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ORIGINAL ARTICLE

Intuitive eating: associations with body weight status and eating attitudes in dietetic majors

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Abstract

Purpose Intuitive eating (IE), an adaptive eating pattern characterized by eating in response to physiological hunger and satiety cues, has been associated with positive psychosocial and physical health outcomes. This study aimed to determine associations between IE behavior with body weight status and eating attitudes in dietetic students and dietitians, who are a risky population for disordered eating and body dissatisfaction.

Methods Participants ($n = 785$) completed a self-administered questionnaire which featured socio-demographic characteristics, the eating attitudes test 26, the three-factor eating questionnaire, and the intuitive eating scale-2 with four facets unconditional permission to eat (UPE), eating for physical rather than emotional reasons (EPR), reliance on hunger and satiety cues (RHSC) and body-food choice congruence (B-FCC).

Results When controlled for potential covariates in the multivariate regression analysis, greater total IE and all subscale scores were associated with reduced BMI in dietetic majors having a BMI of ≥ 18.5 kg/m^2 ($p < 0.05$). Participants with a high IE score had 41%, 74%, and 89% lower risk of developing an eating disorder, uncontrolled eating, and emotional eating, respectively ($p < 0.001$). While higher UPE, EPR, and RHSC scores were associated with lower odds of disordered eating ($p < 0.001$), EPR, RHSC, and B-FCC scores were inversely related to the risk of uncontrolled eating and emotional eating ($p < 0.05$).

Conclusion Considering these inverse associations, IE may be helpful for weight management and a useful skill to reduce eating disorder symptomatology among the dietetic community.

Level of evidence Level V, cross-sectional descriptive study.

Keywords Intuitive eating · BMI · Eating disorder · Dietitian · Nutrition

Introduction

Since the long-term success of diet on weight loss is limited, the new concept of intuitive eating (IE) is recommended as an alternative to traditional restrictive eating [1]. The term intuitive eating was first described as an off-diet approach by clinical dieticians Evelyn Tribole and Elyse Resch in 1995 [2]. Then, the intuitive eating scale (IES) was developed by Tylka in 2006 [3]. Intuitive eating is a form of nutrition that includes: eating for physical rather than emotional reasons, unconditional permission to eat, reliance on hunger and satiety cues, and body-food choice congruence [4]. Its principles aim to develop a healthy relationship between food, mind, and body and promote awareness of emotions and pleasure from eating [5]. Adopting the intuitive eating approach and leaving diet rules and 'forbidden' food lists may cause concern that it will lead to weight gain. In fact, some dietetic professionals may be reluctant to encourage IE because they worry that if they allow individuals to eat what they desire, they will consume high amounts of sugar and fat. However, since the term IE includes the idea of 'body wisdom', it is expected to provide nutrient intake to improve the health of individuals [6]. Furthermore, an inverse association has been shown between IE and eating disorder symptomatology, while there is a positive correlation between IE and psychological conditions such as body acceptance and self-esteem [7].

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Dietetic professionals are experts in nutrition and health, and traditional dietetic education emphasizes cognitive eating, i.e. restricting energy intake to control weight [8]. The perception that being overweight/obese is unhealthy and that weight control can be achieved by diet may affect dietetic majors' relationship with food. Because they are distributing health information, they may feel pressure to match the standard of health, which is a thin and muscular physique [9]. Studies indicating that dietetic students and dietitians are unhappy with their physical appearance and exhibit disordered eating behavior confirm this [10–13]. Given the negative impact of disordered eating and body dissatisfaction on personal and professional satisfaction, dietetic majors may benefit from intuitive eating interventions. Personally, IE principles could improve dietetic majors' relationships with food and their body [3, 14]. Professionally, IE can only be communicated to clients by dietetic professionals, and their personal beliefs and behaviors could affect the delivery of nutrition care [14, 15]. Therefore, understanding the personal attitudes and behaviors of dietetic majors concerning intuitive eating and of the relationship of their intuitive eating patterns to their body weight and abnormal eating habits are critical. To our knowledge, this is the first study aimed to investigate intuitive eating behavior and its relation to weight status and eating attitudes in a large sample consisting of dietetic students and dietitians.

