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The role of acculturative stress and self-construal in maladaptive eating behaviors among female young adults in diverse college settings

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ABSTRACT

The increasing cultural diversity in the United States means more college students identify with racial and ethnic minority backgrounds and may experience acculturative stress. Emerging research has found an association between acculturative stress and maladaptive eating. However, these studies rarely consider other theoretical factors or confounders, and individual differences. Thus, the unique contribution of acculturative stress and the generalizability of previous findings remain unclear.

Objective: This cross-sectional study investigated the role of acculturative stress and self-construal (i.e., how individuals define themselves in relation to others in social environments) in maladaptive eating among female college students.

Method: Participants were 446 female young adults (M_{age} = 20.38, SD = 1.75; M_{BMI} = 23.42, SD = 4.62) who completed online questionnaires.

Results: Structural equation modeling results showed that acculturative stress was related to higher disinhibited eating even when accounting for traditional theoretical risk factors (i.e., body dissatisfaction, perceived sociocultural pressures on body image, and general stress) and potential confounders (i.e., age, BMI, SES, ethnic backgrounds, and birthplace). Furthermore, independent self-construal (i.e., when individuals see themselves as autonomous, prioritizing personal goals and uniqueness over social relationships) moderated this association. When independent self-construal was higher, the magnitude of the regression coefficient between acculturative stress and disinhibited eating was smaller.

Discussion: Given the increasing diversity within U.S. higher education, eating behavior theories should consider integrating acculturative stress to improve inclusiveness. College psychological services should tailor prevention and treatment strategies for maladaptive eating to address acculturative stress, while also promoting an environment that supports healthy, independent self-construal.

The United States (U.S.) has become increasingly culturally diverse, with racial or ethnic minorities and mixed-race individuals making up a substantial and growing portion of the population (Atkin et al., 2022). Acculturative stress, a form of psychological stress that arises from navigating different cultural environments (Berry et al., 1987), has emerged as an important issue affecting young adult college students across various cultural backgrounds (Berry, 2006; Padilla & Borrero, 2006; Smart & Smart, 1995). While many students face general stressors, such as academic pressures and financial difficulties, those in culturally diverse environments may also encounter additional, unique challenges represented by acculturative stress. Acculturative stress encompasses stressors across different life domains. For instance, cultural stressors include challenges in intercultural relations, such as misunderstandings or conflicts arising from cultural differences (Gil et al., 1994). Social stressors involve navigating new social norms and interacting with people from diverse cultures, which can lead to feelings of social exclusion or discrimination (Ward & Kennedy, 1999). Environmental stressors stem from a lack of cultural diversity in the community or cultural isolation (Benet-Martínez & Haritatos, 2005).

Acculturative stress affects everyone in culturally diverse environments, particularly college students regardless of their background. The theoretical framework of acculturative stress suggests that acculturation

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is a bi-directional process where majority and minority cultural groups interact and influence each other, leading to changes in values, behaviors, and social norms (Berry, 2006, p. 289). As interracial contact and globalization increase, acculturative stress is likely to impact everyone involved, though it may pose particular challenges for marginalized populations in Western cultures or foreign-born individuals, partly due to language barriers and minority status (Berry, 2006; Ferguson et al., 2023). Furthermore, although the nature of racial majority individuals' acculturation to a diverse culture likely differs from that of minorities and immigrants, the consequences of acculturative stress are similar for all experiencing it. Young adult college students in increasingly culturally diverse environments may be particularly susceptible to acculturative stress due to their unique life stage, characterized by identity exploration, significant changes in autonomy and social relationships, and new challenges in education and career choices (Zarrett & Eccles, 2006). Additionally, moving away from home or transitioning to a diverse college environment can further intensify acculturative stress for these students.

A small, but growing area of research suggests that acculturative stress functions as a transdiagnostic risk factor, contributing to a range of psychological disorders (Zvolensky et al., 2021), including maladaptive eating. The correlation between acculturative stress and maladaptive eating behaviors was found by a meta-analysis of 11 studies conducted in the U.S. across varied age groups (Kalantzis et al., 2023). Qualitative research among Asian women in the U.S. also supports this relationship, suggesting that stress resulting from acculturation is a key contributor to eating problems (Javier & Belgrave, 2019). The mechanisms underlying the association between acculturative stress and eating problems may include both body dissatisfaction and depressive symptoms. For example, among Latinas, acculturative stress is correlated with higher body dissatisfaction—one of the strongest predictors of eating problems —likely due to conflicts between the beauty standards of their original and dominant cultures (Quinones et al., 2022). Additionally, acculturative stress is associated with more depressive symptoms, which are also related to maladaptive eating behaviors (Song et al., 2023; Wang et al., 2022). As posited in the Escape theory (Heatherton & Baumeister, 1991), binge eating can be a maladaptive coping strategy for stress, with individuals engaging in such behaviors to escape self-awareness and negative emotions. Furthermore, extended periods of stress can interfere with neural pathways associated with voluntary behavior control and subcortical regions regulating stress arousal and energy storage, as well as intense, motivational drive and impulsivity; consequently, chronic stress may lead to disinhibited forms of maladaptive eating (disinhibited eating, hereafter), such as uncontrolled or impulsive eating, as well as eating in response to intense emotions (Epel et al., 2012). A review article further highlights the connection between stress and disinhibited eating, detailing how neurobiological substrates related to food reward sensitivity, interoception, affective regulation, and cognitive control contribute to disinhibited eating (Giddens et al., 2023).

