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Differences in Perceived Stress and Depression among Weight (Dis)Satisfied Midwestern College Students during COVID-19

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Abstract: Background: Stress and depression are common mental health concerns among college students. Factors related to weight status and stigma are associated with poor mental health outcomes. We sought to describe the prevalence of weight dissatisfaction in relation to stress and depression among college students (n = 551). Methods: A cross-sectional study was conducted via a convenient sample between December 2020 and February 2021. Mean differences in the Perceived Stress Scale-10 scores and Center for Epidemiologic Studies Depression Scale scores were examined using a one-way analysis of variance. Associations between stress, depression, and weight dissatisfaction were measured by logistic regression. Results: Weight dissatisfied (75.1%) students had significantly higher mean depression scores compared to weight satisfied. The weight dissatisfied students were 1.05 times more likely to be depressed compared to those who were weight satisfied. Significant mean differences in stress and/or depression were found for weight dissatisfied students by gender, race, parental status, marital status, residence, and U.S. citizenship. Weight dissatisfaction was higher than that reported in the literature, possibly due to the influence of social isolation during the COVID-19 pandemic. Conclusions: Strategies to reduce the prevalence of weight dissatisfaction for improved mental health should be explored, particularly efforts to reduce weight stigmatization and expand access to mental health care.

Keywords: BMI; coronavirus; mental health; pandemic; university students; weight satisfaction

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1. Introduction

College students experienced new challenges to overcome with the onset of the COVID-19 pandemic inclusive of isolation, fears of disease diagnosis, and online education to name a few [1,2]. Consequently, college student's perceived stress and depressive symptoms were impacted due to COVID-19 [3,4]. Nationally represented data shows the mean BMI placed college students in the overweight category, whereas of the Fall 2020 semester, the mean BMI was 25.30, which might be reflective of the impact of the COVID-19 pandemic [5]. Studies have shown that during this time college students' emotional eating was associated with increased perceived stress levels [6]. In addition, due to the COVID-19 pandemic, research has shown that 65% increased snacking and ate in response to the sight and smell of food, and 52% increased eating in response to stress [7]. Additionally, college students reported their eating changed during COVID-19 by eating more convenience foods and cheaper higher processed foods [8]; as a result, college students were gaining more weight during the course of the COVID-19 pandemic [9]. Research among college students has shown that changes in eating habits might lead to increased levels of stress [10]. Studies have shown that experiencing higher levels of stress might lead to more depressive symptoms among college students [11]. Last, college students face pressures of achieving academic success, which might potentially impact their eating habits and increase their levels of stress [12–14].

According to the American College Health National College Health Assessment [ACHA], currently, 34.3% of college students are overweight or obese with a mean body

mass index (BMI) at 24.86 [15]. Recent studies have shown that college students having moderate to high perceived stress were associated with emotional eating and a lack of self-regulation of personal eating [16]. Increased emotional eating, in particular, has been associated with higher perceived stress among students of color [17]. Gender differences have shown that female students are more likely to have higher levels of perceived stress compared to male students [18]. Additionally, college student diets lacking frequent consumption of fruits and vegetables have been associated with higher perceived stress and depressive symptoms [19–21]. Similarly, college students who have higher perceived stress were more likely to have diets high in fats and increased fast-food consumption [21,22]. Though the links between dietary patterns and mental health outcomes are clear, it is less clear how weight dissatisfaction may contribute to poor mental health outcomes.

Nationally, close to half of college students reported that they are currently trying to lose weight [15]. A recent study of adults that were dissatisfied with their body showed they were more likely to be overweight compared to normal weight [23]. A nationally representative sample of U.S. adults found 67% to be body dissatisfied [24]. Body image has been defined as thoughts, feelings, and emotions related to an individual's body shape, size, and attractiveness [25]. Whereas, body dissatisfaction relates to how we look, happiness or lack thereof regarding specific parts of the body, and possessing a feeling of being overweight [26]. Studies have shown that college students with higher BMIs had greater body weight dissatisfaction [27]. Similarly, it has been shown that college students overall have a high rate of body image dissatisfaction, despite lower reported overweight and obesity compared to the adult general population [28]. Specifically, female students are more likely to express body image dissatisfaction as well as a desire to be thinner compared to male students [29]. However, male students who practiced weight suppression and had greater overall mean BMI reported higher body dissatisfaction over a six-month time period, which contrasted with female students [30]. At the same time, female students overall experienced greater body dissatisfaction compared to male students [30]. Studies have shown that having a lower body image and body dissatisfaction might potentially impact college students' overall mental health and, more specifically, self-esteem and self-confidence [28]. Intervention studies that have linked the impact of body satisfaction on mental health have shown that both can be improved among college students through increased exercise and physical activity [31]. Along the same lines, body dissatisfaction has increased the risk of disordered eating among college females [32]. Research has shown that college students that have eating disorders are more likely to be currently experiencing depressive symptoms [33]. Despite losing weight because of an eating disorder, students might still remain dissatisfied with their bodies [34].

Since the onset of COVID-19, understanding the mental health of college students has been at the forefront, more specifically, perceived stress [35,36] and depression [37–40]. Perceived stress has been quantified using the PSS-10 among college students based on eating behaviors [41,42], anxiety and sleep [43], levels of food insecurity [44], exercise [45], smartphone addiction [46], physical activity and sleep [47], online learning [48], and diet and emotional eating [49] among undocumented students [50] and student-athletes [51]. Depression has been quantified among college students using the CES-D based on physical activity level [52], levels of social support and internet addiction [53], levels of sleep variability [54], levels of smartphone addiction [55], levels of social media addiction [56], and among students with ADHD [57], athletes [58], and nursing students [59].

A sizeable amount of literature has focused on body (dis)satisfaction and body image, but to a lesser degree weight (dis)satisfaction among college students. More specifically, the impact of weight (dis)satisfaction on college students' perceived stress and depression. The purpose of this study was to describe the differences in weight satisfaction and dissatisfaction on (1) perceived stress and (2) depression experienced among a sample of midwestern college students.

2. Materials and Methods

2.1. Participant Recruitment

A convenience sample of enrolled students completed a self-administered online survey created via Qualtrics. Data collection spanned 2 months starting on 11 December 2020 and continuing until 12 February 2021. Six separate anonymous individual survey links were created and shared via email to various programs across campus to increase student responses. First, the survey was advertised in the daily university newsletter sent to all students and faculty with an active university email address. Also, the survey was sent to four different programs (Public Health, Exercise Science, Nutrition, and Sports Psychology) in the Principal Investigator's home department. The survey was also sent to the Principal Investigator's school inclusive of six other programs: Early Childhood Education, Elementary Education, Special Education, Secondary Education, Educational Leadership, and Psychology. No participant incentives were offered. Overall, a total of 607 students started the survey. The resulting Excel datasheets from the six individual survey links were combined into one final dataset. The final dataset was cleaned and non-respondents were removed. A total of 56 students were removed from the final analysis due to incomplete responses. Overall, n = 551 completed the survey. The study was approved by Southern Illinois University–Edwardsville Institutional Review Board protocol #1009.