Methods

Participants and procedure

This cross-sectional descriptive study was conducted among dietetic majors in Turkey in 2018. To obtain a 5% margin of error at a 99% level of confidence required a sample size of about 650. With an expectation of approximately 20% losses, a minimum of 780 participants was required, and this study was completed with 799 dietetic majors. Moreover, one-third of nearly 23,000 dietetic majors is a dietitian and others continue their dietetic education in 2018. Taking this ratio into consideration, participants were recruited via web-based methods. The online data collection methodology has been trending for medical surveys due to its potential advantages and was chosen in this study because of its benefits such as ease of access to a huge number of target respondents from different regions of Turkey, cost-efficiency, availability, obtaining complete data quickly [16, 17], as well as its practicality and usefulness in behavioral research [17]. An 82 item online survey was created on Google Forms by the researchers. A mixture of short answer and multiple-choice questions was used. The questionnaire was piloted by ten dietetic majors who were asked to provide feedback on the clarity of questions and the amount of time to complete the questionnaire (ranged between 20 and 25 min). A link to the survey was shared via social networks (e.g. Facebook, Instagram, and WhatsApp) and e-mail groups of universities. Turkish Dietetic Association also shared the study link with members. An electronic consent form providing information about the purpose and procedures of the study was presented before the start of the questionnaire. Participation was voluntary, and only individuals accepting the informed consent could gain access to the survey to be filled. Furthermore, all procedures were conducted in accordance with the Declaration of Helsinki, and this study has been approved by the Erciyes University Social and Humanities Science Ethics Committee. Respondents could stop their participation at any stage; however, they were not able to save their answers without filling in all questions and clicking the submit button. Those who were currently pregnant, breastfeeding, and under 18 years of age were not included in analysis. After excluding 14 participants due to not meeting eligibility requirements, 785 dietitians and dietetic students aged between 18 and 56 years attended from all geographic regions of Turkey, 70 cities, and 47 universities. We also verified that our dataset contained no duplicate answers or unreliable data.

Measures

The questionnaire consisted of anthropometric measurements, demographic (i.e. age, gender, education status) and other health questions, and the intuitive eating scale-2 (IES-2), the eating attitudes test 26 (EAT-26) and the three-factor eating questionnaire revised 18 item version (TFEQ-R18). Anthropometric measurements were recorded based on self-reported weight and height values. Body mass index (BMI-kg/m^2) was calculated and then classified according to the World Health Organization [18].

Intuitive eating scale-2 (IES-2)

Intuitive eating was assessed with the 23 item IES-2 [19] providing a total IE score as well as scores of four subscales: unconditional permission to eat (UPE; 6 items), reliance on hunger and satiety cues (RHSC; 8 items), eating for physical rather than emotional reasons (EPR; 6 items), and body-food choice congruence (B-FCC; 3 items). The response options ranged from one (strongly disagree) to five (strongly agree). Higher scores represent higher levels of IE or its subscales. The validity and reliability of IES-2 were made by Bas et al. [20] in Turkey and the Cronbach's alpha for the scale was 0.85 (for women) and 0.74 (for men).

Eating attitudes test 26 (EAT-26)

The EAT-26 was developed in 1982 by Garner and Garfinkel [21] as a screening instrument for identifying eating disorders. This self-administered questionnaire consists of 26 statements which individuals must rate on a six graded frequency scale varying from zero (infrequently, almost never, and never) to three (always) [22, 23]. A total score of EAT-26 ranges from 0 to 78 and the score of 20 or greater indicates the risk of eating disorders [24]. The Turkish version of the scale was validated by Savaşır ve Erol [25].

Three-factor eating questionnaire (TFEQ-R18)

The TFEQ-R18, revised version of the original 51 item TFEQ, is a widely using scale to assess food-related psychological and behavioral relations [26]. The instrument refers to three different dimensions of human eating behavior: cognitive restraint (tendency to restrict food intake to lose weight or to prevent weight gain), uncontrolled eating (tendency to overconsumption due to loss of control on food intake), and emotional eating (inability to resist negative emotions) [13, 26]. The scale consists of 18 items coded on a four-point response scale (definitely true/mostly true/mostly false/definitely false). The raw questionnaire scores are turned to a 0–100 scale {[(raw score − lowest possible raw score)/possible raw score range] × 100} [26]. TFEQ-R18 does not have a cut-off score, but a greater score indicates more of the behavior. In Turkey, the validity and reliability of TFEQ-R18 were made by Kıraç et al. [27] and the Cronbach's alpha for the scale was 0.721.

