jittery, nervous, ashamed, guilty, irritable, and hostile). Each item was rated on a 5-point Likert scale ranging from 1 (*very slight or not at all*) to 5 (*extremely*). Cronbach alphas ranged from .83 and .90 for PA and from .84 to .93 for NA (Watson et al., 1988). NA was found to be significantly correlated with both anxiety and depression scales, while PA was found to have a weak negative association with depression (Lim, Yu, Kim, & Kim, 2010).

Inventory of College Challenges for Ethnic Minority Students (ICCEMS; Ying, Lee, & Tsai, 2004). The ICCEMS assesses the challenges faced by ethnic minority college students across a range of domains including cultural, academic, social, and practical. Only the Academic Demands (3 items) and Difficulty with Academic Expression subscales (2 items) were used in this study. Each item was rated on a 5-point Likert scale ranging from 1 (*not at all*) to 5 (*all the time*). The Cronbach alpha coefficients were .71 for academic demands and .74 for difficulty with academic expression for the sample of Asian American students (Ying et al., 2004). Both academic demands and difficulty with academic expression have significant positive correlations with depression and negative correlations with self-esteem (Ying et al., 2004).

Acculturative Stress Scale for International Students (ASSIS; Sandhu & Asrabadi, 1994). The ASSIS measures acculturative stress of international students and consists of seven subscales. Only the Perceived Discrimination (8 items) subscale was used in this study to measure racial/national discrimination experienced by international students. Each item was rated on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Cronbach alphas for the Perceived Discrimination scores was .93 among a Chinese international student sample (Wei, Wang, & Ku, 2012). Construct validity of the Perceived Discrimination scores have been supported by positive associations with general stress and posttraumatic stress symptoms (Wei, Wang, & Ku, 2012).

Perceived Language Discrimination Scale (PLD; Wei, Wang, & Ku, 2012). The PLD includes 7 items to measure the perceived language discrimination that international students encounter. Participants completed the measure with a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The Cronbach alpha was .94 for international students. The PLD has been found to have significant positive correlations with depression, anxiety and perceived racial discrimination, as well as negative correlations with self-esteem, life satisfaction and perceived English proficiency (Wei, Wang, & Ku, 2012).

Social Connectedness in Mainstream Society Scale (SCMN; Yoon, 2006). The SCMN is used to assess the sense of connection, belonging, and closeness to Americans in the U.S. society (Yoon & Lee, 2010). Participants responded to each item

using a 7-point Likers scale, ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Cronbach alpha was .89 among Asian international students. The scale demonstrated convergent validity through a significant positive correlation between SCMNI and acculturation (Yoon, Jung, Lee, & Felix-Mora, 2012).

2.4. Procedure

An email was sent to all international students studying at the university through the international center. Two reminder emails were sent approximately two weeks apart after the initial email. The online survey was presented in English. To minimize the time needed complete the survey, as a way to enhance participation, we provided three different sets of measures: (a) IFCS, SWLS, and PANAS, (b) IFCS, SCMNI, and PLD, and (c) IFCS, ASSIS, ICCEMS. Participants were randomly assigned to complete one out of the three sets and were offered the opportunity to raffle for two \$50 and four \$25 gift cards. Each set of survey included two validity check items (e.g., *Please simply select [Strongly Disagree] for this item*). Only participants that correctly responded to both validity check items were included in the sample of this study.

3. Results

Our sample was randomly divided into two subsamples to conduct factor analyses. The first sample ($N = 250$) was used for exploratory factor analysis (EFA) to select the scale items. The second sample ($N = 251$) was used for confirmatory factor analyses (CFA) to cross-validate the factor structure results from the EFA. The reliability and validity analyses were conducted with the full sample.