2.2. Data Analysis

The data were analyzed using JMP Pro 16.2 (SAS Institute., Cary, NC, USA, 1989–2021) software. Sociodemographic variables included: gender (male/female), ethnicity (Hispanic/non-Hispanic), race (white vs. non-white) and (Asian, African-American, White, and multi-racial), parent of a child, first-generation student, current classification (undergraduate/graduate), current enrollment status (full-time/part-time), online/distance education student, current employment status (employed/unemployed), hours worked per week, current residence (on-campus/at home/off-campus), and U.S. citizenship. Student respondents self-reported height, current weight, and weight gained during college. Self-reported weight was reported in pounds (lbs). Height was reported in feet (ft) and inches and was converted to inches. BMI was calculated within the dataset using the equation $703 \times (\text{lbs}/[\text{in}^2])$. Differences in mean PSS-10, mean CES-D scores, mean BMI, and sociodemographic variables were examined using one-way analysis of variance (ANOVA). Significance was established at the $p < 0.05$ level for all statistical tests. Mean PSS-10, CES-D, and BMI were reported with standard deviations [SD] (i.e., PSS-10 $\pm$ SD; CES-D $\pm$ SD; BMI $\pm$ SD). The association between mental health and weight dissatisfaction was measured with binary logistic regression models. Crude models measured the association between stress and weight dissatisfaction and between depression and weight dissatisfaction. Adjusted models controlled for sociodemographic variables. Goodness of fit was measured with the Hosmer-Lemeshow test, and multicollinearity was assessed.

2.3. Measures

2.3.1. Perceived Stress Scale (PSS-10)

The 10-item Perceived Stress Scale (PSS-10) was used to measure levels of stress among the student respondents. The PSS-10 has shown an internal consistency of $\alpha = 0.91$ measuring perceived stress among college students during COVID-19 [60]. Students were asked to respond to the following items (within the last month) using a five-point Likert scale (never, almost never, sometimes, fairly often, and very often) and were scored from 0–4 respectively:

- How often have you been upset because of something that happened unexpectedly?
- How often have you felt that you were unable to control the important things in your life?
- How often have you felt nervous and "stressed"?
- How often have you felt confident about your ability to handle your personal problems?
- How often have you felt that things were going your way?

- How often have you found that you could not cope with all the things that you had to do?
- How often have you been able to control irritations in your life?
- How often have you felt that you were on top of things?
- How often have you been angered because of things that were outside of your control?
- How often have you felt difficulties were piling up so high that you could not overcome them?

The responses per question were added together in the final dataset to provide a cumulative score for each individual student respondent. Respondents that did not complete all 10 items were not included in the final analysis. Scores for the Perceived Stress Scale from 0–13 are considered low stress, 14–26 are considered moderate stress, and 27–40 are considered high stress. Internal consistency for PSS-10 was $\alpha = 0.73$.

2.3.2. Depression

The Center for Epidemiologic Studies Depression Scale (CES-D), is a 20-item validated scale that measures risk for clinical depression [61]. The CES-D has shown an internal consistency of $\alpha = 0.79$ measuring the risk for clinical depression among college students during COVID-19 [52]. Students were asked to respond to the following items (during the past week) using a four-point Likert scale (rarely [less than one day], some or a little of the time [1–2 days], occasionally or a moderate amount of time [3–4 days], and most or all of the time [5–7 days]) and were scored from 0–3, respectively. The responses per question were added together in the final dataset to provide a cumulative score for each individual student respondent. Respondents that did not complete all 20 items were not included in the final analysis. Total scoring for CES-D ranges from 0 to 60. Studies have designated that scores above 16 for CES-D might be suggestive of increased risk for clinical depression [61]. Internal consistency for CES-D was $\alpha = 0.82$.

2.3.3. Weight Satisfaction

Weight satisfaction was measured using one item, "how satisfied are you with your weight since COVID-19"? Respondents had a five-point Likert scale of options to choose from (very satisfied, satisfied, somewhat satisfied, dissatisfied, and very dissatisfied). For the purposes of analysis, participant responses for this item were dichotomized into satisfied and dissatisfied. The responses very satisfied, satisfied, and somewhat satisfied were combined as "satisfied". The responses dissatisfied and very dissatisfied were combined as "dissatisfied". Chi-square analyses (X^2) were performed between the socio-demographic variables and weight satisfaction, and they were reported with odds ratios (OR) and 95% confidence intervals (CI). Independent samples *t*-tests were performed for the continuous PSS-10, CES-D, and BMI scores and weight satisfaction, (means $\pm$ SD) with 95% CI. Binary logic regression models were run to determine potential relationships between the predictor variables perceived stress, depression, and the binary response variable of weight satisfied/weight dissatisfied. Other binary logic regression models were run adding categorical predictor variables to the previously described model inclusive of gender, race, parents of children, first-generation students, student classification, current enrollment status, enrollment in online classes, marital status, current employment status, current residence, and U.S. citizenship.

3. Results

3.1. Participant Characteristics

Most students reported being dissatisfied with their weight (75.1%, $n = 413$) compared to those that were weight satisfied (24.9%, $n = 137$). See Table 1 for differences in participant characteristics by weight satisfaction. The mean perceived stress score for all students was 23.72 $\pm$ 3.74. Most students (75.6%, $n = 403$) reported being weight dissatisfied with a mean perceived stress score of 24.02 $\pm$ 3.76. Weight satisfied (24.4%, $n = 132$) students had a mean perceived stress score of 22.80 $\pm$ 3.56. Weight-dissatisfied students were found to

have significantly higher perceived stress scores compared to weight-satisfied students [$t(532) = 20.41$; $p < 0.0001$ *]. See Table 2 for differences in mean perceived stress based on sociodemographics and weight satisfaction.

Table 1. Participant Characteristics of Midwestern College Students by Weight Satisfaction ($n = 551$).

Variable	WS (*n*)	WS (%)	WD (*n*)	WD (%)	X^2	95% CI	OR	*p*
Gender								
Male	34	25.0	52	12.9	11.18	1.39–3.67	2.26	<0.001 *
Female	102	75.0	352	87.1				
Race								
Non-White	33	24.3	88	21.3	0.52	0.75–1.87	1.18	0.47
White	103	75.7	325	78.7				
Parent of child (<18 years old)								
Yes	9	6.6	58	14.0	5.37	0.21–0.89	0.43	0.02 *
No	128	93.4	355	86.0				
First-generation student								
Yes	33	24.1	164	39.8	11.04	1.34–3.23	2.08	<0.001 *
No	104	75.9	248	60.2				
Classification								
Undergraduate	72	52.6	202	48.9	0.55	0.79–1.70	1.16	0.45
Graduate	65	47.4	211	51.1				
Enrollment status								
Full-time	115	83.9	356	86.4	0.51	0.48–1.40	0.82	0.47
Part-time	22	16.1	56	13.6				
Online student								
Yes	75	55.1	155	37.6	2.24	0.91–2.00	1.35	0.13
No	61	44.9	257	62.4				
Married								
Yes	18	13.2	77	18.6	2.09	0.38–1.16	0.67	0.15
No	118	86.8	336	81.4				
Employed								
Yes	105	76.6	312	75.5	0.07	0.67–1.67	1.06	0.79
No	32	23.4	101	24.5				
Campus residence								
On-campus	17	12.5	37	9.0	2.17	0.89–3.20	1.69	0.39
Off-campus	119	87.5	375	91.0				
US Citizen								
Yes	121	88.3	383	92.7	2.17	0.39–0.41	1.94	0.40
No	16	11.7	30	7.3				

$p < 0.05$ *, WS = Weight satisfied, WD = Weight dissatisfied.

Table 2. Perceived Stress Scores of Midwestern College Students by Weight Satisfaction (n = 551).