Data analysis

Statistical analysis was performed using the SPSS Statistics (version 22.0) software. Data were expressed as the number (*n*) and percentage (%) for categorical variables, and mean and standard deviation for continuous variables. Normality was assessed using the histogram and normal Q–Q plots, and also the Kolmogorov–Smirnov test. Moreover, continuous variables were examined for skewness and kurtosis, and log-transformed before analysis, and reported back-transformed geometric mean and standard error when required (age and BMI). Participant characteristics, anthropometric indices, and all scale scores were categorized based on the median IE and its subscales scores. General participant characteristics were given for the total population and each category of IE and its subscales. To assess the differences in characteristics between categories of IE and its subscales, chi-square tests and Student's *t* tests were used.

After BMI was log-transformed, linear regression analyses were used to determine the effects of IE and its subscales (independent variables) on BMI (dependent variables). Regression models were split by BMI groups ($<18.5/\geq 18.5$ kg/m^2) and adjusted for age and gender. Beta-coefficients were back-transformed as 10^{β} to evaluate the associations between dependent and independent variables [28]. To investigate the association between IE (independent variables) and eating attitudes (dependent variables), binary logistic regression analyses were performed. The low category of IE and its subscales was considered the reference group, and high and low categories were compared to predict the risk of abnormal eating habits. Model 1 was adjusted for age and gender. In Model 2, BMI was also controlled but not for EAT-26 scores (due to no interactions determined between BMI and EAT-26 scores in univariate analysis). For regression analyses, potential confounders were initially considered separately using the univariate analysis, and any variables having a significant Wald test at a level of 0.25 were selected for the multivariate analysis [29]. Then, each potential confounding variable was also tested in the multivariate models and was retained as a confounder if it increased Nagelkerke or adjusted R^2 values and/or modified the respective association substantially [28, 30]. The other potential confounding factors assessed were not included in the multivariate analysis due to their non-contribution significantly to the fit of the models. Furthermore, separate analyses were performed for dietetic students and dietitians. Since they showed similar patterns of associations, results were presented combined. However, statistical significance differed only for the association between B-FCC subscale and BMI in the linear regression model and RHSC subscale and EAT-26 score in the logistic regression model, thus education status was controlled for these analyses. Model assumptions were checked for any potential multicollinearity concerns, and no violation was found. For all statistical analyses, $p < 0.05$ was considered statistically significant.

Results

Participant characteristics

This study was conducted with 785 dietetic majors aged 22.2 (0.2) years, and most of them were normal-weight (80%) women (92%). One-third of participants had earned a bachelor's degree and have exhibited unhealthy eating attitudes. The mean scores of the eating attitude scales (IES-2, EAT-26 and TFEQ-R18) and sociodemographic characteristics describing the whole sample are presented in Table 1.

The characteristics of participants by IES-2 scores are also depicted in Table 1. Most of the relevant variables differed between the two IES-2 categories. For instance, participants in the high total IES-2 category had higher age ($p < 0.001$), education status ($p < 0.001$), and lower BMI ($p < 0.001$), EAT-26 score ($p < 0.001$), TFEQ-R18

Table 1 General participant characteristics and median intuitive eating dimensions

