

**INVESTIGATION OF THE RELATIONSHIP BETWEEN FOOD NEOPHOBIA, BODY PERCEPTION, AND LIFE SATISFACTION IN UNIVERSITY STUDENTS****ÜNİVERSİTE ÖĞRENCİLERİNİN BESİN NEOFOBİSİ, BEDEN ALGISI VE YAŞAM DOYUMU ARASINDAKİ İLİŞKİNİN İNCELENMESİ**Pınar GÖBEL<sup>1</sup>, Nevin ŞANLIER<sup>1</sup>, Sine YILMAZ<sup>1</sup>, Büşra AÇIKALIN<sup>2</sup>, Şule KOCABAŞ<sup>1</sup><sup>1</sup> Ankara Medipol University, Faculty of Health Sciences, Department of Nutrition and Dietetics, Ankara Turkey<sup>2</sup> Ankara, Medipol University, Faculty of Fine Arts, Design and Architecture, Department of Gastronomy and Culinary Arts, Ankara, Turkey**ABSTRACT****Aim:** The study aimed to examine the relationship between food neophobia, body image and life satisfaction of university students.**Methods:** The study was conducted on 983 university students who voluntarily agreed to participate in the study. "Food Neophobia Scale (FNS)", "Stunkard Figure Rating Scale (SFRS)" and "Life Satisfaction Scale (LSS)" were applied online to the participants with a questionnaire form including socio-demographic characteristics and anthropometric measurements. The data were analyzed with SPSS 24.00 statistical analysis program.**Results:** 66.6% of students are women and 33.4% are men. The average age is 20.8±2.6 years, and the body mass index is 22.0±3.8 kg/m<sup>2</sup>. The participants' FNS scores averaged 37.1±8.6, and the food neophobia was moderate. LSS scores averaged 13.4±4.5 and attendees' life satisfaction were found to be low. There is no statistically significant difference between the gender and the FNS and the LSS (p>0.05). A statistically significant difference in scores of SFRS has been detected between gender (p<0.05). Based on the FNS scores, neophilic individuals have scores of 13.6±4.6; average individuals have scores of 13.4±4.5 and neophobic have scores of 13.6±4.4. According to the FNS scores, neophilic individuals rated SFRS scores of -0.6±1.4; average individuals rated -0.5±1.2 and neophobic individuals rated -0.5±1.4. No statistically significant differences have been detected in terms of the FNS subdimensions and the LSS and SFRS scores (p>0.05). A negative, moderately statistically significant relationship has been detected between SFRS and BMI (r=-0.591; p=0.000). As BMI increases, body dissatisfaction and the desire to lose body weight increase. A positive relationship between age and BMI is statistically significant (r=0.114; p=0.000). As the age increased, 11.4% increase in BMI values was detected.**Conclusion:** In this study, the presence of food neophobia in individuals reduced food diversity, it can negatively affect the intake of the required nutrients and lead to eating behavior disorders. In addition, an increased body mass index increases body dissatisfaction.**Keywords:** Body Perception, Food Neophobia, Life Satisfaction, Selective Eating, University Students.**ÖZET****Amaç:** Araştırma üniversite öğrencilerinin yeni besin korkusu (besin neofobisi) ile beden algısı ve yaşam doyumu arasındaki ilişkiyi incelemek amacıyla yapılmıştır.**Yöntem:** Çalışma 983 üniversitede okuyan, araştırmaya katılmayı kabul eden gönüllü öğrenci üzerinde yapılmıştır. Katılımcılara sosyo-demografik özellikleri ve antropometrik ölçümlerini içeren bir anket formu ile "Besin Neofobisi Ölçeği (BNÖ)", "Stunkard Figür Derecelendirme Ölçeği (SFDÖ)" ve "Yaşam Doyumu Ölçeği (YDÖ)" online olarak uygulanmıştır. Veriler SPSS 24.00 istatistiksel analiz programı ile analiz edilmiştir.**Bulgular:** Öğrencilerin %66.6'sı kadın ve %33.4'ü erkektir. Yaş ortalaması 20.8±2.6 yıl, beden kütle indeksi ortalaması 22.0±3.8 kg/m<sup>2</sup>'dir. Katılımcıların Besin Neofobisi Ölçeği puan ortalaması 37.1±8.6 olup gıda neofobileri orta düzeydedir. Yaşam Doyumu Ölçeği puan ortalaması 13.4±4.5 bulunmuş, katılımcıların yaşam doyumlarının düşük olduğu tespit edilmiştir. Cinsiyet ile Besin Neofobisi Ölçeği ve Yaşam Doyumu Ölçeği puanları arasında istatistiksel olarak anlamlı farklılık bulunmamıştır (p>0.05). Stunkard Figür Derecelendirme Ölçeği puanları açısından cinsiyetler arasında istatistiksel olarak anlamlı farklılık tespit edilmiştir (p<0.05). Besin Neofobisi Ölçeği puanlarına göre neofilik olarak değerlendirilen bireylerin Yaşam Doyumu Ölçeği puanları 13.6±4.6; nötr bireylerin puanları 13.4±4.5 ve neofobik bireylerin puanları ise 13.6±4.4 olarak hesaplanmıştır. Besin Neofobisi ölçeği puanlarına göre neofilik olarak değerlendirilen bireylerin Stunkard Figür Derecelendirme Ölçeği puanları -0.6±1.4; nötr bireylerin -0.5±1.2 ve neofobik bireylerin -0.5±1.4 olduğu saptanmıştır. Besin Neofobisi Ölçeği alt boyutları ile Yaşam Doyumu Ölçeği ve Stunkard Figür Derecelendirme Ölçeği puanları açısından istatistiksel olarak anlamlı farklılık tespit edilmemiştir (p>0.05). Stunkard Figür Derecelendirme Ölçeği ile BKİ arasında negatif, orta düzeyde istatistiksel olarak anlamlı ilişki tespit edilmiş olup (r=-0.591; p=0.000) BKİ arttıkça beden memnuniyetsizliği ve vücut ağırlığı kaybetme isteği artmaktadır. Yaş ile BKİ arasında pozitif yönde, zayıf derecede istatistiksel olarak anlamlı ilişki tespit edilmiştir (r=0.114; p=0.000). Yaş arttıkça BKİ değerlerinde %11.4'lük artış tespit edilmiştir.**Sonuç:** Bu çalışmada üniversite öğrencilerinde yeni besin korkusunun besin çeşitliliği tercihini azaltarak, gereksinimleri olan besin ögesi alımlarını olumsuz etkilediği ve yeme davranış bozukluklarına yol açabildiği görülmüştür.**Anahtar Kelimeler:** Besin Neofobisi, Beden Algısı, Seçici Yeme, Üniversite Öğrencileri, Yaşam Doyumu.**Sorumlu Yazar / Corresponding Author:** Pınar GÖBEL, Assistant Professor, Ankara Medipol University, Faculty of Health Sciences, Department of Nutrition and Dietetics, Ankara Turkey. E-mail: pinargobel@gmail.com**Bu makaleye atıf yapmak için / Cite this article:** Gobel P, Şanlıer N, Yılmaz S, Açıkalin B, Kocabaş Ş. (2023). Investigation of The Relationship Between Food Neophobia, Body Perception, and Life Satisfaction in University Students. *Gevher Nesibe Journal of Medical & Health Sciences*, 8(1), 202-212. <http://doi.org/10.5281/zenodo.7601544>