Variable	WS (Mean ± SD)	WD (Mean ± SD)	*F*	95% CI	*p*
Gender					
Male	21.50 ± 4.39	22.83 ± 4.46	14.47	21.35–23.29	<0.0001 *
Female	23.21 ± 3.17	24.22 ± 3.62		23.66–24.32	
Race					
Asian	21.38 ± 3.34	21.52 ± 4.47	3.23	19.61–22.89	0.01 *
African American	23.53 ± 3.56	23.84 ± 3.81		22.86–24.72	
White	22.63 ± 3.52	24.20 ± 3.64		23.47–24.17	
Multi-racial	25.57 ± 3.41	24.41 ± 3.84		23.19–26.31	
Parent of a child (<18 years old)					
Yes	23.44 ± 2.07	22.50 ± 3.51	6.62	21.81–23.45	0.01 *
No	22.76 ± 3.64	24.28 ± 3.74		23.53–24.21	
First-generation student					
Yes	22.63 ± 3.90	24.11 ± 4.01	0.42	23.26–24.41	0.52
No	22.86 ± 3.46	23.96 ± 3.60		23.26–24.02	
Classification					
Undergraduate	22.88 ± 4.04	24.41 ± 3.61	3.14	23.55–24.48	0.08
Graduate	22.72 ± 2.98	23.66 ± 3.86		22.99–23.87	
Enrollment status					
Full-time	22.94 ± 3.63	22.14 ± 3.17	1.70	23.45–24.14	0.19
Part-time	24.08 ± 3.75	23.63 ± 3.85		22.37–24.04	
Online student					
Yes	22.87 ± 3.67	24.08 ± 3.78	0.50	23.39–24.23	0.48
No	22.69 ± 3.48	23.93 ± 3.75		23.06–24.06	
Married					
Yes	22.11 ± 2.42	23.08 ± 3.57	5.57	22.20–23.59	0.02 *
No	22.88 ± 3.71	24.24 ± 3.77		23.53–24.24	
Employed					
Yes	22.59 ± 3.42	24.12 ± 3.72	0.03	23.37–24.09	0.85
No	23.48 ± 3.94	23.73 ± 3.89		22.99–24.34	
Campus residence					
On-campus	22.06 ± 2.88	23.24 ± 3.91	4.38	21.73–24.01	0.01 *
Living at home	22.88 ± 3.40	23.55 ± 3.63		22.94–23.87	
Off-campus	23.00 ± 3.35	24.61 ± 3.79		23.73–24.66	
US Citizen					
Yes	23.06 ± 3.41	24.16 ± 3.68	12.86	23.58–24.22	0.0001 *
No	20.94 ± 4.12	22.35 ± 4.37		20.48–23.00	

$p < 0.05$ *, WS = Weight satisfied, WD = Weight dissatisfied.

Students reported on 20 different items from the CES-D scale. The mean depression score for all students was 25.13 ± 8.43. Most students (75.4%, n = 402) reported being weight dissatisfied with a mean depression score of 26.06 ± 8.52. Weight satisfied (24.6%, n = 131) students had a mean depression score of 22.27 ± 7.51. Weight-dissatisfied students were found to have significantly higher depression scores compared to weight-satisfied students [$t(532) = 8.35$; $p < 0.01$ *]. See Table 3 for differences in mean depression scores based on sociodemographics and weight satisfaction.

Table 3. Depression Scores of Midwestern College Students by Weight Satisfaction (n = 551).

Variable	WS (Mean ± SD)	WD (Mean ± SD)	*F*	95% CI	*p*
Gender					
Male	21.58 ± 7.06	24.90 ± 9.82	2.90	21.60–25.52	0.09
Female	22.37 ± 7.61	26.11 ± 8.37		24.46–26.02	
Race					
Asian	17.50 ± 5.61	25.26 ± 8.26	4.17	19.20–25.57	<0.01 *
African American	21.88 ± 5.93	23.21 ± 7.75		20.94–24.59	
White	22.54 ± 7.67	26.30 ± 8.47		24.59–26.22	
Multi-racial	25.57 ± 9.27	28.89 ± 9.16		24.19–31.73	
Parent of child (<18 years old)					
Yes	20.67 ± 6.27	24.05 ± 3.51	2.53	21.49–25.71	0.11
No	22.39 ± 7.60	26.39 ± 8.41		24.56–26.08	
First-generation student					
Yes	23.58 ± 7.89	26.35 ± 8.99	2.61	24.55–27.07	0.10
No	21.83 ± 7.37	25.80 ± 8.15		23.79–25.52	
Classification					
Undergraduate	22.70 ± 8.34	27.04 ± 8.48	4.58	24.87–26.98	0.03 *
Graduate	21.59 ± 6.46	25.15 ± 8.47		23.34–25.29	
Enrollment status					
Full-time	22.40 ± 7.72	26.25 ± 8.40	2.00	24.53–26.08	0.16
Part-time	21.59 ± 6.46	24.77 ± 9.23		21.93–25.82	
Online student					
Yes	22.54 ± 7.29	26.28 ± 8.55	1.22	24.53–26.39	0.27
No	22.10 ± 7.78	25.63 ± 8.45		23.44–25.70	
Married					
Yes	22.44 ± 7.59	22.30 ± 7.53	2.04	22.28–25.77	0.15
No	24.39 ± 8.73	26.44 ± 8.43		24.57–26.15	
Employed					
Yes	21.93 ± 7.33	25.99 ± 8.50	0.43	24.14–25.78	0.51
No	23.35 ± 8.09	26.26 ± 8.60		24.06–27.05	
Campus residence					
On-campus	25.06 ± 9.19	25.81 ± 6.18	4.67	23.61–27.53	0.01 *
Living at home	21.37 ± 7.72	24.60 ± 8.40		22.78–24.97	
Off-campus	22.27 ± 6.80	27.49 ± 8.82		25.08–27.23	
US Citizen					
Yes	23.03 ± 7.50	26.23 ± 8.44	10.24	24.74–26.22	0.001 *
No	16.75 ± 4.95	23.83 ± 9.34		18.38–23.49	

$p < 0.05$ *, WS = Weight satisfied, WD = Weight dissatisfied.

A binary logistic regression model tested the probability of a student being dissatisfied with their weight as a function of perceived stress. After adjusting for sociodemographic characteristics and depression, no association remained between perceived stress and weight dissatisfaction (Table 4).

Table 4. Binary Logistic Regression Results of Mental Health and Weight Dissatisfaction (n = 551).

Variable	Crude OR (95% CI)	Adjusted OR (95% CI)
Perceived Stress	1.09 * (1.04, 1.15)	1.03 (0.96, 1.11)
Depression	1.06 * (1.03, 1.09)	1.05 * (1.01, 1.08)

$p < 0.05$ *; Adjusted for gender, race, parental status, first-generation student status, current classification, enrollment status, marital status, employment status, and U.S. citizenship status.

A binary logistic regression model tested the probability of a student being dissatisfied with their weight as a function of perceived stress and depression. There was no association between perceived stress and weight dissatisfaction [OR = 1.04; 95%(CI) = 0.98–1.11; p = 0.22]. There was a statistically significant association between depression and weight dissatisfaction; from low to high, for every 1 unit increase in depression, the odds of being weight dissatisfied increased 1.05 times [OR = 1.05; 95%(CI) = 1.01–1.08].

Most students were female (84.1%, n = 456). Female students were significantly more likely to be weight dissatisfied compared to male students ($p < 0.001$ *). Females had significantly higher overall mean perceived stress scores compared to males (24.00 $\pm$ 3.54 vs. 22.32 $\pm$ 4.45; $p < 0.0001$ *). See Table 2 for differences in mean perceived stress scores based on gender and weight satisfaction. Females had higher overall mean depression scores compared to males but this was not statistically significant (25.29 $\pm$ 8.35 vs. 23.56 $\pm$ 8.92). See Table 3 for differences in mean depression scores based on gender and weight satisfaction.