Variables[a]	All participants ($n=785$)		Total IES-2				UPE				EPR				RHSC				B-FCC			
			Low ($n=393$)		High ($n=392$)		Low ($n=393$)		High ($n=392$)		Low ($n=393$)		High ($n=392$)		Low ($n=393$)		High ($n=392$)		Low ($n=393$)		High ($n=392$)	
Age (years)[b]	22.2	0.2	21.6	0.2	22.9	0.3*	22.1	0.2	22.4	0.2	21.6	0.1	22.9	0.3*	21.9	0.2	22.6	0.2*	21.8	0.2	22.7	0.2*
Gender (female)	724	92.2	372	94.7	352	89.8†	366	93.1	358	91.3	372	94.7	352	89.8†	367	93.4	357	91.1	364	92.6	360	91.8
BMI (kg/m^2)[b]	21.1	0.1	21.8	0.2	20.5	0.1*	21.6	0.1	20.7	0.1*	21.7	0.2	20.6	0.1*	21.7	0.2	20.6	0.1*	21.5	0.2	20.8	0.1*
<18.5 kg/m^2	90	11.5	29	7.4	61	15.6†	37	9.4	53	13.5†	32	8.1	58	14.8†	31	7.9	59	15.1†	38	9.7	52	13.3†
≥ 25 kg/m^2	68	8.7	49	12.5	19	4.8†	44	11.2	24	6.1†	47	12.0	21	5.4†	49	12.5	19	4.8†	43	10.9	25	6.4†
Education status (graduate)	263	33.5	105	26.7	158	40.3†	121	30.8	142	36.2	107	27.2	156	39.8†	116	29.5	147	37.5†	101	25.7	162	41.3†
Diagnosed health problem (yes)	120	15.3	65	16.5	55	14.0	64	16.3	56	14.3	59	15.0	61	15.6	70	17.8	50	12.8†	66	16.8	54	13.8
Using medication/supplementation (yes)	166	21.1	77	19.6	89	22.7	95	24.2	71	18.1†	74	18.8	92	23.5	78	19.8	88	22.4	80	20.4	86	21.9
EAT-26 scores	17.0	7.7	18.3	8.1	15.6	7.0*	19.4	8.3	14.5	6.2*	18.2	8.3	15.7	6.8*	17.9	8.1	16.0	7.2*	16.7	7.7	17.2	7.7
EAT-26 score ≥ 20	262	33.4	156	39.7	106	27.0†	174	44.3	88	22.4†	157	39.9	105	26.8†	146	37.2	116	29.6†	127	32.3	135	34.4
TFEQ-R18 scores[c]																						
Cognitive restraint	55.2	19.0	55.9	18.0	54.5	19.8	62.8	17.3	47.6	17.5*	54.9	18.7	55.5	19.3	55.1	18.5	55.3	19.4	52.1	17.7	58.4	19.7*
Uncontrolled eating	35.6	17.5	43.0	17.3	28.2	14.3*	36.2	17.3	35.0	17.7	43.0	16.7	28.3	15.1*	42.3	18.0	29.0	14.2*	40.2	17.9	31.0	15.9*
Emotional eating	38.1	26.4	53.4	23.5	22.7	19.3*	40.9	26.4	35.3	26.1*	55.8	21.9	20.3	16.8*	48.2	26.2	28.0	22.5*	44.1	26.5	32.0	24.9*
Total IES-2 scores[c]	3.52	0.48	3.14	0.30	3.90	0.29*	3.35	0.44	3.69	0.45*	3.19	0.35	3.85	0.33*	3.22	0.38	3.82	0.37*	3.31	0.43	3.73	0.43*
UPE	3.12	0.66	2.95	0.60	3.29	0.68*	2.59	0.34	3.65	0.44*	3.05	0.63	3.19	0.68*	3.08	0.63	3.16	0.69	3.20	0.66	3.04	0.66*
EPR	3.57	0.84	2.98	0.65	4.16	0.53*	3.48	0.86	3.67	0.80*	2.89	0.54	4.26	0.41*	3.22	0.78	3.92	0.73*	3.33	0.82	3.81	0.78*
RHSC	3.67	0.72	3.25	0.66	4.08	0.51*	3.63	0.73	3.71	0.71	3.42	0.70	3.91	0.65*	3.12	0.55	4.22	0.37*	3.32	0.69	4.01	0.57*
B-FCC	3.90	0.61	3.75	0.61	4.05	0.58*	4.02	0.55	3.78	0.64*	3.81	0.62	3.99	0.59*	3.73	0.62	4.06	0.56*	3.47	0.49	4.32	0.38*

IES-2 intuitive eating scale-2, *UPE* unconditional permission to eat, *EPR* eating for physical rather than emotional reasons, *RHSC* reliance on hunger and satiety cues, *B-FCC* body-food choice congruence, *BMI* body mass index, *BW* body weight, *EAT-26* eating attitudes test 26, *TFEQ-R18* three-factor eating questionnaire revised 18 item version

*Student's t test, $p<0.05$

†Chi square test, $p<0.05$

[a]Values were given as the number (n) and percentage (%) for qualitative variables and, mean and standard deviation for quantitative variables

[b]Values were expressed as geometric mean and standard error for log-transformed variables

[c]Higher scores on the TFEQ-R18 and the IES-2 represent greater levels of behavior

uncontrolled eating ($p < 0.001$) and emotional eating scores ($p < 0.001$), compared to those in the low category. In addition, the differences in age (except UPE-subscale), education status (except UPE-subscale), BMI, EAT-26 score (except BFCC-subscale), TFEQ-R18 uncontrolled eating (except UPE-subscale) and emotional eating scores were statistically significant between the low and high category of IES-2 subscales (UPE, EPR, RHSC, and B-FCC).