3.1. Item selection – exploratory factor analysis

We first conducted exploratory factor analyses (EFA) for item selection with sample 1 ($N = 250$). The Kaiser–Meyer–Olkin measure of sampling adequacy for the initial EFA was .93, and Bartlett's test of sphericity [$\chi^2(903) = 6536.00, p < .001$] indicated that the correlation matrix was appropriate for factor analysis. To determine the number of factors, we conducted a parallel analysis and scree plot. Parallel analysis was conducted by comparing initial eigenvalues of this sample with those generated through random data, and suggested a four-factor solution. Scree plot suggested a five-factor solution, which was the same as the amount of categories we used in developing the scale item pool. We thus conducted principal axis factor analyses on the 43 items with four- to six-factor solutions using both orthogonal (Varimax) and oblique (Promax) rotations. The most interpretable solution was a five-factor oblique-rotation solution. The five factors were generally consistent with the five categories used when developing the item pool: International Center Services, Social Engagement, Academic Support, and Identification with Institution, and Campus Discrimination. Among the 43 items tested, 18 were selected based on the following criteria: (a) factor loadings greater than .40 (Netemeyer, Bearden, & Sharma, 2003), (b) cross-loading less than .30, (c) consistency between factor and item category, and (d) no more than four items representing each factor given the goal to develop a brief measure (Tabachnick & Fidell, 2007). Another EFA using principal factor was conducted with the 18 selected items. A five-factor solution accounted for 66.65% of the total variance explained before rotation. After the oblique rotation all factor loadings exceeded .40 on the respective factor, and no item had a cross-loading over .30 on another factor. Each of the items representing the five factors and their factor loadings, communality estimate, mean, and standard deviation are presented in Table 1.

3.2. Cross-validation – confirmatory factor analysis

Confirmatory factor analysis (CFA) was conducted with sample 2 ($N = 251$) using Mplus 7 to cross-validate the measurement qualities of the IFCS based on the principle-axis factor analysis results. The CFA model constrained the 18 IFCS items to load onto their corresponding factors based on the EFA results. The five factors were permitted to correlate with one another. The range of standardized factor loadings were: .69 to .81 for International Center Services, .51 to .72 for Social Engagement, .70 to .93 for Academic Support, .81 to .85 for Identification with Institution, and .52 to .78 for Campus Discrimination. The fit statistics for this model were: $SBS\chi^2(125, N = 251) = 178.93, p = .002, CFI = .97, SRMR = .05, RMSEA = .04$ (90% Confidence Interval .03–.06). Based on the general guidelines (Hu & Bentler, 1999), the CFI, SRMR, and RMSEA all indicated good data to model fit.

3.3. Invariance across genders

Next, we conducted a multiple-group CFA to examine measurement and structural invariance between men and women using a forward (sequential constraint imposition) approach based on Dimitrov's (2010) guidelines (see Table 2). The first step involved establishing configural invariance by examining models for each group separately. Results indicated good fit for both groups [men: $SBS\chi^2(125, n = 125) = 184.93, p < .001, CFI = .93, RMSEA = .06, SRMR = .07$; women: $SBS\chi^2(125, n = 125) = 172.45, p = .003, CFI = .95, RMSEA = .06, SRMR = .05$]. Measurement invariance was examined next, which involved first establishing a baseline model (Model 0: Unconstrained Model), and then testing for equal factor loading across groups (Model 1: Invariant Factor Loadings Model), equal item intercepts across groups (Model 2: Invariant Factor Loadings and Intercepts Model),

Table 1
Summary of pattern matrix for principle axis factoring/promax rotation of ICFS Items.