However, while some studies have explored additional social risk factors of maladaptive eating beyond the bivariate association between acculturative stress and maladaptive eating behaviors, many still neglect to examine the relevant theoretical constructs as covariates or account for potential confounders. For example, the Tripartite Influence Model (Thompson et al., 1999), one of the most widely studied models of body image concerns and eating concerns, posits that perceived sociocultural pressures on body image and body dissatisfaction can lead to maladaptive eating. General psychological distress (Finch & Tomiyama, 2015) is also an important factor related to acculturative stress and eating behaviors. Moreover, participant characteristics such as socioeconomic status (SES) and body mass index (BMI) might also have associations with acculturative stress experience and eating behaviors (Bernal et al., 2022; Kalantzis et al., 2023). Without considering these factors while concurrently examining the association between acculturative stress and eating behaviors, the unique contribution of acculturative stress to disordered eating, compared with other theoretical variables, cannot be established. Thus, the generalizability and practical implications of previous findings remain poorly understood.

Acculturative stress can create interpersonal challenges, making it important to examine constructs that capture how individuals view themselves in relation to others. One potential moderating factor is self-construal and it has two distinct facets (i.e., independent and interdependent self-construal; Markus & Kitayama, 1991). Individuals with higher independent self-construal view themselves as unique within the social context, defining themselves by attributes different from those of others. In contrast, those with higher interdependent self-construal are motivated to fit in with relevant others, create and fulfill social obligations, and become part of various interpersonal relationships. The Self-Construal theory (Markus & Kitayama, 1991, p. 240) suggests that individuals with higher independent self-construal are motivated to express their needs and withstand social pressure. Thus, when experiencing acculturative stress, college students with higher independent self-construal might express their challenges to others and seek out resources, thereby being less likely to resort to maladaptive eating behaviors as a coping mechanism. Empirical evidence supports this proposition. For example, students in the U.S. with independent self-construal tend to adopt direct and problem-focused coping strategies, which are associated with lower perceived stress (Cross, 1995). A bivariate correlation between independent self-construal and fewer eating disorder behaviors or cognitions was also observed among female college students (Chang, Yu, & Kahle, 2014). Independent self-construal has also been found to moderate the relationship between perceived stress and mental health outcomes. Specifically, racial or ethnic minority individuals with lower independent self-construal demonstrated greater cognitive vulnerability in response to higher perceived stress, which was associated with poorer health perceptions and an increased likelihood of reporting impaired physical functioning (Talavera, 2017). However, no study, to our knowledge, has examined the potential moderating role of self-construal in the association between acculturative stress and maladaptive eating behaviors. Independent and interdependent self-construal are more influential on behavior when aligned with social expectations (Neff et al., 2008). The mainstream U.S. culture tends to emphasize independent self-construal (Markus & Kitayama, 1991). Therefore, independent self-construal may protect from engaging in maladaptive eating behaviors when students experience acculturative stress.

Acculturative stress can intensify the challenges faced by college students, particularly those adapting to a new cultural environment (Koo et al., 2021), and is related to poor psychosocial adjustment (Crockett et al., 2007). These students are also susceptible to maladaptive eating behaviors, which can result in physical, social, and psychological consequences, such as impaired relationships, metabolic disturbances, and poor quality of life (Tozun et al., 2010). Therefore, it is timely and essential to examine the association between acculturative stress and maladaptive eating behaviors, as well as the potential moderators of this relationship. This study had two primary aims (Fig. 1). The first aim was to test whether acculturative stress would correlate with the disinhibition aspects of maladaptive eating (i.e., disinhibited eating), above and beyond established theoretical risk factors such as perceived sociocultural pressures on body image, body dissatisfaction, and general perceived stress among female young adult college students. The second aim was to investigate whether self-construal would moderate the association between acculturative stress and disinhibited eating. Specifically, it was hypothesized that the strength of the relationship between acculturative stress and disinhibited eating would be weaker among those with higher (versus lower) independent self-construal.

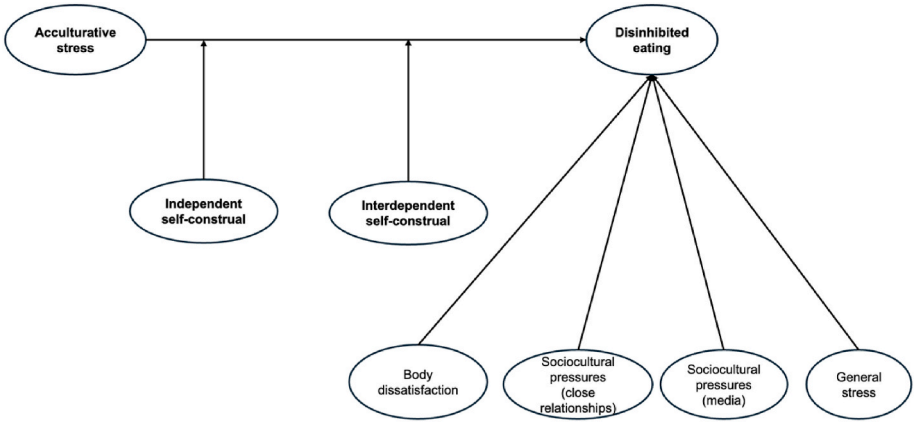

Fig. 1. Hypothesized structural model.