## INTRODUCTION

Humans have been consuming an omnivore diet that is diverse from past to present. But avoiding unfamiliar foods can be a protective mechanism for human beings (Kral, 2018). A substrate of the concept of "fear of novelty" as an aversion to innovation is "nutritional neophobia" (Sivrikaya and Pekersen, 2020). While this concept includes reluctant or anxious behavior while consuming or experimenting with new foods, it is described as a personality trait that negatively impacts the willingness to try and taste new and foreign foods (Nezlek and Forestell, 2019). Nutritional neophobia can lead to physiological reactions in individuals, such as increased pulse, sweating, respiration, and galvanic skin response. Nutritional neophobes have lower saliva responses when new and familiar foods are introduced. Nutritional neophilics (those who are willing to experiment with new nutrients) have different physiological responses from neophobes, such as increased saliva responses and high levels of welcome to new or familiar foods (Muhammad et al., 2016).

Neophobia is a major determinant of nutritional choices. Food neophobia in individuals can decrease nutritional diversity, negatively affecting the acquisition of required nutrients (Lafraire, Rioux, Giboreau and Picard, 2016). While it is noted that the nutritional choices of individuals with nutritional neophobia are more limited, and this condition prevents adequate and balanced nutrition (Rabadán and Bernabéu, 2021), food neophobia is closely related to low dietary quality, high chronic disease resistance, and increased obesity (Sarin et al., 2019). Over the long term, it is stated that neophobic individuals face increased risk of limited nutrition, selective social lifespan, and thus more likely to encounter psychological problems (Maiz and Balluerka, 2018). However, the increased variety of food is affected by neophobia (Hazley et al., 2022). If targeted interventions to reduce food neophobia are not provided in a timely manner, food neophobia can extend from childhood to adulthood (Donadini et al., 2021). In the general population, diversification of nutrients is particularly common in fruit and vegetable groups. In addition to decreasing nutritional diversity, consumption of food is decreasing and healthy eating behavior is adversely affected (Hazley et al., 2022). On the other hand, insufficient consumption of foods, especially fruits and vegetables, can increase the consumption of foods with high energy density. This condition is the basis for obesity and chronic diseases (Proserpio et al., 2016). Various factors have an influence over nutritional neophobia. Culture can have an impact on nutritional neophobia. Culture is often the fundamental determinant of individuals' food choices. Individuals who depend on a particular culture reference the taste principles of the culture to which they are attached. This situation usually allows the individual to determine which food is acceptable for him and which is unacceptable (Mak et al., 2012). Nutritional neophobia decreases with education and income (Rabadán and Bernabéu, 2021). However, the effect of sex on nutritional neophobia is still unclear (Proserpio et al., 2018).

The concept of body perception is a multidimensional concept that reflects both internal and subjective representations of physical appearance and bodily experience, shape, aesthetics and, attitude toward the body (Moustafa et al., 2017). Body perception is driven by the meaning and assessments of the physical appearance of the society in which the individual lives, as well as his traits. Thus the concept of body perception is influenced by many psycho-social factors such as age, gender, habitat, stress, and quality of life (Ridvan et al., 2019). Inaccuracies in the brain of the individual concerned with this concept can develop misconceptions and have particularly negative effects on young people's diets. Therefore, it is important to determine the effects of body perception on nutrition (Khoshkerdar and Raisi, 2020). Individuals' high aesthetic appearance is important, although it is more common in young adult girls to experience the same emotions in boys in recent years as well as being weak and similar to being beautiful, setting the stage for proper nutrition and unhealthy practices and the formation of various eating disorders (Juli, 2019). Some personal traits and social values are reported to have a significant role in the development and development of body perception, and the concept of body perception is predicted to affect the quality of life by reflecting on diet habits (Rahimi-Ardabili et al., 2018).

Life satisfaction, a cognitive indicator of subjective well-being, is important for people of all ages and is associated with many different health indicators. This satisfaction involves comparing what the individual has with what they want to have, and getting closer to what the individual wants to have increases life satisfaction (Chen et al., 2020). University students are highly stressed in both their academic and private lives. Reduced sleep time and increased time spent studying increase stress on university students, and increased stress can adversely affect their life satisfaction (Cabras and Mondo,

2018). It is also reported that life satisfactions are higher than those who are slightly overweight or obese whose body mass index is ideal or lower (Williams et al., 2018). University students often take their own nutritional needs for their distant lives, sometimes from the outside. This causes students to have mostly disorganized eating habits and reduced their diet quality (Kyrkou et al., 2018).