		Factor loadings					h^2	M	SD
		1	2	3	4	5			
International Center Services									
3.	The International Center has helped my transition in [univ].	.87	-.02	.04	-.04	-.09	.70	4.66	1.11
7.	The International Center continues to improve on serving international students.	.77	.01	-.06	.06	.00	.60	4.77	.88
2.	Compared to other student services on campus, the International Center gives special consideration to the characteristics of international students.	.74	.05	.03	-.01	.05	.58	4.92	.98
9.	The International Center is a safe/comfortable place for me.	.48	-.12	-.07	.11	.21	.52	4.92	.99
Campus Discrimination									
8.	I am treated differently or unfairly at [univ] because of being an international student.	.01	.92	-.01	.07	.06	.74	2.29	1.18
4.	I feel as though I am treated as less intelligent at [univ] because of being an international student.	.07	.70	.01	-.06	-.06	.53	2.33	1.24
10.	I hear people at [univ] make insensitive or degrading remarks about international students.	-.06	.62	.11	.10	-.08	.37	2.77	1.36
13.	Compared to American students, I don't have equal access to resources and opportunities at [univ].	-.03	.54	-.18	-.04	.15	.35	2.64	1.49
Academic Support									
16.	Faculty members here are willing to give helpful academic advice to international students.	-.02	.04	1.01	-.10	.05	.93	4.99	.97
17.	I feel comfortable discussing academic issues with faculty here when needed.	-.06	.00	.72	.12	.00	.57	4.87	1.08
18.	Faculty members here make a real effort to understand difficulties international students may have with their academic work.	.18	-.13	.49	.01	-.02	.43	4.50	1.20
Social Engagement									
12.	I have close friendships with American students at [univ].	-.09	-.12	-.07	.73	-.09	.45	4.18	1.35
5.	I am aware of helpful [univ] campus-sponsored programs for social engagements.	.11	.05	.00	.62	.00	.42	4.18	1.19
14.	I engage in social activities here at [univ].	-.09	.10	.08	.60	.16	.46	4.14	1.13
11.	I have close friendships with other international students at [univ].	.15	.11	.02	.54	-.14	.25	4.68	1.14
Identification with Institution									
1.	I like associating myself with [univ].	.00	.09	.03	-.12	.97	.76	4.98	.94
6.	I am proud to be a [univ] student.	.04	-.03	.00	-.01	.77	.64	4.94	.96
15.	I am satisfied with my overall experiences at [univ].	-.03	-.21	.04	.22	.50	.64	4.67	.98

Note. Final 18 ICFS items. Unique factor loadings > .40 are in bold. $N = 250$ participants. Factor 1 = International Center Services; Factor 2 = Campus Discrimination; Factor 3 = Academic Support, Factor 4 = Social Engagement, Factor 5 = Identification with Institution; h^2 = item communalities at extraction. Each item is rated on a 6-point Likert Scale (1 = strongly disagree, 2 = disagree, 3 = slightly disagree, 4 = slightly agree, 5 = agree, 6 = strongly agree). The instructions to participants were: Please read the following items and rate how much they fit with your experiences of being an international student at [univ]. [univ] = the university that the participant attends.

and equal item error variances/covariances across groups (Model 3: Invariant Factor Loadings, Intercepts, and Residual Variances Model). Nested models were compared using Satorra-Bentler scaled chi-square difference tests. In Model 0 (M0), no parameters were constrained to be equal across groups (i.e., men and women). Factor loadings were constrained to be equal across groups in Model 1 (M1). A nonsignificant SBS $\Delta\chi^2$ difference between M1 and M0 [SBS $\Delta\chi^2(13) = 12.44, p = .49$] indicated that the factor loadings were invariant across the two groups. Both factor loadings and item intercepts were constrained to be equal across two gender groups in Model 2 (M2). The SBS $\Delta\chi^2$ between M2 and M1 was nonsignificant [SBS $\Delta\chi^2(13) = 8.04, p = .84$], indicating that the intercepts were also invariant across the two gender groups. Model 3 (M3) added constraints for residual item variances/covariances to be equal across genders. The nonsignificant SBS $\Delta\chi^2$ difference

Table 2

Testing for measurement and structural invariance across gender groups.

	SBS χ^2	df	M comp	SBS $\Delta\chi^2$	Δ df	CFI	RMSEA	SRMR
Male	184.93	125				.93	.06	.07
Female	172.45	125				.95	.06	.05
[M0] Unconstrained	357.57	250				.94	.06	.06
[M1] Loadings	370.50	263	M1–M0	12.44	13	.94	.06	.07
[M2] Loadings, Intercepts	379.75	276	M2–M1	8.04	13	.94	.06	.07
[M3] Loadings, Intercepts, Residual Variances	403.00	294	M3–M2	23.57	18	.94	.05	.07
[M4] Loadings, Intercepts, Factor Variances/Covariances	399.38	306	M4–M2	21.76	30	.94	.06	.09