1. Method

1.1. Participants and procedure

Participants were 446 female young adults ($M_{age} = 20.38$, $SD = 1.75$; $M_{BMI} = 23.42$, $SD = 4.62$), recruited at the University of California, Irvine characterized by a diverse cultural environment and frequent interracial contact. The current sample was part of a larger cross-sectional, cross-cultural study examining the role of culture in health and well-being. This subset included women participants from the total undergraduate sample aged 18–29 years old at the U.S. site ($N = 505$). Students who were currently enrolled and 18 years or older at the time of the study were eligible to participate. No specific exclusion criteria were applied. To maintain data quality, the dataset was thoroughly reviewed, and three duplicate entries were identified and removed due to double enrollment.

Participants provided informed consent by clicking on "next" on their screen after reading the study information sheet. For a more detailed description of the participants' characteristics, study procedure, and data cleaning procedure, see Wang et al. (2024). The Institutional Review Board at the authors' institution approved this study as part of a larger research project (IRB #383).

The current sample size ($N = 446$) is adequate for the analytical approach described below. To test whether acculturative stress was related to disinhibited eating above and beyond other established theoretical risk factors (Aim 1), the Shiny Web app, *pwrSEM*, was used (Wang & Rhemtulla, 2021). A total of 10,000 simulations indicated that a sample size of 446 provides 94% power to detect a small effect size in the path between acculturative stress and disinhibited eating at a .05 alpha level. To test the moderating role of self-construal (Aim 2) using the latent moderated structural equations approach, the sample size recommended by Monte Carlo simulations (Pieters et al., 2022) was referenced, indicating that 312 observations are needed to detect a small interaction effect ($d = .20$) with 85% reliability and 80% power.

1.2. Measures

1.2.1. Primary study measures

1.2.1.1. Acculturative stress. The Riverside Acculturative Stress Inventory (15 items, Benet-Martínez & Haritatos, 2005) was used to measure acculturative stress. This scale was chosen for its non-ethnic-group-specific nature, making it applicable to diverse populations (Miller et al., 2011), and consistent with the acculturation theory (Berry, 2006).

Participants were asked to fill in the blank with the nationality or culture they identify with. The acculturative stress domains and example questions are as follows: Intercultural Relations (e.g., "I feel that my particular practices (American or ___) have caused conflict in my relationships."), Cultural Isolation (e.g., "When I am in a place or room where I am the only ___ person, I often feel different or isolated."), Work Challenge (e.g., "In looking for a job, I sometimes feel that my ___ background is a limitation."), Language Skills (e.g., "It bothers me that I have an accent (in English or a ___ language)."), and Discrimination (e.g., "I have been treated rudely or unfairly because of my ___ background."). Each item was rated on a 5-point Likert scale (1 = *strongly disagree* to 5 = *strongly agree*), with a higher score representing a greater level of acculturative stress from both the host and home cultures. The use of the overall score was recommended (Benet-Martínez & Haritatos, 2005). The reliability for the overall scale in the original scale development study was .83 among college students (Miller et al., 2011), and .90 in this study.

1.2.1.2. Independent and interdependent self-construal. The Self-Construal Scale (30 items; Singelis, 1994) was used to measure independent self-construal (15 items) and interdependent self-construal (15 items). An example question for the independent self-construal dimension was "Being able to take care of myself is a primary concern for me," and for the interdependent self-construal dimension was "It is important to me to respect decisions made by the group." Participants reported their levels of agreement with each statement on a 7-point scale (1 = *strongly disagree* to 7 = *strongly agree*), with higher scores reflecting greater levels of self-construal. This scale has shown good reliability for the two dimensions (e.g., .81 for the independent self-construal dimension and .73 for the interdependent self-construal dimension; McCullough & Svetina Valdivia, 2021). In this study, Cronbach's alpha was .78 for the independent self-construal dimension and .79 for the interdependent self-construal dimension.

1.2.1.3. Maladaptive eating. The Uncontrolled eating and Emotional eating subscales from the Three-Factor Eating Questionnaire 18-R Version 2 (Cappelleri et al., 2009) were used to measure maladaptive eating behaviors. These two subscales were selected to capture disinhibited eating (Bryant et al., 2019). The approach to using the Uncontrolled Eating and Emotional Eating subscales to represent the disinhibited eating construct has been adopted by previous studies (e.g., Masterson et al., 2019).

Each item was rated on a 4-point scale (1 = *definitely false* to 4 = *definitely true*), with a higher score indicating more severe tendencies towards maladaptive eating behaviors. An example item from the uncontrolled eating subscale (9 items) is "Sometimes when I start eating, I just can't seem to stop," and from the emotional eating subscale (6 items) is "I start to eat when I feel anxious." This scale has shown good reliability among the general English-speaking population, with

Cronbach's alpha averaging of .92 for the two subscales (Cappelleri et al., 2009). In the current sample, Cronbach's alpha was .83 for the Uncontrolled Eating subscale, .90 for the Emotional Eating subscale, and .91 for the combined scale of the two subscales.