A binary logistic regression model tested the probability of a student being dissatisfied with their weight as a function of perceived stress, depression, and gender. Both the crude and adjusted models were significant. The crude model found female students were 0.48 times as likely to be weight dissatisfied compared to males [OR = 0.48; 95%(CI) = 0.30–0.77], whereas in the adjusted model, female students were 2.07 times more likely to be weight dissatisfied compared to males [OR = 2.07; 95%(CI) = 1.23–3.48] (Table 5).

Table 5. Binary Logistic Regression Results of Sociodemographic Variables and Weight Dissatisfaction (n = 551).

Variable	Crude OR (95% CI)	Adjusted OR (95% CI)
Female Gender	0.48 * (0.30, 0.77)	2.07 * (1.23, 3.48)
White Race	0.90 (0.57, 1.42)	1.14 (0.70, 1.85)
Parent of Child	2.39 * (1.15, 4.95)	0.36 * (0.17, 0.77)
Not First Generation	0.49 * (0.32, 0.76)	1.92 * (1.22, 3.03)
Graduate Student	0.83 (0.57, 1.22)	1.29 (0.86, 1.94)
Full Time Student	1.11 (0.66, 1.89)	0.88 (0.51, 1.54)
Online Student	0.70 (0.47, 1.03)	1.39 (0.92, 2.09)
Married	1.57 (0.91, 2.73)	0.60 (0.34, 1.07)
Unemployed	0.99 (0.78, 1.25)	1.00 (0.62, 1.61)
Live at Home	0.74 (0.39, 1.40)	1.75 (0.90, 3.45)
Live Off Campus	1.16 (0.77, 1.76)	1.33 (0.69, 2.57)
U.S. Citizen	0.68 (0.36, 1.27)	1.39 (0.71, 2.72)

$p < 0.05$ *; Adjusted for perceived stress and depression.

A majority of students identified as white (79.1%, n = 436). Other students that are non-white identified as African American (12.0%, n = 66), multi-racial (4.7%, n = 26), and Asian (4.2%, n = 23). White students were 1.14 times more likely compared to non-white students to be weight dissatisfied [OR = 1.14; 95%(CI) = 0.70–1.85; p = 0.59]. See Table 2 for differences in mean perceived stress scores based on race and weight satisfaction. See Table 3 for differences in mean depression scores based on race, ethnicity, and weight

satisfaction. There were no statistically significant differences in perceived stress and depression scores based on ethnicity and weight satisfaction ($p > 0.05$).

A binary logistic regression model tested the probability of a student being dissatisfied with their weight as a function of perceived stress, depression, and race. Neither the crude nor the adjusted models were found to be significant (Table 5).

Most students were not parents of children (87.8%, $n = 484$). Students that were not parents had significantly higher overall mean perceived stress scores compared to students that had children (23.88 ± 3.77 vs. 22.63 ± 3.36; $p = 0.01$ *). See Table 2 for differences in mean perceived stress scores based on being parents of children and weight satisfaction. Students that were not parents had higher overall mean depression scores compared to students that had children (25.35 ± 8.39 vs. 23.60 ± 8.65). See Table 3 for differences in mean depression scores based on being parents of children and weight satisfaction. There were no statistically significant differences in depression scores based on being parents of children and weight satisfaction ($p > 0.05$).

A binary logistic regression model tested the probability of a student being dissatisfied with their weight as a function of perceived stress, depression, and parents of children. Both the crude and adjusted models were significant. The crude model found parents were 2.39 times more likely to be weight dissatisfied compared to nonparents [OR = 2.39; 95%(CI) = 1.15–4.95], whereas in the adjusted model, nonparents were 0.36 times as likely to be weight dissatisfied compared to parents [OR = 0.36; 95%(CI) = 0.17–0.77] (Table 5).

A majority of students were not first-generation college students (64.0%, $n = 352$). First-generation college students were significantly more likely to be weight dissatisfied compared to non-first-generation college students ($p < 0.0001$ *). A binary logistic regression model tested the probability of a student being dissatisfied with their weight as a function of perceived stress, depression, and first-generation college students. Both the crude and adjusted models were significant. The crude model found first-generation college students were 0.49 times as likely to be weight dissatisfied compared to males [OR = 0.49; 95%(CI) = 0.32–0.76], whereas in the adjusted model first-generation college students were found to be 1.92 times more likely compared to non-first-generation students to be weight dissatisfied. [OR = 1.92; 95%(CI) = 1.22–3.03].

First-generation college students had higher overall mean perceived stress scores (23.86 ± 4.02 vs. 23.64 ± 3.59) and depression scores (25.88 ± 8.86 vs. 24.65 ± 8.13) compared to non-first-generation college students. See Tables 2 and 3 for differences in mean perceived stress and depression scores based on being a first-generation college student and weight satisfaction. There were no statistically significant differences in perceived stress and depression scores based on being a first-generation college student and weight satisfaction ($p > 0.05$).

A near-even split of student respondents was found between undergraduate (49.9%, $n = 275$) and graduate students (50.1%, $n = 276$). Undergraduate students had significantly higher overall perceived stress scores to graduate students (25.92 ± 8.64 vs. 24.37 ± 8.18; $p = 0.03$ *). See Table 2 for differences in mean perceived stress scores between undergraduate/graduate students and weight satisfaction. Undergraduate students had higher overall depression scores to graduate students (24.02 ± 3.78 vs. 23.44 ± 3.69). See Table 3 for mean CES-D scores between undergraduate/graduate students and weight satisfaction. There were no significant differences in mean depression scores between undergraduate/graduate students and weight satisfaction.

A binary logistic regression model tested the probability of a student being dissatisfied with their weight as a function of perceived stress, depression, and classification. There was no association between undergraduate classification and weight dissatisfaction for the crude or the adjusted models (Table 5).

Most students were currently enrolled full-time (85.8%, $n = 472$). Full-time students had higher overall mean perceived stress scores compared to part-time students (23.80 ± 3.75 vs. 23.21 ± 3.71). There was no association between full-time status and weight dissatisfaction [OR = 0.88; 95%(CI) = 0.51–1.54; $p = 0.66$]. Full-time students had higher overall

mean depression scores compared to part-time students (25.33 ± 8.40 vs. 23.87 ± 8.62). See Tables 2 and 3 for mean perceived stress scores and depression scores based on current enrollment status and weight satisfaction. There were no statistically significant differences in perceived stress and depression scores based on current enrollment status and weight satisfaction ($p > 0.05$).

A binary logistic regression model tested the probability of a student being dissatisfied with their weight as a function of perceived stress, depression, and enrollment status. There was no association between enrollment status and weight dissatisfaction for either the crude or the adjusted models (Table 5).

Most students were enrolled in online classes (60.7%, $n = 333$). Online students had higher overall mean perceived stress scores (23.81 ± 3.78 vs. 23.58 ± 3.71) and depression scores compared to on-campus students (25.46 ± 8.42 vs. 24.63 ± 8.40). See Tables 2 and 3 for mean perceived stress scores and depression scores based on being enrolled in online courses and weight satisfaction. There were no statistically significant differences in perceived stress and depression scores based on being enrolled in online courses and weight satisfaction ($p > 0.05$).

A binary logistic regression model tested the probability of a student being dissatisfied with their weight as a function of perceived stress, depression, and enrollment in online classes. Neither the crude nor the adjusted models were found to be significant (Table 5).

A majority of students were single (82.7%, $n = 454$). Single students had significantly higher overall perceived stress scores compared to married students (23.89 ± 3.80 vs. 22.89 ± 3.39; $p = 0.02$ *). See Table 2 for differences in mean perceived stress scores relationship status and weight satisfaction. Single students had higher overall depression scores to graduate students (25.39 ± 8.40 vs. 24.02 ± 8.52). See Table 3 for mean depression scores between undergraduate/graduate students and weight satisfaction. There were no significant differences in mean depression scores based on relationship status and weight satisfaction ($p > 0.05$).