This study was planned and conducted to study the relationship between food neophobia, body perception, and life satisfaction in university students.

## **MATERIALS AND METHODS**

### **Participants**

This identifying work was done online from December 2021 to January 2022. The study's universe is composed of university students living in Turkey. According to the study's sample calculation for the unfamiliar state of cosmos size and prevalence, 95% confidence interval, 5% error share, and sampling number are estimated at 584, with 328 male and 655 female students, all of whom were completed by 983 university students. After the Google Forms download of the prepared questionnaire, the individual was given the questionnaire through their social media channels (Whatsapp, Facebook, Twitter, Instagram, Inc., California, USA). Individuals have been notified before completing the questionnaire. Respondents to the voluntary question of participation in the consent form, complete all questionnaires, and university students are included in the study. Upon completion of the surveys, the file was imported from Google Forms into Excel. Of the 990 questionnaires obtained as part of the study's objective, 7 were of a cyclical nature that could not be included in the study, so the analysis was carried out with 983 surveys.

### **Ethical Dimension of Research**

The study was approved by Ankara Medipol University University on 09.12.2020 and the Non-Interventional Ethics Board on 0502 and the Ministry of Health on 07.12.2020 and T20-48-57. The work was following the principles of the Helsinki Declaration.

### **Instrumentations**

Participants were given a survey form containing the researcher's demographic data, anthropometric measurements, nutrition, and and survey form containing the Food Neophobia Scale, Stunkard Figure Rating Scale, and Life Satisfaction Scale.

### **Food Neophobia Scale (FNS)**

The scale, originally the "Food Neophobia Scale", was developed by Pliner and Hobden in 1992 as a psychometric tool for describing food neophobia (Pliner & Hobden, 1992). The validity of the scale in Turkish was done by Duman and his colleagues (Duman et al., 2020). The scale consists of 10 articles containing 5 positive and 5 negative expressions about nutrients and nutritional conditions. The scale consists of 7 likert: "I absolutely agree", "I agree", "I agree very little", "Hesitant", "I disagree very little", "I disagree absolutely not". An increase in the participant's scale score means that food neophobia has increased. The FNS is rated at 10-70 scores. Above average scores, food neophobia exists. The Cronbach alpha coefficient of the scale is calculated to be 0.80 (Duman et al., 2020). The assessment is based on the average ( $\bar{X}$ ) and standard deviation (SS) of the total scores. The new food scare scale score  $\bar{X} \pm 1SD$  was evaluated as individuals/neophobic with a higher food neophobia. In this study, the Cronbach alpha coefficient was calculated at 0.60.

### **Stunkard Figure Rating Scale (SFRS)**

It's a figurative scale that allows an individual to subjectively assess the body shape. Participants are asked to evaluate their current body shape with a figure on a scale. There are figures for both sexes on the scale. The first figure refers to the weakest body shape, while the last figure refers to the fattest body shape. In the assessment, figures 1 and 2: "weak", figure 3 and 4 "appropriate weight", figure 5 "slightly fat", figure 6 and 7 "moderately fat", figure 8 and 9 are grouped into "very fat" body shapes. The difference between what they believe to be healthy and closest to (Healthier-I) (more objective) and the number between ideal and those closest to them (more subjective) indicates dissatisfaction with body image (Ideal-I) (more objective). (BID) and scores range from -8 to +8. The greater the difference, the greater the ratio of body image dissatisfaction (Stunkard, Sorensen & Schulsinger, 1983).

### The Life-Satisfaction Scale (LSS)

The Life-Satisfaction Scale was developed by Diener and his colleagues in 1985 and is intended to determine the satisfaction individuals receive from their lives (Diener et al., 1985). It is based on a reliability study of the scale by Dağlı and Baysal (Dağlı and Baysal, 2016). The scale of five questions is composed of 7 likert. A score of 1 on the scale "definitely disagree=1 point" refers to "definitely agree=7 points". The minimum 5 points to be awarded on the scale is 35 at the highest. Low score on the scale indicates low life satisfaction, and high score indicates high life satisfaction. Cronbach's Alpha was found at 0.88.

### Anthropometric Measurements

Body mass index (BMI) was calculated by dividing the participants' body weight in kilograms by the square of their height in meters, according to their statements. According to the WHO, BMI is classified as 18.5 kg/m<sup>2</sup> weak, 18.5 to 24.9 kg/m<sup>2</sup> normal, 25.0 kg/m<sup>2</sup> overweight/obese (WHO, 2004).

### Data Analysis

Statistical analyzes were done using a package program called SPSS (IBM SPSS Statistics 24.0). Interpretation of the findings using frequency tables and descriptive statistics. The "Independent Sample-t" test (t-table value) was compared the measurement values of two independent groups; the "ANOVA" test (F-table value) was used in the comparison of three or more individual groups. For binary comparisons of variables that make sense for three or more groups, LSD and Bonferroni corrections have been applied. The relationships between the scales and some variables are determined by Pearson correlation analysis. The results of the analysis were interpreted at the level of 95% confidence and 0.05% meaningfulness for comparison tests, 95% and 99% confidence levels, and 0.05 and 0.01 meaningfulness values for correlation tests.

## RESULTS

The average age of the participants was  $20.76 \pm 2.60$  years, of which 655 (66.6%) were women, 251 (38.32%) of the women were in satisfactory economic status, and 282 (27.80%) had previously been abroad. Of the participants, 328 (33.4%) were male, 114 (34.76%) of the men were in sufficient economic condition, and 121 (36.90%) had previously been abroad. It was analyzed that there was a statistically significant relationship between faculty and overseas status, food selection, chronic disease status, frequency of eating out, appetite status and BMI and gender classes ( $p < 0.05$ ) (Table 1).