1.2.2. Theoretical covariates

1.2.2.1. Perceived sociocultural pressures on body image. Perceived sociocultural pressures on body image were evaluated using the media pressure (4 items), peer pressure (4 items), and family pressure subscales of the Sociocultural Attitudes Toward Appearance Questionnaire-4 (SATAQ-4; Schaefer et al., 2015). The family pressure subscale was modified to ask about perceived pressures from the mother (4 items) and the father (4 items) separately, following a previous study (Shao et al., 2023). An example question is, "I feel pressure from [the source] to improve my appearance." Participants rated their agreement with each item for perceived peer, maternal, and paternal pressures subscales on a 5-point Likert scale (1 = *definitely disagree* to 5 = *definitely agree*). Due to an error in data collection, the perceived media pressures subscale was rated on a 6-point Likert scale (1 = *definitely disagree* to 6 = *definitely agree*). The original scale development study demonstrated high reliability for the scale among college women, and Cronbach's alphas for the peer pressure subscale ranged from .85 to .89, for the family pressure subscale ranged from .85 to .90 and for the family pressure subscale ranged from .94 to .95, depending on U.S. female's ethnicity and location (Schaefer et al., 2015). In the present study, Cronbach's alpha was .91 for peer pressures, .95 for maternal pressures, .90 for paternal pressures, and .92 for the subscales combined; the Cronbach's alpha was .95 for media pressures.

1.2.2.2. Body dissatisfaction. The appearance and weight subscales from the Body Esteem Scale (Mendelson et al., 2001) were used. The appearance domain evaluates general feelings about one's physical appearance, including facial features and body shape with 10 items. The weight domain assesses satisfaction with body weight with 8 items. An example question from the appearance domain is, "I'm pretty happy about the way I look," and from the weight domain, "I really like what I weigh." Responses were collected on a 5-point scale (0 = *never* to 4 = *always*). After reverse coding for some items, a higher score indicates greater body dissatisfaction. In previous studies, this scale has demonstrated high reliability, with Cronbach's alpha averaging .93 for the two subscales among adolescents and adults (e.g., Mendelson et al., 2001). In this study, Cronbach's alpha was .90 for the appearance domain, .91 for the weight domain, and .94 for the overall scale.

1.2.2.3. General stress. The stress subscale of the Depression Anxiety Stress Scales-21 (Henry & Crawford, 2005) was used to assess the degree to which participants perceived their lives as stressful during the past week. Seven items were rated on a 4-point scale (0 = *Did not apply to me at all* to 3 = *Applied to me very much, or most of the time*). Cronbach's alpha in the original study was .90 (Henry & Crawford, 2005), and in the present study, it was .84.

1.2.3. Participant information

Participants provided information on their age, gender, ethnic background, weight (in pounds), height (in feet and inches), birthplace (non-U.S.-born vs. U.S.-born), annual family income, parental education level, academic level, and living arrangement. Their BMI was calculated by first converting their height into inches, then dividing their weight in pounds by the square of their height in inches and multiplying the result by 703. To estimate participants' SES, the annual family income and the education levels of both parents were first converted into z-scores. Then, the mean of the parental education z-scores was averaged with the annual income z-score, resulting in the final SES score.

1.3. Analytical strategy

Preliminary analyses were conducted using SPSS (Version 24.0) to investigate the missing patterns, outliers, and distribution of the study constructs and parcels. The analysis determined the missing pattern to be missing completely at random (Little's MCAR test chi-square [13] = 14.43, p = .34). The rate of missing cases was 2.7%, and the rate of missing values was .6%, indicating that missing data was not a significant concern (Bennett, 2001). Thus, missing data were handled using Maximum Likelihood with Robust Error parameter estimates within the Structural Equation Modeling framework described below. No outliers were detected across all item parcels, as determined by the criterion of three times the interquartile range (IQR = 2). All indicators were normally distributed (|skewness| < 1.25, |kurtosis| < 1.01). Descriptive statistics and bivariate correlations were also examined.

Confirmatory factor analysis (CFA) was conducted using Mplus version 8.6 (Muthén & Muthén, 2017). Model fit was evaluated using χ^2 statistics, the Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI), the Root Mean Square Error of Approximation (RMSEA), and the Standardized Root Mean Square Residuals (SRMR). The criteria for excellent model fit include CFI and TLI values of .95 or higher, RMSEA values below .08, and SRMR values of .05 or lower; TLI and CFI values greater than .90 are considered acceptable (Kline, 2005).

For CFA analyses, item parcels were carefully constructed, given their psychometric and estimation advantages —such as greater parsimony, fewer chances for correlated residuals or dual loadings, and reductions in different sources of sampling error—and the research goal of building replicable models by understanding the relationships among constructs (Little et al., 2002). Due to inconsistencies in the scoring method for the perceived sociocultural pressures measure, this construct was divided into two subconstructs: 1) perceived pressures from close relationships, represented by three parcels comprising items from the peer, maternal, and paternal pressures subscales, and 2) perceived pressures from media, indicated by four items from the media pressures subscale. While most latent constructs (except perceived media pressures) were represented by three parcels to achieve optimal local identification (Little et al., 2002), the perceived media pressures construct was indicated by the four items directly due to the small number of available measures. All items from the scales described in the Measures section were used to create parcels and, subsequently, latent constructs. Parcels for unidimensional constructs, such as acculturative stress, independent self-construal, interdependent self-construal, and general perceived stress, were generated using a random algorithm (Matsunaga, 2008). For multidimensional constructs, including eating behaviors, perceived pressures from close relationships, and body dissatisfaction, a domain-representative approach was employed (Kishton & Widaman, 1994).