Note. $N = 251$. M0: The Baseline Model (i.e., all parameters freely estimated). M1: The Invariant Factor Loadings Model (i.e., constraining all factor loadings to be equal across the two groups). M2: The Invariant Factor Loadings and Intercepts Model (i.e., constraining all factor loadings and intercepts to be equal across the two groups). M3: The Invariant Factor Loadings, Intercepts and Residual Variances Model (i.e., constraining all factor loadings, intercepts, and residual variances to be equal across the two groups). M4: The Invariant Factor Loadings, Intercepts and Factor Variances/Covariances Model (i.e., constraining all factor loadings, intercepts, and factor variances and covariances to be equal across the two groups).

between M3 and M2 [$SBS\Delta\chi^2(18) = 23.57, p = .17$] indicated that item error variances/covariances were also invariant across genders. Testing structural invariance was the last step where constraints were added to factor variances and covariances across genders in Model 4 (M4). The $SBS\Delta\chi^2$ difference between M4 and M2 was nonsignificant [$SBS\Delta\chi^2(30) = 21.76, p = .86$], supporting structural invariance between genders. In sum, multiple-group CFA results indicate that the IFCS demonstrated impressive measurement and structural invariance between men and women in this sample.

3.4. Reliability

The internal consistency reliability for the IFCS total and subscale scores were all adequate. The IFCS total scores had a Cronbach alpha of .89. The IFCS subscale scores had Cronbach alphas ranging from .70 to .86.

3.5. Validity

To examine the construct validity of the IFCS, we conducted correlations between IFCS subscale scores and also with other study variables (see Table 3). Based on Cohen (1988), a correlation coefficient of .10 is considered a weak association; a correlation coefficient of .30 is considered a moderate association; and a correlation coefficient of .50 or larger is considered a strong association. There were moderate to strong correlations among the IFCS subscale scores, with absolute values ranging between .31 and .55. The IFCS total and subscale scores had mostly moderate and some strong correlations with measures of psychological well-being, social connection with mainstream society, academic stress, discrimination, and language discrimination in the expected directions, which supported the construct validity of this new measure.

We also conducted a series of hierarchical regressions to examine the incremental validity of each IFCS subscale and the IFCS total score. Satisfaction with Life was the dependent variable, as we examined the IFCS subscales and total scores' incremental predictability over and above positive and negative affect. For the five separate regression analyses, in step 1, we entered both positive affect and negative affect. In step 2, the IFCS subscale or total scores were entered (see Table 4). In step 1, positive and negative affect together accounted for 30% of the variance. In step 2, the incremental variances in predicting life satisfaction were all significant (ranged from 6% to 13%), except for Campus Discrimination (2%). These results provide support for the incremental validity of four out of five IFCS subscales showing that their associations with life satisfaction were not simply due to confounding effects (Hoyt, Warbasse, & Chu, 2006).

Table 3

Intercorrelations between predictor and outcome variables.

	IFCS	ICS	SE	AS	II	CD	Range	Mean	SD	N	alpha
IFCS Total							18–108	83.42	12.07	501	.89
International Center Services [ISC]	.74**						4–24	19.30	3.34	501	.85
Social Engagement [SE]	.73**	.41**					4–24	17.15	3.58	501	.70
Academic Support [AS]	.73**	.40**	.43**				3–18	14.29	2.83	501	.84
Identification with Institution [II]	.78**	.54**	.55**	.52**			3–18	14.62	2.64	501	.86
Campus Discrimination [CD]	-.72**	-.40**	-.31**	-.46**	-.40**		4–24	9.90	3.97	501	.75
Satisfaction with Life	.59**	.47**	.46**	.46**	.58**	-.34**	5–35	24.57	6.05	167	.87
Positive Affect	.46**	.29**	.39**	.34**	.48**	-.26**	10–50	35.67	7.26	167	.88
Negative Affect	-.37**	-.23*	-.17	-.34**	-.21*	.43**	10–50	20.54	7.61	167	.88
Academic Stress	-.32**	-.07	-.36**	-.20	-.30**	.25*	5–25	10.14	3.98	164	.80
ASSIS-Discrimination	-.68**	-.35**	-.34**	-.48**	-.52**	.76**	8–40	17.49	5.99	164	.92
Language Discrimination	-.57**	-.34**	-.37**	-.42**	-.35**	.59**	7–35	14.17	4.78	170	.94
Social Connection-Mainstream	.54**	.38**	.48**	.33**	.46**	-.35**	5–35	22.94	6.41	170	.92

Note. IFCS Total was computed by first reversing the CD score and then summing the scores of all five subscales.