A binary logistic regression model tested the probability of a student being dissatisfied with their weight as a function of perceived stress, depression, and marital status. There was no association between marital status and weight dissatisfaction for either the crude or the adjusted models (Table 5).

A majority of students were employed (75.8%, $n = 417$). Employed students worked a mean of 26.72 ± 12.52 h per week. Weight-dissatisfied students worked significantly more hours per week compared to weight-satisfied students (27.60 ± 12.40 vs. 24.20 ± 12.58; $t(376) = 5.43$; $p = 0.02$ *). Employed students had higher overall mean perceived stress scores compared to unemployed students (23.74 ± 3.70 vs. 23.67 ± 3.89). Unemployed students had higher overall mean depression scores compared to employed students (25.55 ± 8.54 vs. 24.99 ± 8.41). See Tables 2 and 3 for mean perceived stress scores and depression scores based on employment status and weight satisfaction. There were no statistically significant differences in perceived stress and depression scores based on current employment status and weight satisfaction ($p > 0.05$). A binary logistic regression model tested the probability of a student being dissatisfied with their weight as a function of perceived stress, depression, and employment status. There was no association between employment status and weight dissatisfaction for either the crude or the adjusted models (Table 5).

Most students lived off-campus (90.2%, $n = 494$). For the off-campus students, (47.4%, $n = 260$) lived in apartments, and (42.7%, $n = 234$) lived at home. Students that lived in off-campus apartments had significantly higher perceived stress scores compared to those that lived at home and on campus (24.21 ± 3.74 vs. 23.40 ± 3.58 vs. 22.87 ± 4.17; $p = 0.01$ *). See Table 2 for differences in mean perceived stress scores based on current residence and weight satisfaction. Students that lived in off-campus apartments had significantly higher depression scores compared to those that lived on-campus and at home (26.20 ± 8.65 vs. 25.57 ± 7.18 vs. 23.88 ± 8.35; $p = 0.01$ *). See Table 3 for differences in mean depression scores based on current residence and weight satisfaction. A binary logistic regression model tested the probability of a student being dissatisfied with their

weight as a function of perceived stress, depression, and current residence. There was no association between marital status and weight dissatisfaction for either the crude or the adjusted models (Table 5).

Most students reported as U.S. citizens (91.6%, n = 504). U.S. citizens were found to have significantly higher overall mean perceived stress scores compared to non-U.S. citizens (23.90 ± 3.64 vs. 21.87 ± 4.30; $p < 0.0001$ *). See Table 2 for differences in mean perceived stress scores based on U.S. citizenship and weight satisfaction. U.S. citizens were found to have significantly higher overall mean depression scores compared to non-U.S. citizens (25.48 ± 8.33 vs. 21.31 ± 8.69; $p = 0.001$ *). See Table 3 for differences in mean depression scores based on U.S. citizenship and weight satisfaction. A binary logistic regression model tested the probability of a student being dissatisfied with their weight as a function of perceived stress, depression, and U.S. citizenship. There was no association between U.S. citizenship and weight dissatisfaction for either the crude or the adjusted models (Table 5).

3.2. BMI, Weight Gain, Current Weight by Weight Satisfaction

The mean BMI for students was 27.10 ± 7.20. There were significant differences in BMI [$t(540) = 54.46$; $p < 0.0001$ *]. Students that were dissatisfied with their weight had a significantly higher BMI compared to those that were satisfied with their weight (28.36 ± 7.58 vs. 23.34 ± 4.04). Students reported they gained a mean of 16.39 ± 18.08 pounds since starting college. There were significant differences in weight gained in college [$t(488) = 20.50$; $p < 0.0001$ *]. Students that were dissatisfied with their weight reportedly gained significantly more weight from when they started college compared to those that were satisfied with their weight (18.44 ± 16.94 pounds vs. 9.95 ± 20.07 pounds). There were significant differences by current weight in college [$t(540) = 32.05$; $p < 0.0001$ *]. The mean current weight for students was 166.08 ± 46.64 pounds. There were significant differences in current weight in college [$t(540) = 32.05$; $p < 0.0001$ *]. Students that were dissatisfied with their weight had significantly higher current weight compared to those that were satisfied with their weight (172.48 ± 49.24 vs. 147.03 ± 30.96).

3.3. Student Education Outcomes

Students responded to five different items related to their mental health and education. Most students reported they felt isolated during the COVID-19 pandemic (77.9%, n = 422), had adequate support from family/friends during COVID-19 (76.6%, n = 415), found it difficult to be motivated to attend class and/or complete all coursework due to the COVID-19 pandemic (71.5%, n = 387), and did not miss class and/or any assignments due to their mental health as a result of the COVID-19 pandemic (62.2%, n = 337). Other responses include students who had a change in student status as a result of COVID-19 [i.e., withdrawn from classes; full-time to part-time] (11.3%, n = 61). Significant differences were found based on weight satisfaction. Students that were dissatisfied with their weight were significantly more likely to report finding it difficult to be motivated to attend class and/or complete all coursework due to the COVID-19 pandemic compared to those students that were satisfied with their weight [78.8% vs. 21.2%, $X^2(1) = 9.63$; OR = 1.91; 95%(CI) = 1.27–2.90; $p < 0.01$ *]. Students that were dissatisfied with their weight were significantly more likely to report missing a class and/or any assignments due to their mental health as a result of the COVID-19 pandemic [82.0% vs. 18.0%, $X^2(1) = 8.00$; OR = 1.84; 95%(CI) = 1.20–2.82; $p < 0.01$ *]. Students that were dissatisfied with their weight were significantly more likely to report they felt isolated during the COVID-19 pandemic [77.3% vs. 22.7%, $X^2(1) = 4.20$; OR = 1.59; 95%(CI) = 1.02–2.49; $p = 0.04$ *]. No other significant differences were found ($p > 0.05$).

4. Discussion

The prevalence of weight dissatisfaction was much higher in the study sample (75.1%) compared to reports from previous studies. A study of community college students found

41.7% of surveyed students were dissatisfied with their weight [62], and international studies reported a prevalence of weight dissatisfaction among 38.3% of undergraduates in India [63] and 47.2% of adolescents in Turkey [64]. Though cultural differences make it difficult to compare U.S. college students to international settings, both domestic and international studies consistently report that females are significantly more likely to be weight dissatisfied compared with their male counterparts [62,64]. It is possible that experiencing the COVID-19 pandemic influenced the particularly high weight dissatisfaction in the study sample. A recent study of college students from the southeastern U.S. found that 67.1% of students reported increased concerns about weight and body shape since the start of the pandemic [9].

Weight dissatisfaction was significantly associated with both BMI and depression, where weight-dissatisfied students were more likely to have a higher BMI and were more likely to have higher depression scores compared to weight-satisfied students. In Turkey, each unit increase in BMI resulted in a 7.5% increase in depression levels among young adults [65], and among U.S. young adolescent females, weight satisfaction was significantly correlated with depressive symptoms [66]. The relationship between depression and weight dissatisfaction remained after controlling for stress and sociodemographic characteristics, suggesting that depression and weight dissatisfaction are independently associated. Though not measured in the present study, weight stigma likely contributes to the association between weight dissatisfaction and depression. Experiencing weight stigma was found to be associated with weight dissatisfaction and with depression and anxiety [67–70].

Overall, depression appears to be more strongly associated with weight dissatisfaction compared to perceived stress. After adjusting for depression and sociodemographic characteristics, there was no association between perceived stress and weight dissatisfaction, whereas the association between depression and weight dissatisfaction persisted after adjustment.