**Table 1:** Participants' demographics

Variable	Women (n=655)		Man (n=328)		Total (n=983)		X <sup>2</sup>	p
	n	%	n	%	n	%		
<b>Age (year)</b>	(20.56±2.48)		(21.14±2.71)		(20.76 ± 2.60)		10.986	<b>0.004*</b>
<20	421	64.27	179	54.57	600	61.04		
21-25	215	32.82	130	39.63	345	35.10		
≥26	19	2.90	19	5.79	38	3.87		
<b>Faculty</b>							19.943	<b>0.000*</b>
Educational Sciences	273	41.70	181	55.20	454	46.20		
Science	43	6.60	21	6.40	64	6.50		
Health Sciences	242	36.90	79	24.10	321	32.70		
Social Sciences	97	14.80	47	14.30	144	14.60		
<b>Nutritional Information</b>							2.088	0.72
Too inadequate	16	2.44	10	3.05	26	2.64		
Insufficient	51	7.80	24	7.32	75	7.63		
Medium	285	43.51	148	45.12	433	44.05		
That's enough	251	38.32	114	34.76	365	37.13		
It's quite enough	52	7.94	32	9.76	84	8.55		
<b>Abroad Presence</b>							8.495	<b>0.004*</b>
Yes	182	27.80	121	36.90	303	30.80		
No	473	72.20	207	63.10	680	69.20		

<b>Reason for Being Abroad</b>								
Academic/educational	35	19.23	18	14.88	53	17.49		
General culture	76	41.76	62	51.24	138	45.54		
For a close/environmental visit	43	23.63	19	15.70	62	20.46	13.671	<b>0.008*</b>
Other causes (Family business etc.)	28	15.38	22	18.18	50	16.50		
<b>Choosing Food Abroad</b>								
Sometimes	174	26.56	49	14.94	223	22.70		
Yes	244	37.25	128	39.03	372	37.80	18.579	<b>0.000*</b>
No	237	36.19	151	46.03	388	39.50		
<b>Chronic disease</b>								
Has chronic disease	269	41.10	88	26.80	357	36.30	19.161	<b>0.000*</b>
Hasn't chronic disease	386	58.90	240	73.20	626	63.70		
<b>Eating Frequency Outside</b>								
Never	36	5.50	21	6.40	57	5.80		
1-2 days a week	297	45.30	109	33.23	406	41.30		
2-3 days a week	201	30.70	104	31.71	305	31.00	41.956	<b>0.000*</b>
5-6 days a week	89	13.60	40	12.20	129	13.10		
Every day	32	4.90	54	16.46	86	8.70		
<b>Appetite Status</b>								
Bad	37	5.65	16	4.88	53	5.40		
Medium	305	46.56	110	33.54	415	42.20	16.971	<b>0.000*</b>
Good	313	47.79	202	61.59	515	52.40		
<b>BMI (kg/m<sup>2</sup>)</b>								
<18.5	99	15.11	5	1.52	104	10.58		
18.5-24.9	475	72.52	228	69.51	703	71.52	72.054	<b>0.000*</b>
>25	81	12.37	95	28.97	176	17.90		

\*p<.05 Pearson Ki-Square Test

The women's body weight was calculated at 58.97±9.97 kg, men's 77.21±12.50 kg; women's height averaged 165.46±5.98 cm, and men's 179.92±6.55 cm. The body mass index is 21.52±3.32 kg/m<sup>2</sup> in women and 23.81±3.39 kg/m<sup>2</sup> in men. Age, body weight, length of height, BMI and SFRS scores have been found to differ from individual gender (p< 0.05) (Table 2).

**Table 2:** Participants' Certain Features Compared to Gender

	Women (n=655)			Man (n=328)			t	p
	$\bar{X}$	±	SD	$\bar{X}$	±	SD		
Age (year)	20.56	±	2.48	21.14	±	2.71	-3.30	<b>0.000*</b>
Body weight (kg)	58.97	±	9.97	77.21	±	12.50	-24.78	<b>0.000*</b>
Height length (cm)	165.46	±	5.98	179.92	±	6.55	-33.58	<b>0.000*</b>
BMI (kg/m <sup>2</sup> )	21.52	±	3.32	23.81	±	3.39	-10.07	<b>0.000*</b>
Food Neophobia Scale	37.30	±	8.36	36.85	±	9.03	0.77	0.444
Life Satisfaction Scale	13.44	±	4.42	13.36	±	4.58	0.27	0.786
Stunkard Figure Rating Scale	-0.62	±	1.18	-0.39	±	1.45	-14.42	<b>0.000*</b>

\*p< 0.05; t:Two Independents t-Test,  $\bar{X}$ : Average, SD: Standard Deviation

In Table 3, the sub-dimensions of FNS and the LSS and SFRS scores of the individuals were evaluated. The LSS scores of neophilic individuals were 13.55±4.59, average individuals were 13.35±4.48 and neophobic individuals were 13.59±4.4. The SFRS scores of neophilic individuals were -0.55±1.44, average individuals were -0.54±1.23 and neophobic individuals were -0.53±1.37 according to FNS scores. There is no statistically significant difference between the FNS sub-dimensions and the LSS and SFRS scores (p>0.05).