Association of IE with BMI

Regression coefficients (β) and 95% confidence intervals (CI) for BMI by IE scores are given in Table 2. Before linear regression analyses, BMI was log-transformed because of the skewed distribution. Regression models were split by BMI groups (< 18.5/≥ 18.5 kg/m^2) and the final model was adjusted for age and gender. Greater IE and also higher subscale scores were associated with lower BMI ($p < 0.05$) in participants with a BMI of ≥ 18.5 kg/m^2 (Table 2, Fig. 1). On the other hand, no effect of total IES-2 scores and UPE and EPR subscales was observed on BMI in dietetic majors with a BMI of < 18.5 kg/m^2. However, a positive association was found for BFCC-subscale (β 1.021, 95% CI 1.002–1.037; $p = 0.020$) and a non-significant trend for RHSC-subscale (β 1.014, 95% CI 1.000–1.028; $p = 0.064$) in unadjusted model. Since age and gender did not contribute significantly to the fit of the model, were not controlled while investigating the effect of BFCC-subscale on BMI. In addition, RHSC-subscale was adjusted only for age (β 1.016, 95% CI 1.001–1.030; $p = 0.038$).

Association of IE with eating attitudes

Odds ratios (OR) and 95% CI for eating attitudes by IE scores are provided in Table 3. The final logistic regression models included age and gender for EAT-26 scores (Model 1) and age, gender, and BMI for other eating behaviors (Model 2) as confounding variables. Higher IE scores were associated with a decreased risk of eating disorder (OR 0.59, 95% CI 0.43–0.80; $p = 0.001$). That is, for a total IES-2 score > 3.52, the odds of developing abnormal eating habits decreased by a factor of 0.59 (or equivalently by 41%). This inverse association was also found for UPE (OR 0.37, 95% CI 0.27–0.50; $p < 0.001$), EPR (OR 0.58, 95% CI 0.42–0.78; $p < 0.001$), and RHSC (OR 0.73, 95% CI 0.54–0.98; $p = 0.042$) subscales.

When IE was examined in relation to each of the three aspects of eating behavior, it was found to be inversely associated with the odds of uncontrolled eating (OR 0.26, 95%

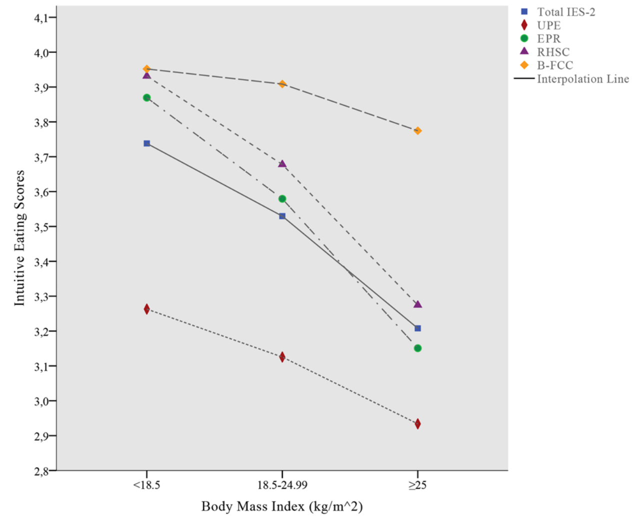

Fig. 1 Simple slopes analysis of the associations between intuitive eating scores and body mass index. *IES-2* intuitive eating scale-2, *UPE* unconditional permission to eat, *EPR* eating for physical rather than emotional reasons, *RHSC* reliance on hunger and satiety cues, *B-FCC* body-food choice congruence

Table 2 Linear regression analysis assessing the associations between intuitive eating scores and body mass index[a]

Intuitive eating scores	Unadjusted model			Adjusted model[b]		
	β^c	95% CI	p	β^c	95% CI	p
Total IES-2	− 1.076	− 1.094, − 1.059	< 0.001*	− 1.094	− 1.109, − 1.076	< 0.001*
UPE	− 1.025	− 1.037, − 1.011	< 0.001*	− 1.028	− 1.040, − 1.016	< 0.001*
EPR	− 1.032	− 1.042, − 1.023	< 0.001*	− 1.042	− 1.052, − 1.033	< 0.001*
RHSC	− 1.040	− 1.052, − 1.028	< 0.001*	− 1.045	− 1.057, − 1.035	< 0.001*
B-FCC	− 1.011	− 1.025, 1.002	0.075[d]	− 1.014	− 1.026, − 1.001	0.05[d]*

IES-2 intuitive eating scale-2, *UPE* unconditional permission to eat, *EPR* eating for physical rather than emotional reasons, *RHSC* reliance on hunger and satiety cues, *B-FCC* body-food choice congruence

*p-trend < 0.05

[a]Values were given for participants with a BMI of ≥ 18.5 kg/m^2 ($n = 695$)