Those who were first-generation college students were more likely to be weight dissatisfied and had higher PSS-10 and depression scores compared with non-first-generation students. Among students seeking services at a university counseling center, first-generation students were significantly more likely to experience distress related to academics and finances [71]. However, other studies have found weak to no associations between first-generation status and depression [71,72].

Depression scores by race significantly differed between weight-satisfied and weight-dissatisfied students. For all race categories, weight-dissatisfied students had higher depression scores. Among weight-dissatisfied students, those who identified as Multiracial had the highest depression scores, followed by white, Asian, and African American students. Weight dissatisfaction has been found to vary by race among U.S. adolescents from the upper Midwest region [73]. It has previously been reported that African American students, particularly African American women, report body dissatisfaction less frequently than their white counterparts; however, African American female students who were more enculturated reported body dissatisfaction at levels closer to white female students in the Midwest [74]. Thus, body dissatisfaction is likely more tied to prevailing cultural beliefs and norms rather than racial categories themselves. The influence of U.S. culture may also be evident in the differences in depression and stress reported by students who were U.S. citizens compared to those who were not citizens. For both depression and stress, U.S. citizen students reported higher scores for both weight-satisfied and weight-dissatisfied students.

5. Conclusions

A high prevalence of weight dissatisfaction was found in this sample of midwestern college students. Those who were weight dissatisfied scored higher on both stress and depression scales across multiple variables. Depression was independently associated with weight dissatisfaction. Further descriptive and analytic studies are recommended to better understand the potential moderating role of U.S. culture (enculturation) on associations

between body dissatisfaction and mental health outcomes and to determine whether differences exist by region. Additionally, strategies to reduce the prevalence of weight dissatisfaction for improved mental health should be explored, particularly efforts to reduce experiences of weight stigmatization and expanding access to mental health care.

Limitations

Though the results presented demonstrate important patterns in relationships between weight dissatisfaction and mental health, results should be interpreted to understand a few limitations. Convenience sampling may reduce generalizability to other populations. Additionally, the cross-sectional nature of the study does not allow for assessments of causality; it is unknown whether mental health preceded feelings of weight (dis)satisfaction or whether mental health outcomes are a consequence of weight dissatisfaction. The relationships between physical health, mental health, and body perceptions operate within complex pathways. Future analytic studies should develop and measure other potentially mediating and moderating variables under a directed acyclic graph or causal diagram) framework, particularly variables related to experiences of weight stigma and sources of weight messaging.

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References

1. Gordon, M. Synchronous teaching and learning; on-ground versus Zoom. *Int. J. Educ. Hum. Dev.* **2020**, *6*, 11–19.
2. Yang, C.; Chen, A.; Chen, Y. College students' stress and health in the COVID-19 pandemic: The role of academic workload, separation from school, and fears of contagion. *PLoS ONE* **2021**, *16*, e0246676. [CrossRef] [PubMed]
3. Kohls, E.; Baldofski, S.; Moeller, R.; Klemm, S.L.; Rummel-Kluge, C. Mental health, social and emotional well-being, and perceived burdens of university students during COVID-19 pandemic lockdown in Germany. *Front. Psychiatry* **2021**, *12*, 643957. [CrossRef] [PubMed]
4. Son, C.; Hegde, S.; Smith, A.; Wang, X.; Sasangohar, F. Effects of COVID-19 on college students' mental health in the United States: Interview survey study. *J. Med. Internet Res.* **2020**, *22*, e21279. [CrossRef] [PubMed]
5. National College Health Assessment-Fall 2020. Available online: https://www.acha.org/documents/ncha/NCHA-III_Fall_2020_Undergraduate_Reference_Group_Data_Report.pdf (accessed on 1 April 2023).
6. Shen, W.; Long, L.M.; Shih, C.H.; Ludy, M.J. A humanities-based explanation for the effects of emotional eating and perceived stress on food choice motives during the COVID-19 pandemic. *Nutrients* **2020**, *12*, 2712. [CrossRef]
7. Zachary, Z.; Forbes, B.; Lopez, B.; Pedersen, G.; Welty, J.; Deyo, A.; Kerekes, M. Self-quarantine and weight gain related risk factors during the COVID-19 pandemic. *Obes. Res. Clin. Pract.* **2020**, *14*, 210–216. [CrossRef]
8. Silva, F.B.; Osborn, D.E.; Owens, M.R.; Kirkland, T.; Moore, C.E.; Patterson, M.A.; Tucker, W.J.; Miketinas, D.C.; Davis, K.E. Influence of COVID-19 pandemic restrictions on college students' dietary quality and experience of the Food Environment. *Nutrients* **2021**, *13*, 2790. [CrossRef]
9. Keel, P.K.; Gomez, M.M.; Harris, L.; Kennedy, G.A.; Ribeiro, J.; Joiner, T.E. Gaining "The quarantine 15:" perceived versus observed weight changes in college students in the wake of COVID-19. *Int. J. Eat. Disord.* **2020**, *53*, 1801–1808. [CrossRef]