**Table 3.** Comparison of Life Satisfaction Scale and Stunkard Figure Rating Scale Scores of Individuals According to the Sub-Dimensions of the Food Neophobia Scale

	Food Neophobia Scale															F	p
	Neophilic					Average					Neophobic						
	$\bar{X}$	$\pm$	SD	Min	Max.	$\bar{X}$	$\pm$	SD	Min	Max.	$\bar{X}$	$\pm$	SD	Min	Max.		
<b>LSS</b>	13.55	$\pm$	4.59	5	22	13.35	$\pm$	4.48	5	25	13.59	$\pm$	4.36	5	25	0.243	0.784
<b>SFRS</b>	-0.55	$\pm$	1.44	-8	5	-0.54	$\pm$	1.23	-5	4	-0.53	$\pm$	1.37	-5	5	0.007	0.993

\* $p < 0.05$  One Way Variance Analysis,  $\bar{X}$ :Average, SD: Standard Deviation, LSS: Life Satisfaction Scale, SFRS:Stunkard Figure Rating Scale

While the difference between the gender and the Food Neophobia Scale and Life Satisfaction Scale scores is not statistically significant ( $p > 0.05$ ), a statistically significant difference was found between the genders in terms of Stunkard Figure Rating Scale scores ( $t_{(981)} = -2.489$ ;  $p = 0.013$ ). A statistically significant difference has been detected between the Life Satisfaction Scale and the economic situation ( $F_{(4,978)} = 42.016$ ;  $p = 0.000$ ). A statistically significant difference between the chronic condition and the SFRS scores ( $t_{(981)} = -2.450$ ;  $p = 0.014$ ). A statistically significant differences have been detected between the number of meals and the number of LSS scores ( $F_{(2,980)} = 5.619$ ;  $p = 0.004$ ). There is a statistically significant difference between the number of meals and the score of the SFRS ( $F_{(2,980)} = 7.519$ ,  $p = 0.001$ ). According to the statement, a statistically significant difference has been detected between the appetite situation and the SFRS ( $F_{(2,980)} = 9.994$ ;  $p = 0.000$ ). Statistically significant differences have been detected between the appetite and the score of the SFRS ( $F_{(2,980)} = 26.969$ ;  $p = 0.000$ ). Statistically significant differences have been detected between BMI and SFRS scores ( $F_{(2,980)} = 129.663$ ;  $p = 0.000$ ) (Table 4).

**Table 4.** Comparing Food Neophobia Scale, Life Satisfaction Scale, and Stunkard Figure Rating Scale Scores to Various Findings

Variable	n	Food Neophobia Scale				Life Satisfaction Scale				Stunkard Figure Rating Scale				
		$\bar{X}$	SD	Analaysis	p	$\bar{X}$	SD	Analaysis	p	$\bar{X}$	SD	Analaysis	p	
Gender	Female	655	37.30	8.36	t=0.785	0.432	13.44	4.42	t=0.274	.0784	-0.62	1.18	t=-2.489	<b>0.013*</b>
	Male	328	36.85	9.03			13.36	4.58			-0.39	1.45		
Age (years)	<20	600	37.18	8.53	F=0.519	0.595	13.67	4.26	F=2.770	0.63	-0.54	1.23	F=0.106	0.899
	21-25	345	36.96	8.54			12.96	4.77			-0.55	1.38		
	≥26	38	38.45	9.97			13.61	4.74			-0.45	1.25		
Economic status	Too inadequate	26	38.15	5.79	F=1.882	0.111	9.88	4.13	F=42.016	<b>0.000*</b> <b>(1-3,4,5;</b> <b>2-3,4,5;</b> <b>3-4,5)</b>	-0.15	1.22	F=2.260	0.061
	Insufficient	75	34.75	7.74			10.12	4.31			-0.84	1.67		
	Medium	433	37.52	8.71			12.44	4.19			-0.55	1.27		
	That's enough	365	37.01	8.52			14.95	3.86			-0.54	1.24		
	It's quite enough	84	37.70	9.44			15.80	4.84			-0.32	1.03		
Chronic disease	Has chronic disease	357	37.20	8.90	t=0.146	0.884	13.55	4.48	t=0.694	0.488	-0.67	1.28	t=-2.450	<b>0.014*</b>
	Hasn't chronic disease	626	37.12	8.41			13.34	4.47			-0.46	1.27		
Number of main meals	1	66	36.15	9.46	F=0.687	0.503	12.08	4.81	F=5.619	<b>0.004*</b> <b>(1-2,3;2-3)</b>	-0.65	1.28	F=7.519	<b>0.001*</b> <b>(1-3;2-3)</b>
	2	543	37.07	8.69			13.24	4.33			-0.66	1.22		
	3	374	37.44	8.27			13.90	4.57			-0.34	1.34		
Appetite status by declaration	Bad	53	36.00	7.41	F=0.542	0.582	11.15	5.06	F=9.994	<b>0.000*</b> <b>(1-2,3;2-3)</b>	0.38	1.29	F=26.969	<b>0.000*</b> <b>(1-2,3;2-3)</b>
	Medium	415	37.13	8.52			13.17	4.31			-0.37	1.24		
	Good	515	37.29	8.76			13.85	4.46			-0.77	1.25		
BMI (kg/m <sup>2</sup> )	<18.5	104	36.47	6.97	F=0.664	0.515	13.16	4.44	F=0.444	0.642	0.55	0.89	F=129.663	<b>0.000*</b> <b>(1-2,3;2-3)</b>
	18.5-24.9	703	37.34	8.73			13.50	4.44			-0.43	1.15		
	>25	176	36.78	8.91			13.23	4.64			-1.62	1.22		

\*p<0.05,  $\bar{X}$ :Average, SD: Standard Deviation

\*Parametric methods were used for measurement values that are in following the normal distribution. Following parametric methods, the "Independent Sample-t test" (t-table value) was used to compare the measurement values of two independent groups; the "ANOVA" test (F-table value) method was used to compare three or more independent groups. LSD and Bonferroni correction were applied for pairwise comparisons of variables with significant differences for three or more groups

A negative, statistically significant relationship was found between SFRS and BMI ( $r=-0.591$ ;  $p=0.000$ ). As the BMI value increases, individuals body dissatisfaction increases and their desire to lose weight also increases. A positive, statistically significant relationship was found between age and BMI ( $r=0.114$ ;  $pDec=0.000$ ). As the age increased, an 11.4% increase in BMI values was detected (Table 5).