[b]Age and gender were controlled in the adjusted model

[c]Back-transformed β-coefficients (95% confidence interval)

[d]Values were adjusted for education status (undergraduate/graduate)

Table 3 Logistic regression analysis assessing the associations between intuitive eating scores and eating attitudes

Variables[a]	Total IES-2		UPE		EPR		RHSC		B-FCC	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
EAT-26 score ≥ 20										
Crude[b]	0.56	0.42, 0.76*	0.36	0.26, 0.49*	0.55	0.40, 0.74*	0.71	0.53, 0.96[c]	1.10	0.82, 1.48
Model 1[d]	0.59	0.43, 0.80*	0.37	0.27, 0.50*	0.58	0.42, 0.78*	0.73	0.54, 0.98[c]*	1.15	0.85, 1.55
Cognitive restraint score > 52.9										
Crude[b]	0.87	0.66, 1.15	0.26	0.20, 0.36*	1.07	0.81, 1.41	1.07	0.81, 1.41	1.98	1.49, 2.63*
Model 1[d]	0.82	0.61, 1.09*	0.25	0.19, 0.34*	1.02	0.76, 1.35*	1.04	0.78, 1.38*	1.92	1.44, 2.56*
Model 2[e]	0.99	0.73, 1.34*	0.27	0.20, 0.37*	1.21	0.90, 1.64*	1.22	0.91, 1.65*	2.18	1.62, 2.94*
Uncontrolled eating score > 34.6										
Crude[b]	0.22	0.16, 0.29*	0.72	0.55, 0.96*	0.21	0.15, 0.28*	0.31	0.23, 0.42*	0.46	0.34, 0.61*
Model 1[d]	0.23	0.17, 0.31*	0.73	0.55, 0.97*	0.22	0.16, 0.30*	0.32	0.24, 0.43*	0.48	0.36, 0.65*
Model 2[e]	0.26	0.19, 0.36*	0.85	0.63, 1.13*	0.25	0.18, 0.35*	0.37	0.27, 0.50*	0.53	0.40, 0.71*
Emotional eating score > 33.3										
Crude[b]	0.08	0.06, 0.12*	0.80	0.61, 1.06	0.04	0.03, 0.06*	0.23	0.17, 0.32*	0.45	0.34, 0.60*
Model 1[d]	0.09	0.06, 0.13*	0.82	0.62, 1.09*	0.05	0.03, 0.07*	0.24	0.18, 0.33*	0.47	0.35, 0.63*
Model 2[e]	0.11	0.07, 0.15*	1.01	0.75, 1.37*	0.06	0.04, 0.08*	0.29	0.21, 0.40*	0.53	0.39, 0.72*

IES-2 intuitive eating scale-2, *UPE* unconditional permission to eat, *EPR* eating for physical rather than emotional reasons, *RHSC* reliance on hunger and satiety cues, *B-FCC* body-food choice congruence, *EAT-26* eating attitudes test 26

*p-trend < 0.05

[a]Values are odd ratio (95% confidence interval) estimated through logistic regression using the low category of intuitive eating and its subscales as reference

[b]Crude: not adjusted for any variables

[c]Values were adjusted for education status (undergraduate/graduate)

[d]Model 1: the model was adjusted for age and gender

[e]Model 2: the model was additionally adjusted for body mass index

CI 0.19–0.36; $p < 0.001$) and emotional eating (OR 0.11, 95% CI 0.07–0.15; $p < 0.001$), except for restrained eating (OR 0.99, 95% CI 0.73–1.34; $p = 0.939$). That is, participants with a high IE score had a 74% and 89% lower risk of developing uncontrolled eating and emotional eating, respectively. These inverse associations were also observed for all IE subscales, except for UPE-subscale (Table 3). However, the restrained eating risk was found to be inversely associated with UPE-subscale (OR 0.27, 95% CI 0.20–0.37; $p < 0.001$) and positively associated with BFCC-subscale (OR 2.18, 95% CI 1.62–2.94; $p < 0.001$).

Discussion

The present study provides the first evidence of the relationships of IE dimensions with body weight status and eating attitudes in a large sample of dietitians and dietetic students. The current findings revealed that increased IE patterns were related to reduced BMI in dietetic majors with a BMI of ≥ 18.5 kg/m^2. This inverse association was also seen between all IE subscales and BMI, the strongest of which was observed in the RHSC dimension. Furthermore, participants with higher IE scores had 41%, 74%, and 89% lower risk of developing an eating disorder, uncontrolled eating, and emotional eating, respectively. While EPR, RHSC, and B-FCC subscales showed inverse associations with the risk of uncontrolled eating and emotional eating, higher UPE, EPR, and RHSC scores were related to the odds of abnormal eating habits. Given the attention being paid to the dietetic students' and dietitians' eating habits, these findings shed light on the relevance of developing strategies to promote intuitive eating in this population.