To examine cultural validity and measurement equivalence of the scale scores for various ethnic cultural groups included and categorized in the analyses, measurement invariance was assessed at the parcel level (except for the perceived media pressures construct, which was assessed at the item level) across groups before testing the overall measurement model. Two groups were created. The first group was Latina Americans (N = 123), including Mexican or Mexican Americans (n = 112), Other Hispanic or Latino (n = 4), Peruvian or Peruvian American (n = 3), Guatemalan or Guatemalan American (n = 2), and Salvadoran or Salvadoran American (n = 2). The second group was Asian Americans (N = 196), including East Asian or East Asian American (n = 123), Southeast Asian or Southeast Asian American (n = 43), Filipino or Filipino American (n = 15), South Asian or South Asian American (n = 14), and Pacific Islander or Pacific Islander American (n = 1). The sample sizes of the remaining ethnic groups were too small for equivalence analyses, and these groups would be too diverse to make it meaningful to combine them into a group. The step involved comparisons among the Configural, Metric, and Scalar models, with each subsequent model introducing additional constraints to verify the consistency of the

measurement model across groups. For measurement invariance to be supported, transitioning to a more constrained model should not significantly deteriorate model fit. The criteria for changes are as follows: from Configural to Metric, the changes should be less than .010 in CFI, less than .015 in RMSEA, and less than .030 in SRMR; from Metric to Scalar, the change in SRMR should be less than .015 (Cheung & Rensvold, 2002). Additionally, Satorra-Bentler scaled chi-square (SB χ^2) difference tests were performed to compare the models. However, changes in CFI, RMSEA, and SRMR were deemed more indicative of model fit than the SB χ^2 difference test (Putnick & Bornstein, 2016).

Next, the latent moderated structural equations approach (Klein & Moosbrugger, 2000) was used to test the hypothesized moderation model, which consists of two steps. First, the model without the hypothesized interactions (model 0) was assessed, and the fit indices were obtained from this model. Second, the moderation model with the hypothesized two interaction terms (model 1; Fig. 1) was tested using maximum likelihood with robust error parameter estimates. Then, using a log-likelihood ratio test, the relative fit of Model 0 and Model 1 was compared to determine whether the more parsimonious Model 0 represents a significant loss in fit relative to the more complex Model 1 (Satorra & Bentler, 2010). If Model 0 fits well and, according to the log-likelihood ratio test, Model 0 represents a significant loss in fit relative to Model 1, then Model 1 with the two interaction terms is also well-fitted. The significant interaction effect was subsequently plotted. Additionally, potential confounders (i.e., age, BMI, SES, ethnic backgrounds, and birthplace) were included in the significant latent moderated structural equations model to examine the generalizability of the results. Data from the current study and the study analysis code can be accessed at https://osf.io/my3ab/?view_only=cee8afc9600f498cb201df8e5a39f03f.

2. Results

2.1. Participants

The sample primarily consisted of junior and senior students (64.3%). Participants had diverse living arrangements, with most living with roommates (58.5%). They represented various ethnic backgrounds, including 27.6% East Asian and 25.1% Mexican. Most participants were born in the U.S. (70.0%). See Table 1 for the detailed demographic characteristics of the sample.

2.2. Preliminary analysis

Descriptive statistics and bivariate correlations among the primary study measures, theoretical covariates (i.e., body dissatisfaction, perceived sociocultural pressures, and general stress), and potential continuous confounders (i.e., age, BMI, and SES) are displayed in Table 2. Disinhibited eating was associated with higher acculturative stress ($p < .001$), lower independent self-construal ($p < .001$), higher body dissatisfaction ($p < .001$), higher perceived pressures from close relationships ($p < .001$), higher perceived pressures from media ($p < .001$), higher general stress ($p < .001$), and higher BMI ($p = .004$).

2.3. Measurement model and measurement invariance

The measurement model showed a good fit for the data, $\chi2$ (247) = 586.62, $p < .001$; CFI = .96, TLI = .95, RMSEA (90% CI) = .06 (.05, .06), SRMR = .04. All standardized factor loadings were significant at the $p < .001$ level and ranged from .60 (one of the parcels of independent self-construal) to .98 (one of the parcels of body dissatisfaction). Full Configural, Metric, and Scalar measurement invariances across the ethnic backgrounds were supported for the study models (Table 3).

Table 1
Demographic characteristics of the sample (N = 446).