10. Ross, S.E.; Niebling, B.C.; Heckert, T.M. Sources of stress among college students. *Coll. Stud. J.* **1999**, *33*, 312.
11. Hirsch, J.K.; Rabon, J.K.; Reynolds, E.E.; Barton, A.L.; Chang, E.C. Perceived stress and suicidal behaviors in college students: Conditional indirect effects of depressive symptoms and mental health stigma. *Stigma Health* **2019**, *4*, 98–106. [CrossRef]
12. Zhang, M.; Zhang, J.; Zhang, F.; Zhang, L.; Feng, D. Prevalence of psychological distress and the effects of resilience and perceived social support among Chinese college students: Does gender make a difference? *Psychiatry Res.* **2018**, *267*, 409–413. [CrossRef]
13. Liu, C.; Xie, B.; Chou, C.P.; Koprowski, C.; Zhou, D.; Palmer, P.; Sun, P.; Guo, Q.; Duan, L.; Sun, X.; et al. Perceived stress, depression and food consumption frequency in the college students of China seven cities. *Physiol. Behav.* **2007**, *92*, 748–754. [CrossRef]
14. Errisuriz, V.L.; Pasch, K.E.; Perry, C.L. Perceived stress and dietary choices: The moderating role of Stress Management. *Eat. Behav.* **2016**, *22*, 211–216. [CrossRef]
15. National College Health Assessment-Fall 2022. Available online: https://www.acha.org/documents/ncha/NCHAIII_FALL_2022_UNDERGRADUATE_REFERENCE_GROUP_DATA_REPORT.pdf (accessed on 1 April 2023).
16. Ling, J.; Zahry, N.R. Relationships among perceived stress, emotional eating, and dietary intake in college students: Eating self-regulation as a mediator. *Appetite* **2021**, *163*, 105215. [CrossRef]
17. Diggins, A.; Woods-Giscombe, C.; Waters, S. The association of perceived stress, contextualized stress, and emotional eating with body mass index in college-aged Black women. *Eat. Behav.* **2015**, *19*, 188–192. [CrossRef]
18. Graves, B.S.; Hall, M.E.; Dias-Karch, C.; Haischer, M.H.; Apter, C. Gender differences in perceived stress and coping among college students. *PLoS ONE* **2021**, *16*, e0255634. [CrossRef]
19. Mikolajczyk, R.T.; El Ansari, W.; Maxwell, A.E. Food consumption frequency and perceived stress and depressive symptoms among students in three European countries. *Nutr. J.* **2009**, *8*, 31. [CrossRef]
20. El Ansari, W.; Adetunji, H.; Oskrochi, R. Food and mental health: Relationship between food and perceived stress and depressive symptoms among university students in the United Kingdom. *Cent. Eur. J. Public Health* **2014**, *22*, 90–97. [CrossRef]
21. Vidal, E.J.; Alvarez, D.; Martinez-Velarde, D.; Vidal-Damas, L.; Yuncar-Rojas, K.A.; Julca-Malca, A.; Bernabe-Ortiz, A. Perceived stress and high fat intake: A study in a sample of undergraduate students. *PLoS ONE* **2018**, *13*, e0192827. [CrossRef]
22. Nastaskin, R.S.; Fiocco, A.J. A survey of diet self-efficacy and food intake in students with high and low perceived stress. *Nutr. J.* **2015**, *14*, 42. [CrossRef]
23. Gruszka, W.; Owczarek, A.J.; Glinianowicz, M.; Bąk-Sosnowska, M.; Chudek, J.; Olszanecka-Glinianowicz, M. Perception of body size and body dissatisfaction in adults. *Sci. Rep.* **2022**, *12*, 1159. [CrossRef] [PubMed]
24. Fiske, L.; Fallon, E.A.; Blissmer, B.; Redding, C.A. Prevalence of body dissatisfaction among united states adults: Review and Recommendations for Future Research. *Eat. Behav.* **2014**, *15*, 357–365. [CrossRef] [PubMed]
25. Quittkat, H.L.; Hartmann, A.S.; Düsing, R.; Buhlmann, U.; Vocks, S. Body dissatisfaction, importance of appearance, and body appreciation in men and women over the lifespan. *Front. Psychiatry* **2019**, *10*, 864. [CrossRef] [PubMed]
26. Barnes, M.; Abhyankar, P.; Dimova, E.; Best, C. Associations between body dissatisfaction and self-reported anxiety and depression in otherwise healthy men: A systematic review and meta-analysis. *PLoS ONE* **2020**, *15*, e0229268. [CrossRef]
27. Gunnare, N.A.; Silliman, K.; Morris, M.N. Accuracy of self-reported weight and role of gender, body mass index, weight satisfaction, weighing behavior, and physical activity among rural college students. *Body Image* **2013**, *10*, 406–410. [CrossRef]
28. Radwan, H.; Hasan, H.A.; Ismat, H.; Hakim, H.; Khalid, H.; Al-Fityani, L.; Mohammed, R.; Ayman, A. Body mass index perception, body image dissatisfaction and their relations with weight-related behaviors among university students. *Int. J. Environ. Res. Public Health* **2019**, *16*, 1541. [CrossRef]
29. Withnell, S.J.; Bodell, L.P. Does suppressing weight improve body satisfaction? A longitudinal analysis in undergraduate men and women. *Body Image* **2023**, *45*, 126–132. [CrossRef]
30. Grossbard, J.R.; Lee, C.M.; Neighbors, C.; Larimer, M.E. Body image concerns and contingent self esteem in male and female college students. *Sex Roles* **2008**, *60*, 198–207. [CrossRef]
31. Annesi, J.J.; Howton, A.; Johnson, P.H.; Porter, K.J. Pilot testing a cognitive-behavioral protocol on psychosocial predictors of exercise, nutrition, weight, and body satisfaction changes in a college-level health-related fitness course. *J. Am. Coll. Health* **2015**, *63*, 268–278. [CrossRef]
32. Stice, E.; Gau, J.M.; Rohde, P.; Shaw, H. Risk factors that predict future onset of each DSM-5 eating disorder: Predictive specificity in high-risk adolescent females. *J. Abnorm. Psychol.* **2017**, *126*, 38–51. [CrossRef]
33. Chan, Y.L.; Samy, A.L.; Tong, W.T.; Islam, M.A.; Low, W.Y. Eating disorder among Malaysian University students and its associated factors. *Asia Pac. J. Public Health* **2020**, *32*, 334–339. [CrossRef]
34. Fairburn, C.G.; Cooper, Z.; Shafran, R. Cognitive behaviour therapy for eating disorders: A "Transdiagnostic" theory and treatment. *Behav. Res. Ther.* **2003**, *41*, 509–528. [CrossRef]
35. Garcia Colato, E.; Ludema, C.; Rosenberg, M.; Kianersi, S.; Luetke, M.; Chen, C.; Macy, J.T. The association between social factors and COVID-19 protective behaviors and depression and stress among midwestern US college students. *PLoS ONE* **2022**, *17*, e0279340. [CrossRef]
36. Liu, B.; Huynh, E.; Li, C.; Wu, Q. Impact of COVID-19 on college students at one of the most diverse campuses in the USA: A factor analysis of survey data. *BMJ Open* **2022**, *12*, e061719. [CrossRef]
37. Origlio, J.; Odar Stough, C. Locus of control and pre-pandemic depressive symptoms relate to psychological adjustment of college students to the COVID-19 pandemic. *J. Am. Coll. Health* **2022**, 1–8. [CrossRef]