The intuitive eating paradigm encourages eating based on internal cues of hunger and satiety [31]. This philosophy conflicts with the current model of professional dietetic training, which emphasizes counting calories and macronutrients [8]. Since they are taught this type of dietary approach, it is reasonable to believe that dietetic majors eat more cognitively than intuitively. Although there is no article that examined the intuitive eating patterns of dietetic majors, a few studies indicated the intuitive eating attitudes and practices among dietitians [31–33]. Curiously, these studies demonstrated that the majority of dietitians have a positive attitude towards intuitive eating and also use intuitive eating approaches to counsel clients [31, 32]. Moreover, dietetic majors who were older, and had lower BMI were more likely to show positive attitudes towards intuitive eating [32] and who had advanced education and more experience in nutrition counseling reported greater use of intuitive eating practices [31]. As similar to these findings, higher intuitive eating patterns were demonstrated among dietetic majors who were older, had lower BMI, and higher education status in the present study.

Even though intuitive eating promotes health rather than weight loss, there is evidence that it is associated with a lower body mass [3, 19, 34] and greater body satisfaction [31]. However, researches are limited and a few of them are adequately controlled for confounding factors. In our dietetic population-based sample, a greater intuitive eating score and also higher subscale scores were shown to be related to lower BMI (in participants with a BMI of ≥ 18.5 kg/m^2) in the multivariate linear regression model adjusted for confounding factors. To the best of our knowledge, no comparable data are available in dietetic majors, but in agreement with our results, the previous three studies have indicated an inverse association between intuitive eating and BMI in a nationwide sample [6, 34, 35]. These prior results increase the possibility of reverse causality, because of cross-sectional design issues. Weight gain may impair perceived hunger and satiety signals or overweight individuals may be prone to consciously ignore their physiological signals to lose weight, and may consequently disrupt their regulatory processes [34]. All in all, these findings supply some evidence that intuitive eating may prevent weight gain.

Many dietetic majors have dissatisfaction with body weight and exhibit disordered eating patterns [10–13]. An increased risk of eating disorder symptomatology and a high cognitive restraint has been reported in these individuals [13, 36] since they are exposed to a perceived pressure to fit a certain image that is congruent with the dietetics profession [8, 36]. A new intuitive eating concept is an alternative to restrictive eating [15] and inversely associated with eating disorder symptomatology [3, 19]. However, no data exist regarding the association between eating disorder risk and intuitive eating in dietetic majors. For the first time, our findings exhibited that intuitive eating patterns are inversely related to the risk of developing abnormal eating habits in dietetic majors. This inverse association was also shown for UPE, EPR, and RHSC subscales. The fact that intuitive eating has been shown to be associated with decreased risk of eating disorders in dieticians, as in the general population [3, 19] may lead to the creation of alternative solutions to reduce disordered eating attitudes in this risky group.

Disordered eating behaviors include a wide range of eating irregularities such as dietary restrictions, preoccupation with food and dieting, and unhealthy and obsessive methods of weight control. They might also manifest themselves in uncontrolled eating or eating under the influence of negative emotions, which has previously been related to BMI [37] and body image [38]. In the present study, dietetic majors scoring higher on intuitive eating patterns had a 74% and 89% lower risk of developing uncontrolled eating and emotional eating, respectively. These inverse associations were also observed for EPR, RHSC and B-FCC dimension. Due to the nature of intuitive eating, these findings are not surprising, because intuitive eating emphasizes trusting internal hunger and satiety cues and changing cognitive distortions, reducing emotional eating, and increasing shape acceptance [39].