* $p < .01$.

** $p < .001$.

Table 4
Hierarchical regressions for incremental validity in predicting life satisfaction over and above positive and negative affect ($N = 167$).

	<i>B</i>	SE	β	ΔR^2	ΔF	dfs
International Center Services						
Step 1				.30***	35.68	2, 164
Positive Affect	.30	.05	.36***			
Negative Affect	-.16	.05	-.20**			
Step 2				.09***	24.00	1, 163
International Center Services	.60	.12	.32***			
Social Engagement						
Step 1				.30***	35.68	2, 164
Positive Affect	.28	.06	.33***			
Negative Affect	-.18	.05	-.23***			
Step 2				.07***	17.61	1, 163
Social Engagement	.51	.12	.29***			
Academic Support						
Step 1				.30***	35.68	2, 164
Positive Affect	.30	.06	.36***			
Negative Affect	-.14	.05	-.18**			
Step 2				.06***	15.04	1, 163
Academic Support	.57	.15	.27***			
Identification with Institution						
Step 1				.30***	35.68	2, 164
Positive Affect	.21	.06	.25***			
Negative Affect	-.16	.05	-.21**			
Step 2				.13***	37.49	1, 163
Identification with Institution	.88	.14	.42***			
Campus Discrimination						
Step 1				.30***	35.68	2, 164
Positive Affect	.34	.06	.41***			
Negative Affect	-.16	.06	-.20**			
Step 2				.02	3.84	1, 163
Campus Discrimination	-.21	.11	-.14			
Overall International Friendly Campus						
Step 1				.30***	35.68	2, 164
Positive Affect	.23	.06	.27***			
Negative Affect	-.11	.05	-.14*			
Step 2				.12***	35.07	1, 163
IFSC Total Score	.20	.03	.42***			

Note. All the *B*, SE, and β presented in the table are based on the numbers from step 2.

- * $p < .05$.
 ** $p < .01$.
 *** $p < .001$.

4. Discussion

4.1. Psychometric evaluation

Although a number of studies have identified environmental factors contributing to the cross-national adjustment of international students (see Zhang & Goodson, 2011), there is no existing scale that focuses specifically on measuring the international friendliness climate of U.S. campus besides a few needs survey conducted by individual campuses (e.g., Zehner, 2012). The IFCS represents the first scale assessing international friendliness climate on U.S. campuses and has solid psychometric properties. In terms of reliability, the IFCS has adequate internal consistencies with Cronbach alphas of subscale scores ranging between .70 to .86, and a Cronbach alpha of .89 for the composite score.

Using EFA, a five-factor structure consistent with our initial framework emerged. In addition, CFA results showed that the five-factor model was a good fit with a different sample providing cross-validation. Moreover, the IFCS factor structure was invariant between male and female students, indicating the suitability of using this scale across genders and to make fair comparisons.

Construct validity was supported by moderate to strong correlations in the expected directions. The correlations between the five subscale score were moderate to strong, which supports the distinctiveness of each factor as well as the possible use of a composite score. The IFCS and its subscale score showed adequate associations with both positive (i.e., positive affect and satisfaction with life) and negative (i.e., negative affect) indicators of psychological well-being, social connection with mainstream society, academic stress, and two forms of discrimination (i.e., general and language). The strengths of these associations were mostly in the moderate to strong range. Incremental validity of the IFCS was also supported. With the

exception of Campus Discrimination, the IFCS total and other four subscale scores significantly predicted satisfaction with life over and above both positive and negative affect. The evidence of incremental validity indicates that the association between ISCS and psychological indicators were not simply due to them being either positive/supportive or negative/detrimental variables.