38. Kim, D.; Yoon, B.H.; Sea, Y.H.; Kang, H.; Kim, K.; Song, J.H.; Park, S. Stress Coping and Resilience in College Students with Depression. *Mood Emot.* **2021**, *19*, 85–93. [CrossRef]
39. Wang, Z.H.; Yang, H.L.; Yang, Y.Q.; Liu, D.; Li, Z.H.; Zhang, X.R.; Zhang, Y.J.; Shen, D.; Chen, P.L.; Song, W.Q.; et al. Prevalence of anxiety and depression symptom, and the demands for psychological knowledge and interventions in college students during COVID-19 epidemic: A large cross-sectional study. *J. Affect. Disord.* **2020**, *275*, 188–193. [CrossRef]
40. Aamir, S.; Winkel, C. The impact of COVID-19 on Saudi Arabian female students: An application of the CES-D depression scale. *J. Educ. Soc.* **2021**, *1*, 23–31. [CrossRef]
41. Ulhaq, N.D.; Amalia, D.P.; Rafa, K.D.; Rizkiya, I.; Astuti, Y.D.; Febriyanti, F.; Syafaatun, A.; Alrahmah, K.; Widayati, K.A. Correlation between stress and eating behaviour in college students: A longitudinal study. *HAYATI J. Biosci.* **2020**, *30*, 88–94. [CrossRef]
42. Choi, J. Impact of stress levels on eating behaviors among college students. *Nutrients* **2020**, *12*, 1241. [CrossRef]
43. Wang, X.; Chen, H.; Liu, L.; Liu, Y.; Zhang, N.; Sun, Z.; Lou, Q.; Ge, W.; Li, M. Anxiety and sleep problems of college students during the outbreak of COVID-19. *Front. Psychiatry* **2020**, *11*, 588693. [CrossRef] [PubMed]
44. OoNorasak, K.; Barr, M.; Pennell, M.; Hardesty, D.; Yokokura, K.; Udarbe, S.; Stephenson, T. Intersectionality of self-reported food Insecurity and perceived stress of college students at a land-grant southeastern higher education institution during the COVID-19 pandemic. *Ga. J. Coll. Stud. Aff.* **2023**, *39*, 25–46. [CrossRef]
45. Elliott, L.D.; Wilson, O.W.; Holland, K.E.; Bopp, M. Using exercise as a stress management technique during the COVID-19 pandemic: The differences between men and women in college. *Int. J. Exerc. Sci.* **2021**, *14*, 1234–1246. [PubMed]
46. Zhao, Z.; Zhao, S.; Wang, Q.; Zhang, Y.; Chen, C. Effects of physical exercise on mobile phone addiction in college students: The chain mediation effect of psychological resilience and perceived stress. *Int. J. Environ. Res. Public Health* **2022**, *19*, 15679. [CrossRef] [PubMed]
47. Zhai, X.; Wu, N.; Koriyama, S.; Wang, C.; Shi, M.; Huang, T.; Wang, K.; Sawada, S.S.; Fan, X. Mediating effect of perceived stress on the association between physical activity and sleep quality among Chinese college students. *Int. J. Environ. Res. Public Health* **2021**, *18*, 289. [CrossRef]
48. Keliat, B.A.; Azni, A.Y.; Susanti, N.C. Differences in stress levels between junior high school students and college students during online learning. *Nurs. Manag.* **2023**, *54*, 25–28. [CrossRef]
49. Grajek, M.; Krupa-Kotara, K.; Białek-Dratwa, A.; Staśkiewicz, W.; Rozmiarek, M.; Misterska, E.; Sas-Nowosielski, K. Prevalence of emotional eating in groups of students with varied diets and physical activity in Poland. *Nutrients* **2022**, *14*, 3289. [CrossRef]
50. Goodman, J.; Wang, S.X.; Ornelas, R.A.G.; Santana, M.H. Mental health of undocumented college students during the COVID-19 pandemic. *medRxiv* **2020**. [CrossRef]
51. Strauser, C.M.; Chavez, V.; Lindsay, K.R.; Figgins, M.M.; DeShaw, K.J. College student athlete versus nonathlete mental and social health factors during the COVID-19 pandemic. *J. Am. Coll. Health* **2023**, 1–6. [CrossRef]
52. Lin, J.; Guo, T.; Becker, B.; Yu, Q.; Chen, S.T.; Brendon, S.; Hossain, M.M.; Cunha, P.M.; Soares, F.C.; Veronese, N.; et al. Depression is associated with moderate-intensity physical activity among college students during the COVID-19 pandemic: Differs by activity level, gender and gender role. *Psychol. Res. Behav. Manag.* **2020**, *13*, 1123–1134. [CrossRef]
53. Dong, Y.; Li, H. The relationship between social support and depressive symptoms among the college students of Liaoning, China: A moderated mediated analysis. *Psychol. Health Med.* **2020**, *25*, 368–378. [CrossRef]
54. Price, S.; Chikersal, P.; Doryab, A.; Villalba, D.; Dutcher, J.; Tumminia, M.; Cohen, S.; Creswell, K.; Mankoff, J.; Creswell, D. 0258 Early semester sleep variability predicts depression among college students. *Sleep* **2020**, *43*, A98. [CrossRef]
55. Yang, X.; Hu, H.; Zhao, C.; Xu, H.; Tu, X.; Zhang, G. A longitudinal study of changes in smart phone addiction and depressive symptoms and potential risk factors among Chinese college students. *BMC Psych.* **2021**, *21*, 252. [CrossRef]
56. Saputri, R.A.M.; Yumarni, T. Social media addiction and mental health among university students during the COVID-19 pandemic in Indonesia. *Int. J. Ment. Health Addict.* **2023**, *21*, 96–110.
57. Müller, V.; Mellor, D.; Piko, B.F. How to procrastinate productively with ADHD: A study of smartphone use, depression, and other academic variables among university students with ADHD symptoms. *J. Atten. Disord.* **2023**, 10870547231171724. [CrossRef]
58. Yim, H.; Kim, A.C.H.; Du, J.; James, J.D. Sport participation, acculturative stress, and depressive symptoms among international college students in the United States. *Front. Psych.* **2023**, *14*, 1104325. [CrossRef]
59. Nway, N.C.; Phetrasuwan, S.; Putdivarnichapong, W.; Vongsirimas, N. Factors contributing to depressive symptoms among undergraduate nursing students: A cross-sectional study. *Nurse Educ. Pract.* **2023**, *68*, 103587. [CrossRef]
60. Zhan, H.; Zheng, C.; Zhang, X.; Yang, M.; Zhang, L.; Jia, X. Chinese college students' stress and anxiety levels under COVID-19. *Front. Psychiatry* **2021**, *12*, 615390. [CrossRef]
61. Lewinsohn, P.M.; Seeley, J.R.; Roberts, R.E.; Allen, N.B. Center for Epidemiologic Studies Depression Scale (CES-D) as a screening instrument for depression among community-residing older adults. *Psychol. Aging* **1997**, *12*, 277–287. [CrossRef]
62. Nanney, M.S.; Lytle, L.A.; Farbakhsh, K.; Moe, S.G.; Linde, J.A.; Gardner, J.K.; Laska, M.N. Weight and weight-related behaviors among 2-year college students. *J. Am. Coll. Health* **2015**, *63*, 221–229. [CrossRef]
63. Vijayalakshmi, P.; Thimmaiah, R.; Gandhi, S.; BadaMath, S. Eating attitudes, weight control behaviors, body image satisfaction and depression level among Indian medical and nursing undergraduate students. *Community Ment. Health J.* **2018**, *54*, 1266–1273. [CrossRef] [PubMed]

64. Ozmen, D.; Ozmen, E.; Ergin, D.; Cetinkaya, A.C.; Sen, N.; Dundar, P.E.; Taskin, E.O. The association of self-esteem, depression and body satisfaction with obesity among Turkish adolescents. *BMC Public Health* **2007**, *7*, 80. [CrossRef] [PubMed]
65. Hamurcu, P. Impact of perceived body weight on depression, anxiety and stress levels of young adults in Turkey. *Iran J. Public Health* **2023**, *52*, 603. [CrossRef] [PubMed]
66. Rierdan, J.; Koff, E. Weight, weight-related aspects of body image, and depression in early adolescent girls. *Adolescence* **1997**, *32*, 615–624.
67. Puhl, R.M.; Latner, J.D. Stigma, obesity, and the health of the nation's children. *Psychol. Bull.* **2007**, *133*, 557–580. [CrossRef]
68. Jensen, C.D.; Steele, R.G. Body dissatisfaction, weight criticism, and self-reported physical activity in preadolescent children. *J. Pediatr. Psychol.* **2009**, *34*, 822–826. [CrossRef]
69. Bucchianeri, M.M.; Eisenberg, M.E.; Wall, M.M.; Piran, N.; Neumark-Sztainer, D. Multiple types of harassment: Associations with emotional well-being and unhealthy behaviors in adolescents. *J. Adolesc. Health* **2014**, *54*, 724–729. [CrossRef]
70. Warnick, J.L.; Darling, K.E.; West, C.E.; Jones, L.; Jelalian, E. Weight stigma and mental health in youth: A systematic review and meta-analysis. *J. Pediatr. Psychol.* **2021**, *47*, 237–255. [CrossRef]
71. House, L.A.; Neal, C.; Kolb, J. Supporting the mental health needs of First Generation College students. *J. College Stud. Psychother.* **2019**, *34*, 157–167. [CrossRef]
72. Jenkins, S.R.; Belanger, A.; Connally, M.L.; Boals, A.; Durón, K.M. First-generation undergraduate students' social support, depression, and life satisfaction. *J. Coll. Couns.* **2013**, *16*, 129–142. [CrossRef]
73. Van den Berg, P.A.; Mond, J.; Eisenberg, M.; Ackard, D.; Neumark-Sztainer, D. The link between body dissatisfaction and self-esteem in adolescents: Similarities across gender, age, weight status, race/ethnicity, and socioeconomic status. *J. Adolesc. Health* **2010**, *47*, 290–296. [CrossRef]
74. Awad, G.H.; Kashubeck-West, S.; Bledman, R.A.; Coker, A.D.; Stinson, R.D.; Mintz, L.B. The role of enculturation, racial identity, and body mass index in the prediction of body dissatisfaction in African American women. *J. Black Psychol.* **2020**, *46*, 3–28. [CrossRef]