While intuitive eating suggests that the body knows what, when and how much to eat [15] restrained eaters can be unresponsive to their physiological hunger and fullness signals [40]. The observed negative correlations between intuitive eating and restraint lend support to assertions that intuitive eating may reflect the opposite of restraint [39]. The present study also indicated an inverse association between only UPE-subscale and restrained eating, which is consistent with previous studies [6, 40]. The permission dimension reflects an individual's willingness to eat when hungry without following external food rules and/or having forbidden foods [19]. Indeed, the permission dimension may not always have a positive impact on diet without concurrent health awareness [40]. It is possible that individuals scoring higher on UPE may allow themselves to enjoy a wide range of foods including unhealthy ones, without feeling guilty or judging this as wrong [6]. Therefore, the B-FCC dimension should be considered with the permission dimension. This dimension assesses one's tendency to choose foods according to the body's needs and could qualify the permission dimension by adding the notion of concurrent health awareness [6, 40]. In the present study, the B-FCC dimension was found positively related to the risk of restrained eating in the dietetic community who possibly have health awareness. In accordance with our findings, several researchers have reported a tendency to select healthy foods in restrained eaters [6, 26, 40]. Thus, a certain degree of cognitive control may be required to eat healthfully in the existing food environment where energy-intensive palatable foods are easily accessible [40].

The present study has several notable strengths, including its large dietetic population sample and analysis of all four IE dimensions. In addition, our study included dietitians together with dietetic students, as well as both men and women. Furthermore, using Internet for data collection allowed access to a heterogeneous sample in terms of sociodemographic characteristics assessed to effectively control for potential confounding factors [34]. Also, the Web-based IES-2 questionnaire minimized missing data by automatic controls and alerts. Nonetheless, there are some limitations to the present study that should also be mentioned. Firstly, the cross-sectional nature of the study does not allow to demonstrate causality among variables. Secondly, it cannot be ruled out the potential of selection bias. In this study, the self-selection sampling procedure was used, that is, only those willing to participate were recruited. Therefore, our findings may represent a narrower range of opinions than a randomly selected sample and need to be carefully interpreted. Additionally, the use of an online survey might have caused us to miss some of the targeted population, thus limiting the generalizability of our results. Nonetheless, we believe that this should not have affected the overall validity of the findings, given that the use of e-mail and social media is very common among dietetic majors. Thirdly, only 7.8% of the participants were men. Although this percentage is very limited, it is consistent with the diversity of gender within the dietetics profession. Female monopolization of dietetics is widespread and observed in most countries [31, 41]. In addition, there were no significant differences when statistical analyses were repeated without the men, and thus the results were presented for both genders together. Lastly, anthropometric data were self-reported; however, epidemiological studies have proved a satisfying accuracy of self-reported weight and height [42, 43].

In conclusion, the present study has shown that IE inversely associates with BMI and odds of disordered eating attitudes in dietetic majors. Considering this inverse association, intuitive eating may be helpful for weight management and a useful skill to reduce eating disorder symptomatology among the dietetic community. Therefore, designing interventions to teach intuitive eating skills and helping individuals to recognize and trust their bodies' hunger and satiety signals are important to better regulate their eating behaviors. In this way, improving dietitians' knowledge can increase their efficacy of applying the intuitive eating model to their own dietary habits as well as in practice with clients, patients, and community members. With future prospective studies, IE intervention might be a powerful approach to improve physical health and mental well-being through eating disorders and obesity prevention.

What is already known on this subject?

Many dietetic majors have dissatisfaction with body weight and exhibit disordered eating patterns. An increased risk of eating disorder symptomatology and a high cognitive restraint has been reported in these individuals since they are exposed to a perceived pressure to fit a certain image that is congruent with the dietetics profession. A new intuitive eating concept is an alternative to restrictive eating and was reported as inversely associated with eating disorder symptomatology. However, no data exist regarding the association between eating disorder risk and intuitive eating in dietetic majors.

What our study adds?

For the first time, our findings exhibited that intuitive eating patterns are inversely related to the risk of developing abnormal eating habits in a large sample consisting of dietetic students and dietitians. Participants with a high intuitive eating score had 41%, 74%, and 89% lower risk of developing an eating disorder, uncontrolled eating, and emotional eating, respectively ($p < 0.001$). Considering these inverse associations, intuitive eating may be a useful skill to reduce eating disorder symptomatology among the dietetic community. Furthermore, improving dietitians' knowledge can increase their efficacy of applying the intuitive eating model in practice with clients, patients, and community members.

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Authors contributions ZC designed the research protocol; conducted the research and statistical analysis; prepared the manuscript and had primary responsibility for the final content. HT contributed to the planning and management of the study, and contributed to the manuscript writing. All authors read and approved the final manuscript.

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Declarations

Conflict of interest The authors declare no conflict of interest.

Ethical approval All procedures were conducted in accordance with the Declaration of Helsinki, and this study has been approved by the Erciyes University Social and Humanities Science Ethics Committee.

Consent to participate Informed consent was obtained from all participants electronically.

Consent for publication All authors read and approved the final manuscript.

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