Characteristic		
	M	*SD*
Age (years)	20.38	1.75
BMI	23.42	4.62
	n	%
Ethnic Background		
East Asian or East Asian American	123	27.6
Mexican or Mexican American	112	25.1
Southeast Asian or Southeast Asian American	43	9.6
European or European American	43	9.6
Mixed	42	9.4
Middle Eastern or Middle Eastern American	16	3.6
Filipino or Filipino American	15	3.4
South Asian or South Asian American	14	3.1
African or African American	8	1.8
Persian or Persian American	6	1.3
Other Hispanic or Latino	4	.9
Peruvian or Peruvian American	3	.7
Guatemalan or Guatemalan American	2	.4
Salvadoran or Salvadoran American	2	.4
Pacific Islander or Pacific Islander American	1	.2
Other	1	.2
Missing Data	11	2.5
Place of Birth		
U.S.-born	312	70
Missing Data	11	2.5
Year in School		
First Year	41	9.2
Second Year	107	24
Third Year	123	27.6
Fourth Year	149	33.4
Fifth Year or Beyond	15	3.3
Living Situation		
Roommates	261	58.5
Family	124	27.8
Alone	32	7.2
Other (e.g., with partner)	17	3.8
Missing Data	12	2.7

2.4. Structural model

The structural model (Fig. 2) showed a good fit to the data: $\chi2$ (247) = 554.18, $p < .001$; CFI = .96, TLI = .95, RMSEA (90% CI) = .05 (.05, .06), SRMR = .04. These fit indices were obtained from Model 0, where no interaction terms were included. A significant log-likelihood ratio test ($\chi2$ (2) = 9.51, $p = .009$) indicates that Model 0 represents a significant loss in fit relative to Model 1 (the model with the hypothesized interaction effects) and thus Model 1 was well-fitted (see Fig. 2).

The experience of acculturative stress was related to higher disinhibited eating ($\beta = .23$, 95% CI = .14, .31), above and beyond the effects of perceived pressures from close relationships ($\beta = .24$, 95% CI = .14, .34), perceived pressures from media ($\beta = .11$, 95% CI = .02, .20), and general stress ($\beta = .14$, 95% CI = .04, .25).

Independent self-construal moderated the association between acculturative stress and disinhibited eating ($\beta = -.13$, 95% CI = −.21, −.04), such that at higher levels of independent self-construal, the strength of the positive relationship between acculturative stress and maladaptive eating behaviors was stronger. The association between acculturative stress and disinhibited eating was significant and strong when independent self-construal was low at the -1SD level ($b = .25$, $p < .001$), or was medium at the mean level ($b = .16$, $p < .001$). However, this association was not significant when independent self-construal was high at the +1SD level ($b = .07$, $p = .14$; Fig. 3). Interdependent self-construal was not a significant moderator of this association ($\beta = -.04$, $p = .39$). This study model accounted for 37% of the variance in disinhibited eating. Furthermore, adding potential confounders, including age, BMI, SES, ethnic backgrounds (dummy coded; reference group: other groups), and birthplace (0 = non-U.S.-born, 1 = U.S.-born)

Table 2
Descriptive statistic and bivariate correlations among study measures.

	M	*SD*	1	2	3	4	5	6	7	8	9	10
1. Acculturative Stress	2.58	.79	–									
2. Independent self-construal	4.66	.76	−.06	–								
3. Interdependent self-construal	4.81	.73	.11*	.04	–							
4. Disinhibited eating	2.20	.60	.33***	−.22***	.03	–						
5. Body dissatisfaction	2.17	.84	.22***	−.36***	.17***	.41***	–					
6. Perceived pressures from close relationship	2.26	.99	.23***	−.15**	.08	.42***	.49***	–				
7. Perceived pressures from media	4.72	1.29	.15**	−.13**	.16**	.30***	.43***	.32**	–			
8. General stress	1.13	.66	.19***	−.22***	.10*	.31***	.39***	.24***	.19***	–		
9. Age	20.38	1.75	−.02	.09	−.13**	.02	−.08	−.03	−.14**	.03	–	
10. BMI	23.47	4.73	.06	.02	−.01	.14**	.38***	.31***	.14**	.08	.03	–
11. SES	−.00	.81	−.26***	−.04	.06	−.04	−.05	.02	−.02	−.04	−.09	−.24***

Note. *$p < .05$, **$p < .01$, ***$p < .001$.

Table 3
Measurement invariance for the study model between Latina and Asian Americans.

Invariance Model	χ^2 (*df*)	CFI	RMSEA (90% CI)	SRMR	χ^2 diff. test (*df*)	ΔCFI	ΔRMSEA	ΔSRMR	Invariance
Configural	846.93 (494)	.94	.067 (.06, .08)	.05	–	–	–	–	–
Metric	876.13 (511)	.94	.067 (.06, .07)	.06	29.20 (*17*) *	0	0	0	supported
Scalar	912.11 (528)	.94	.068 (.06, .08)	.06	35.98 (*17*) **	0	.001	0	supported

Note. *$p < .05$, **$p < .01$.