**Table 5.** Correlation Test Between Individuals' Food Neophobia Scale, Life Satisfaction Scale, and Stunkard Figure Rating Scale Scores

		Food Neophobia Scale	Stunkard Figure Rating Scale	Life Satisfaction Scale	BMI (kg/m <sup>2</sup> )	Age (year)
Food Neophobia Scale	<i>r</i>	1	0.008	-0.003	-0.002	0.029
	<i>p</i>	-	0.813	0.927	0.960	0.362
Stunkard Figure Rating Scale	<i>r</i>	0.008	1	0.060	-0.591**	-0.015
	<i>p</i>	0.813	-	0.059	<b>0.000</b>	0.647
Life Satisfaction Scale	<i>r</i>	-0.003	0.060	1	-0.025	-0.022
	<i>p</i>	0.927	0.059	-	0.425	0.486
BMI (kg/m <sup>2</sup> )	<i>r</i>	-0.002	-0.591**	-0.025	1	0.114**
	<i>p</i>	0.960	<b>0.000</b>	0.425	-	<b>0.000</b>
Age (year)	<i>r</i>	0.029	-0.015	-0.022	0.114**	1
	<i>p</i>	0.362	0.647	0.486	<b>0.000</b>	-

$p<0.05$ , \*\* $p<0.01$

## DISCUSSION

Although food neophobia is not defined as an eating disorder, it can cause eating-related problems in individuals when it is not controlled. University students generally do not consider nutrition due to the intensity of academic life (Zhong et al., 2021). It is important for university students, a private social group, to acquire the right eating habits with adequate and balanced nutrition (Vilaro et al., 2018). As education levels increase, nutritional neophobia decreases (Rabadán and Bernabéu, 2021). In this study, the students' food neophobia poin was found  $37.2\pm 8.6$  and this level is high according to the literature. Different scores have been obtained in studies conducted in various countries on this subject. University students average nutritional neophobia scale scores of 36.3 (Zhong et al., 2021) and 33.6 in China (Zhao et al., 2020), 31.1 in the United Kingdom (Stafford et al., 2017), 25.8 in Spain (Domínguez et al., 2019), 17.3 in Chile (Schnettler et al., 2017), young people 21-24 years old in Poland 28.7 (Wilczyńska and Newerli-Guz, 2019) and 18-19 years of university in Southern India were found in vegetarians 37.7, ovo-vegetarians 38.9 and omnivorous 37.3 (Chitra et al., 2016). In our study, high scaling scores are thought to be the cause of this difference, both religious and cultural. Age is considered an important factor for nutritional neophobia. When neophobia is higher in childhood, it decreases around middle age. Neophobia toward old age is reported to have increased again (van den Heuvel, Newbury and Appleton, 2019). The family, modeled after many subjects from childhood, also plays an important role in the development of nutritional neophobia or selective eating (Elkins and Zickgraf, 2018). Age is an important concept for nutritional neophobia. Food neophobia is highest in childhood, decreasing in adolescence, stable in adulthood, and increases slightly in old age again due to health problems (Rabadán and Bernabéu, 2021). No new differences were detected among the age groups of students in this study in terms of their food neophobia ( $F=0.519$ ;  $p=0.595$ ). This is thought to be because age groups are closer together.

While there is a relationship between obesity and food neophobia, neophobic individuals are reported to have higher BMI. In addition, when normal-weight individuals and obese individuals were compared, it was found that the food neophobia of obese people was higher than normal-weight individuals, and obese men had higher food neophobia than both obese women and all normal-weight individuals (Proserpio et al., 2018). Another study found that individuals with high food neophobia had a higher body mass index (Knaapila et al., 2015). In this study, the students' BMI's were found in males at  $23.8\pm 3.4$  kg/m<sup>2</sup> and women at  $21.5\pm 3.3$  kg/m<sup>2</sup>, and found no correlation between food neophobia and the body mass index. This is thought to be because that participants are generally young adults and that obesity in the participating group is low. However, a statistically significant difference has been detected



between the participants' appetite ( $F_{(2,980)}=9.994$ ;  $p=0.000$ ) and the SFRS. ( $F_{(2,980)}=9.048$ ;  $p=0.000$ ). In this case, it can be argued that gender has no clear effect on food neophobia, and can vary depending on the age group or the society in which the individual lives. BMI growth is noted to show a negative correlation with life satisfaction (Yin, Zhang, & Shao, 2020). A study found that students with lower BMIs have higher life satisfaction. Moreover, students who are in the ideal BMI or who are weak are more likely to have a high life expectancy than those who are overweight or obese (Williams et al., 2018). However, no statistically significant differences were detected in this study between BMI and LSS scores ( $p>0.05$ ). This is thought to be because the majority of respondents have normal BMI.

Correct detection of body shape and weight is reported to be related to appropriate weight control behaviors and body misperceptions (Mahat and Zha, 2020). Unhealthy eating behavior is less common among university students with the right body perception, with higher self-esteem and lower levels of depression (Gillen, 2015). In a study, it was reported that body weight control behaviors and practices are caused by body perception, and it was reported that the predictors of impaired body perception are female gender and young adult age (Akindele et al., 2017). Poor perception of the body as it suggests a decrease in obesity awareness. A study has shown that attempts to lose weight are lower among overweight and obese adults with a misperception of body decency (Albeeb et al., 2018). Disorders in the perception of your body size may lead to a lack of cure for obesity. A study found that most women prefer a weak figure as an optimal model, whereas approximately 30.0% of men prefer an overweight figure as an optimal model (Kuan et al., 2011). This study found a statistically significant difference between gender in respect of SFRS scores ( $t_{(981)}=-2.489$ ;  $p=0.013$ ). The scores of men's and women's body dissatisfaction differ statistically. It also identified a statistically significant relationship between the SFRS and BMI in a negative direction ( $r=-0.591$ ;  $p=0.000$ ). As BMI values rise, individuals' body dissatisfaction rises, and their body size satisfaction decreases. As a result, there is an increase in dissatisfaction and increased demand for weight loss. It is thought that in cases on overweight and obesity to increase the effectiveness of obesity treatment, it is necessary to analyze the weight-state perception and body-size perception.