4.2. Implications

There are several ways the IFCS can be used for practice and research. First and foremost, the IFCS serves as an instrument to measure how environmental factors are associated with the adjustment of international students. This may help facilitate a more comprehensive understanding of international student adjustment by extending research beyond individual factors and thus avoid making the international students solely responsible for their adjustment outcomes. The IFCS can also be used to assess which campus climate factors have the strongest impact on various aspects of international student adjustment. Through examining the different campus climate dimensions, researchers can gain a better sense of how the different environmental factors relate to the different types of adjustment indicators. For example, enhancing the identification with the institution might provide better life satisfaction for international students, whereas minimizing campus discrimination might be a better way to decrease one's depressive mood.

The IFCS can also be used to provide campus international centers a sense of how their international students perceive the campus climate. The scale can serve as a way to quantitatively measure campus climate. Information from the scale can be used to identify areas of strength for campuses, which can serve as useful information to recruit prospective international students. Assessment results may also be used to inform strategic planning on which areas of the international campus climate warrants the most attention for improvement. The IFCS could also be used as an indicator to track annual progress at institutions over time.

A longer-term goal is for the IFCS to be adopted by multiple institutions. And if so, results can be compared across institutions, thus, university campuses may be able to learn about factors and programs that may promote a better and more welcoming environment. In other words, campuses with positive ratings may serve as models of how to promote those kinds of atmosphere. Through the use of this scale, institutions can learn and improve from each other.

4.3. Limitations and future directions

Despite the many strengths of this new developed IFCS, there are a few limitations that should be noted. First, this scale was developed through a sample in a Midwest public university. Future studies may include other U.S. campuses from various regions (e.g., East, West, Southern), of different types (e.g. private, community college), and in different settings (e.g., metropolitan, college town, rural). Moreover, longer-term expansions of this scale could involve assessing international friendly campus climates in other countries outside of the U.S., such as examining the psychometric properties of this scale with international students studying in China. Another area for future studies is to examine U.S. study abroad students' perceptions of international friendliness of oversea campuses and how that relates to their adjustment process.

Second, although the IFCS incorporates five dimensions with 18 items, it is not all-inclusive. For example, appreciation for diversity could be a positive future dimension that addresses the friendliness beyond lack of discrimination. Also, two of the IFCS subscales (i.e., Academic Support and Identification with Institution) only had three items each. However, their internal consistency reliability held up quite well (Cronbach alpha = .84 and .86), which then should be less of a concern. Third, the item development was mainly based on literature review and input from service providers and researchers. Future studies could utilize qualitative methods, such as grounded theory, to develop a model or focus groups to generate ideas on more factors related to the international friendliness of campuses. Fourth, the variables utilized to establish IFCS's construct validity are limited in this initial study. The nomological network of construct validity can continue to be developed by examining how different IFCS subscales are associated with other variables (e.g., acculturative stress, social desirability, psychological distress, other measures of acceptance toward diversity). Fifth, due to the limited sample size, we were only able to test gender invariance of the IFCS factor structure. With larger sample sizes or combined samples across institutions in the future, it would also be useful to further examine invariance between different countries of origin, graduate and undergraduate statuses, native and non-native English speakers, etc. Sixth, this scale addresses the broader aspects of campus climate, but it does not focus on the specific campus services (e.g., housing, transportation, administrative services) that may relate to international students. Thus, follow-up needs/satisfaction surveys may be used to identify specific areas for improvement. Seventh, this initial study is cross-sectional. Longitudinal studies of how perceived campus international climate relates to academic retention and completion rates can also provide more information on how the campus climate impacts student success. Finally, factors that facilitate a positive international climate should also be studied. An example could be to use the IFCS to evaluate the effectiveness of programs that aim at facilitating a more international friendly campus.

5. Conclusion

Much of the literature has identified sociocultural challenges that international students experience during their study in the Western hemisphere of the world. In particular, much discussion has been contributed to identifying internal attributes from international students (e.g., psychological trait, cultural background) that are related to such experiences. Inversely,

this study attempts to address international students' experiences that are embedded in the overall external campus environment. From an administrative perspective, both academic units (e.g., academic programs and departments) as well as campus administrative units (e.g., ISSS) are part of a larger context that determines international students' experiences. The IFCS can be applied to varied academic institutions, allowing the institutions to obtain a comprehensive understanding of the overall international friendliness of campuses. The scale also highlights the importance of paying attention to the various dimensions involved to facilitate a supportive environment for international students.

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