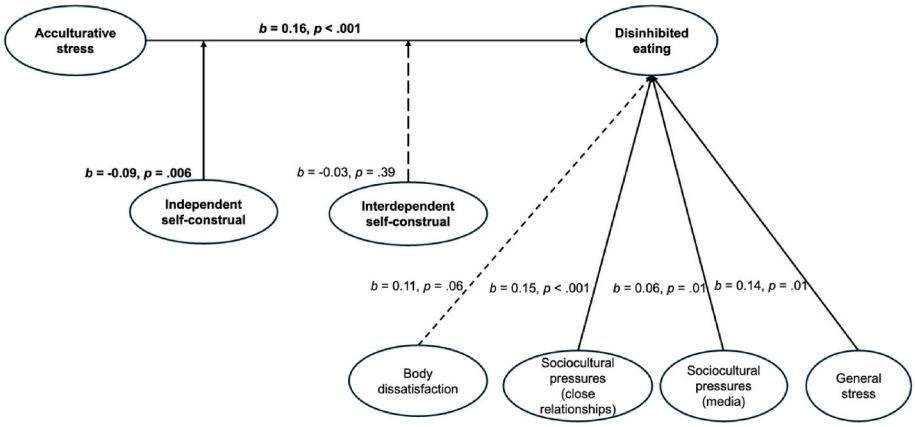

Fig. 2. The structural model with unstandardized coefficients.

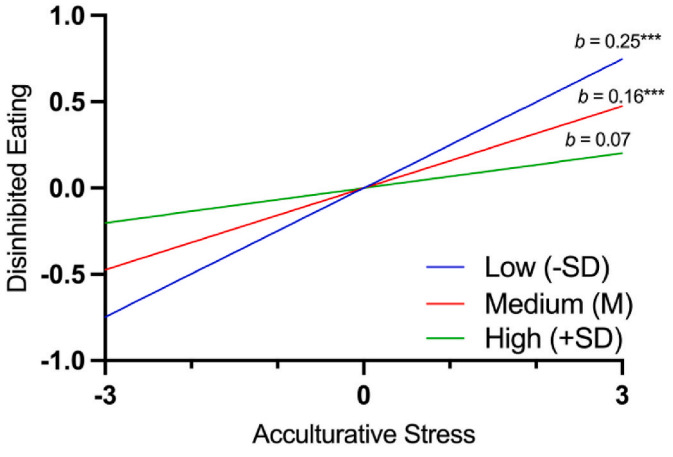

Fig. 3. The interaction effect between acculturative stress and independent self-construal on disinhibited eating.

did not change the results and none of the confounders were significantly related to disinhibited eating in the structural model (*ps* > .25).

Additionally, recent studies on acculturative stress and its debated role in European or European American samples led us to repeat all analyses excluding the 43 participants identified as European or European American. All findings were replicated. Given the predominantly Hispanic or Asian campus setting, where European or European American participants might also experience acculturative stress, such as in the form of cultural isolation or a lack of belonging, and the theory that acculturative stress affects everyone in the acculturation process (Berry, 2006), we report and interpret findings for the full sample.

3. Discussion

This study is among the first to our knowledge that investigated the role of acculturative stress and self-construal in maladaptive eating behaviors among female college students. Acculturative stress was related to maladaptive eating behaviors, above and beyond theoretical risk factors including perceived sociocultural pressures on body image, body dissatisfaction, and general perceived stress as well as other potential confounders (i.e., age, BMI, SES, ethnic backgrounds, and birthplace). Independent self-construal functioned as a moderator in this association. When independent self-construal was higher, the strength of the

correlation between acculturative stress and maladaptive eating behaviors was weaker. Thus, adding acculturative stress to traditional sociocultural tripartite factors, such as perceived sociocultural pressures and body dissatisfaction, as well as general stress, may highlight unique associations and create a more culturally relevant model of risk factors for eating pathology. This approach is especially important in culturally diverse populations.

The finding that acculturative stress was related to maladaptive eating behaviors, even when accounting for traditional and theoretical social risk factors and potential confounders, is noteworthy. The result aligns with previous studies and meta-analyses (Kalantzis et al., 2023), which found a significant correlation between acculturative stress and eating concerns. This research further strengthens these previous findings by integrating both traditional theoretical risk factors and relevant confounders in the model, suggesting that acculturative stress could be an independent risk factor for maladaptive eating behaviors. Therefore, when addressing maladaptive eating behaviors, college health professionals and psychological services, especially those in areas with greater cultural diversity, need to consider broader sociocultural dynamics and one's cultural experience, rather than focusing solely on individual psychopathology or body image issues. Furthermore, while our study focused on the association between acculturative stress and maladaptive eating behaviors, it is important to acknowledge that acculturative stress may interact with other well-established risk factors—such as body dissatisfaction, sociocultural pressures, and general psychological distress—to exacerbate the risk of maladaptive eating. For example, one study found that acculturative stress was related to body dissatisfaction, particularly among Latinas who had a weaker identification with their ethnic identity (Quinones et al., 2022).

The moderating role of independent self-construal in the association between acculturative stress and maladaptive eating behaviors is interesting. If replicated in future studies, this finding could offer a more nuanced understanding of the individual variations in responses to acculturative stress and their relationships to maladaptive eating behaviors. Whether individuals see themselves as independent entities in relation to others can influence the association. A higher independent self-construal appeared to moderate the stress of acculturation, perhaps by providing more effective coping strategies that buffer against external stressors (Cross, 1995). Also, individuals with a higher independent self-construal may exhibit a lesser dependence on the emotional states of those around them for their personal well-being. Consequently, in environments marked by acculturative stress, such individuals might have greater emotional autonomy (Markus & Kitayama, 1991), which could mitigate the likelihood of stress manifesting in maladaptive eating behaviors. Conversely, a moderation effect was not found for interdependent self-construal. This null finding was expected because the function of the two aspects of self-construal may play distinct roles depending on the situation (Oyserman, 2011) and the large sociocultural environment (Neff et al., 2008). The current results suggest that independent self-construal may be more meaningfully related to acculturative stress and maladaptive eating behaviors in the U.S., where individualism and independent self-construal are promoted.