## CONSLUSION

Food neophobia refers to avoiding unfamiliar foods, which can prevent a person from taking full advantage of all nutrients while reducing the risk of eating harmful foods. Nutrient neophobes have a smaller diet than neophilic ones. In particular, neophobia developed during childhood can lead to poor nutritional choices later in life, as well as improved eating behavior disorders.

Food neophobia in individuals can reduce nutritional diversity, adversely affect the intake of required nutrients and lead to eating disorders of behavior. However, deformities in body perception and quality of life may adversely affect eating behavior. For university students to adopt healthy eating habits, it is important to provide effective, continuous and, regular, with replaceable nutritional training to students, to protect public health, and to prevent the formation of non-infectious diseases. It is useful to conduct more studies in different ages and communities examining the relationship of food neophobia with eating behavior disorders and other influencing factors.

## Author Contributions

**Plan, design:** PG,NŞ,SY; **Material, methods and data collection:** PG,BA,ŞK; **Data analysis and comments:** PG,NŞ,SY; **Writing and corrections:** PG,NŞ,SY,BA,ŞK.

## Conflict of Interest

There are no conflicts of interest among the authors of the study.

## Acknowledgments

We are grateful to the participants in the study for their kind and heartfelt cooperation.

## Funding

No financial support was received for this research.

## REFERENCES

- Akindele, M.O., Phillips J., Igumbor E., Useh U. (2017). Body weight misperception and dissatisfaction among overweight and obese adult nigerians. *JMIR Public Health Surveill*, 16;3(3):e56.
- Albeeybe, J., Alomer, A., Alahmari, T., Asiri, N., Alajaji, R., Almassoud, R., & Al-Hazzaa, H. M. (2018). Body size misperception and overweight or obesity among Saudi college-aged females. *Journal of Obesity*, 2018.
- Cabras, C., and Mondo, M. (2018). Coping strategies, optimism, and life satisfaction among first-year university students in Italy: Gender and age differences. *Higher Education*, 75(4), 643-654.
- Chen, X., Cai, Z., He, J., & Fan, X. (2020). Gender differences in life satisfaction among children and adolescents: A meta-analysis. *Journal of Happiness Studies*, 21(6), 2279-2307.
- Chitra U, Adhikari K, Radhika MS, Balakrishna N. (2016). Neophobic Tendencies and Dietary Behavior in a Cohort of Female College Students from Southern India. *Journal of Sensory Studies*, 31(1), 70-77.
- Dağlı, A., & Baysal, N. (2016). Adaptation of life satisfaction scale to Turkish: A study of validity and reliability. *Electronic Journal of Social Sciences*, 15(59).
- Diener, E. D., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment*, 49(1), 71-75.
- Domínguez L, Fernández-Ruiz V, Sánchez-Mata MC, Cámara M. (2018). Food neophobia: Spanish case study related to new formulations based on traditional 'Gazpacho'. In XV International Symposium on Processing Tomato, 1233, 209-216.
- Donadini G, Spigno G, Porretta S. (2021). Preschooler liking of meal components: the impact of familiarity, neophobia, and sensory characteristics. *Journal of Sensory Studies*, 36(3), e12649.
- Duman E, Akçil Ok M, Keser A. (2020). Besin neofobisi ölçeğinin Türkçeye uyarlanması: Geçerlik ve güvenilirlik çalışması. *Kocaeli Üniversitesi Sağlık Bilimleri Dergisi*, 6(2):157-161.
- Elkins A, Zickgraf HF. (2018). Picky eating and food neophobia: Resemblance and agreement in parent/young adult dyads. *Appetite*. 126, 36-42.
- Gillen, M.M. (2015). Associations between positive body image and indicators of men's and women's mental and physical health. *Body Image*, 13, 67-74.
- Williams, S. G., McDermott, R., Fruh, S., Graves, R., Hall, H., Wright, T., ... & Carter, C. (2018). Nursing student satisfaction with daily life: A holistic approach. *Journal of Nursing Education*, 57(12), 751-755.
- Hazley, D., Stack, M., Walton, J., McNulty, B. A., & Kearney, J. M. (2022). Food neophobia across the life course: Pooling data from five national cross-sectional surveys in Ireland. *Appetite*, 171, 105941.
- Juli, M. R. (2019). The "imperfect beauty" in eating disorders. *Psychiatria Danubina*, 31(suppl 3), 447-451.
- Khoshkerdar, P., and Raeisi, Z. (2020). The effect of mindfulness-based stress reduction on body image concerns of adolescent girls with dysfunctional eating attitudes. *Australian Journal of Psychology*, 72(1), 11-19.
- Knaapila AJ, Sandell MA, Vaarno J, Hoppu U, Puolimatka T, Kaljonen A et al. Food neophobia associates with lower dietary quality and higher BMI in Finnish adults. *Public Health Nutrition*, 2015;18(12):2161-71.
- Kral, T. V. (2018). Food neophobia and its association with diet quality and weight status in children. In *Food Neophobia* (pp. 287-303). Woodhead Publishing.
- Kuan, P. X., Ho, H. L., Shuhaili, M. S., Siti, A. A., & Gudum, H. R. (2011). Gender differences in body mass index, body weight perception and weight loss strategies among undergraduates in Universiti Malaysia Sarawak. *Malaysian Journal of Nutrition*, 17(1).
- Kyrkou, C., Tsakoumaki, F., Fotiou, M., Dimitropoulou, A., Symeonidou, M., Menexes, G., ... & Michaelidou, A. M. (2018). Changing trends in nutritional behavior among university students in Greece, between 2006 and 2016. *Nutrients*, 10(1), 64.
- Lafraire J, Rioux C, Giboreau A, Picard D. (2016). Food rejections in children: cognitive and social/environmental factors involved in food neophobia and picky/fussy eating behavior. *Appetite*, 96, 347-357.
- Mahat, G., & Zha, P. (2022). Body weight perception and physical activity among young adults: Analysis from the national longitudinal study of adolescent to adult health. *Journal of American College Health*, 70(4), 1257-1264.
- Maiz, E. and Balluerka, N. (2018). Trait Anxiety and Self-Concept Among Children and Adolescents with Food Neophobia. *Food Research International*, 105, 1054-1059.
- Mak, A. H., Lumbers, M., Eves, A., & Chang, R. C. (2012). Factors influencing tourist food consumption. *International Journal of Hospitality Management*, 31(3), 928-936.
- Moustafa, S., Tawbe, Z., Sleiman, F., Daouk, S. E., Al-Iskandarani, M., Sleiman, M., & Hoteit, M. (2017). Body image perception in association with healthy lifestyle behaviour's in Lebanese men and women. *International Journal of School and Cognitive Psychology*, 4(4), 2-7.
- Muhammad, R., Ibrahim, M. A., Ahmad, R., & Hanan, F. (2016). Psychological Factors on Food Neophobia among the young Culinarian in Malaysia: Novel food preferences. *Procedia-Social and Behavioral Sciences*, 222, 358-366.
- Nezlek, J. B., and Forestell, C. A. (2019). Food neophobia and the Five Factor Model of personality. *Food Quality and Preference*, 73, 210-214.

- Pliner, P., and Hobden, K. (1992). Development of a scale to measure the trait of food neophobia in humans. *Appetite*, 19(2), 105-120.
- Proserpio, C., Laureati, M., Bertoli, S., Battezzati, A., Pagliarini, E. (2016). Determinants of obesity in Italian adults: the role of taste sensitivity, food liking, and food neophobia. *Chemical Senses*, 41(2):169–76.
- Proserpio, C., Laureati, M., Invitti, C., Pagliarini, E. (2018). Reduced taste responsiveness and increased food neophobia characterize obese adults. *Food Quality Prefer*, 63:73–9.
- Rabadán, A., & Bernabéu, R. (2021). A systematic review of studies using the Food Neophobia Scale: Conclusions from thirty years of studies. *Food Quality and Preference*, 93, 104241.
- Rahimi-Ardabili, H., Reynolds, R., Vartanian, L. R., McLeod, L. V. D., & Zwar, N. (2018). A systematic review of the efficacy of interventions that aim to increase self-compassion on nutrition habits, eating behaviours, body weight and body image. *Mindfulness*, 9(2), 388-400.
- Ridwan, H., Hasan, H. A., Ismat, H., Hakim, H., Khalid, H., Al-Fityani, L., ... & Ayman, A. (2019). Body mass index perception, body image dissatisfaction and their relations with weight-related behaviors among university students. *International Journal of Environmental Research and Public Health*, 16(9), 1541.
- Sarin, H.V., Taba, N., Fischer, K., Esko, T., Kanerva, N., Moilanen, L., Perola, M. (2019). Food neophobia associates with poorer dietary quality, metabolic risk factors, and increased disease outcome risk in population-based cohorts in a metabolomics study. *American Journal of Clinical Nutrition*, 110:233–45.
- Schnettler, B., Crisóstomo, G., Sepúlveda, J., Mora, M., Lobos, G., Miranda, H., Grunert, K.G. (2013). Food neophobia, nanotechnology and satisfaction with life. *Appetite*, 69, 71-79.
- Sivrikaya, K. K., and Pekerşen, Y. (2020). The impact of food neophobia and sensation seeking of foreign tourists on the purchase intention of traditional Turkish food. *International Journal of Gastronomy and Food Science*, 21, 100222.
- Stafford, L.D., Tsang, I., López, B., Severini, M., Iacomini, S.. (2017). Autistic Traits Associated with Food Neophobia but not Olfactory Sensitivity. *Appetite*, 116, 584-588.
- Stunkard, A, Sorensen, T, Schulsinger, F. (1983). Use of the Danish adoption register for the study of obesity and thinness. *Association for Research in Nervous and Mental Disease Journal*, 60, 115-20.
- van den Heuvel, E., Newbury, A., & Appleton, K. M. (2019). The psychology of nutrition with advancing age: Focus on food neophobia. *Nutrients*, 11(1), 151.
- Vilaro, M. J., Colby, S. E., Riggsbee, K., Zhou, W., Byrd-Bredbenner, C., Olfert, M. D., ... & Mathews, A. E. (2018). Food choice priorities change over time and predict dietary intake at the end of the first year of college among students in the US. *Nutrients*, 10(9), 1296.
- WHO Expert Consultation (2004). Appropriate body-mass index for Asian populations and its implications for policy and intervention strategies. *Lancet*, 363(9403),157-163.
- Wilczyńska A & Newerli-Guz J. (2019). Acceptance of innovative food products and the level of neophobia. In European conference on innovation and entrepreneurship. Academic Conferences International Limited. 1129-XXVIII.
- Yin, C., Zhang, J., & Shao, C. (2020). Relationships of the multi-scale built environment with active commuting, body mass index, and life satisfaction in China: A GSEM-based analysis. *Travel Behaviour and Society*, 21, 69-78.
- Zhao, J.B., Gao, Z.B., Li, Y.X., Zhang, X.Y., Zou, L.Q. (2020). The Food Neophobia Scale (FNS): Exploration and confirmation of factor structure in a healthy Chinese sample. *Food Quality and Preference*, 79, 103791.
- Zhong, X.T., Wang, T.X., Zhou, Q., Chen, X.Y. (2021). Correlation between nutritional status and dietary behavior of college students in a medical college in Guangzhou. *Chinese Journal of School Health*, 42(4), 529–533.