This study has limitations. First, due to the cross-sectional design of the study, causal inference cannot be established. Longitudinal research is needed to understand one's cultural experience before and after moving to a new cultural environment and investigate how acculturative stress is related to the development of maladaptive eating behaviors. Second, the finding might not be generalizable to other age groups or other acculturation experiences. The acculturation experience of refugees or forced migrants is likely very different from that of the current college student sample (Choy et al., 2021), with differential implications for maladaptive eating behaviors. Also, data were collected at a site where Asian and Latino students constitute the majority of the undergraduate student body. Therefore, acculturation or acculturative stress may be variably experienced by White college students in a predominantly White demographic in the U.S. Lastly, the inconsistency in the scoring method for perceived media pressures was addressed by modeling it separately from perceived pressures from close relationships, and it does not affect its role as a covariate in predicting maladaptive eating behavior. However, the mean and standard deviation scores for the perceived media pressures construct are not directly comparable to those from other studies.

Despite its limitations, this research underscores the need for a nuanced understanding of the interplay between cultural adaptation experiences and self-construal in relation to maladaptive eating behaviors, offering practical and theoretical implications. In the increasingly diverse college environment of the U.S. and with heightened cultural contact due to globalization, effective prevention and treatment strategies for maladaptive eating behaviors must be culturally sensitive. This necessitates developing approaches to address the challenges female college students face in navigating various forms of acculturative stress. Furthermore, colleges should promote a supportive environment that encourages a healthy, independent self-construal while preserving important aspects of cultural identity that foster interdependence and collectivism. Interventions that focus on strengthening independent self-construal, such as promoting self-efficacy, autonomy, and problem-focused coping, may help individuals better navigate the challenges of acculturative stress. Furthermore, theoretical frameworks related to maladaptive eating behaviors are acknowledged to not fully capture the unique and increasingly diverse cultural dynamics faced by young adults (Brown et al., 2009; Cheng, 2014; Striegel-Moore & Bulik, 2007; Talleyrand, 2012). Including acculturative stress and variations in self-construal in these models might improve their inclusiveness.

There are several directions for future research building upon the current results. For example, studies can further explore the moderating role of independent self-construal by investigating mechanisms such as coping strategies (Cross, 1995) and emotional autonomy (Markus & Kitayama, 1991). The potential benefits of interdependent self-construal on health and well-being among college students should also be examined. Moreover, this research focused on women due to their vulnerability to maladaptive eating behaviors. However, individuals of other genders also experience acculturative stress and maladaptive eating behaviors (Castillo et al., 2015; Pritchard, 2008). Future studies should replicate these findings and explore potential gender differences. For example, the indirect effect of depressive symptoms between acculturative stress and eating disinhibition was found to be stronger among Asian male students compared to their female counterparts (Wang et al., 2022). Furthermore, conducting subgroup analyses based on ethnic backgrounds with a larger sample size would allow for more nuanced comparisons, which can be valuable in understanding the generalizability of the findings. Also, examining the interaction between acculturative stress and other established risk factors, such as body dissatisfaction, in relation to maladaptive eating can further strengthen the integration of the theoretical framework. Lastly, replicating the current study in various cultural contexts and comparing the results where European or European American students are the racial or ethnic majority to those where they are the local racial or ethnic minority (i.e., the current study context) could offer a deeper understanding of how cultural contexts influence the findings.

Given the emphasis on diversity, equity, and inclusion within many U.S. higher education institutions—a movement that brings numerous benefits—it is imperative that psychological services also integrate awareness of the unique cultural adaptation challenges among students from all cultural backgrounds into their approach, especially when addressing eating concerns. Tailoring these services to the needs of students will not only enhance their effectiveness but also contribute to a more inclusive and supportive campus environment.

CRediT authorship contribution statement

Peiyi Wang: Writing – review & editing, Writing – original draft, Visualization, Project administration, Methodology, Investigation,

Formal analysis, Conceptualization. **Chuansheng Chen:** Writing – review & editing, Writing – original draft, Validation, Supervision. **Ilona S. Yim:** Writing – review & editing, Writing – original draft, Validation, Supervision.

Statements

Data from the current study and the analysis code have been made publicly available in the Open Science Framework and can be accessed at https://osf.io/my3ab/?view_only=cee8afc9600f498cb201df8e5a39f03f.

The authors have no conflict of interest to disclose.

Public health significance statements

This study underscores that college psychological services should consider students' acculturative stress experiences and self-construal when addressing maladaptive eating, especially in a culturally diverse college environment.

Ethical statement

All procedures were performed in compliance with relevant laws and institutional guidelines and have been approved by the appropriate institutional committee, IRB #383, approval date: Feb 06, 2023.

The privacy rights of human subjects have been observed and informed consent was obtained for experimentation with human subjects.

Declaration of competing interest

The authors have no conflict of interest to disclose.

Data availability

The link to the data and code has been provided: https://osf.io/my3ab/?view_only=cee8afc9600f498cb201df8e5a39f03f.

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