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Evaluation of picky eating and chemosensory pleasure and their relationship with some variables among adults

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ABSTRACT

Objective: Picky eating (PE) is a multifaceted behavior often linked to food neophobia, sensory processing issues, and social or cultural influences. This study examines the relationship between PE behaviors, chemosensory pleasure, and adherence to the Mediterranean diet (MD) in adults.

Methods: A cross-sectional study was conducted with a sample of 1,362 adults (aged 18-65 years) using validated questionnaires, including the adult picky eating questionnaire (APEQ), chemosensory pleasure scale (CPS), and the Mediterranean diet adherence scale (MEDAS). Statistical analyses assessed correlations between PE, sensory pleasure, and dietary adherence, controlling demographic variables.

Results: MEDAS was significantly positively correlated with and the purely olfactory subscale of the CPS ($r = 0.081$, $p < 0.05$), while negatively correlated with consummatory subscale of the CPS indicating a mild association between MD adherence and olfactory pleasure and consummatory. The total APEQ score showed a positive correlation with the CPS total score ($r = 0.095$, $p < 0.01$), suggesting a potential link between PE and chemosensory pleasure. Linear regression analysis revealed that both age and the CPS total score were significant predictors of PE behavior ($R^2 = 0.140$, $p < 0.001$), while body mass index and gender were not significant predictors for the APEQ score.

Discussion: This study reveals a significant association between chemosensory pleasure and PE behaviors, emphasizing the importance of taste and smell in shaping food preferences. While no direct link was found between PE and adherence to the MD, this study highlights the need to explore sensory-driven dietary interventions for improving nutrition and overall quality of life.

Keywords: picky eating, chemosensory pleasure, Mediterranean diet, dietary adherence, sensory processing

INTRODUCTION

Nowadays, there is an increase in eating behavior disorders. Recently, picky eating (PE) behavior has become increasingly common among these eating behaviors. This is explained by the rejection of both traditional and unfamiliar foods and the consumption of a small variety of foods [1]. PE is a descriptive concept commonly used in diets characterised by food rejection and food neophobia [2]. It is important to emphasise that these two concepts cannot be used interchangeably. PE, unlike food neophobia, can occur not only before but also after the act of tasting a food. Food neophobia is therefore another problematic eating behavior, a subcomponent of PE, characterized by the refusal to try new or unfamiliar foods [3]. This is because it has been suggested that PE may reflect similar subclinical symptoms that occur in some avoidant/restrictive food intake disorder (ARFID) [4].

ARFID is included in the newly defined category in the diagnostic and statistical manual of mental disorders-V (DSM-V). It is also included in the DSM-IV categories feeding disorder in infancy or early childhood'. Unlike other eating disorders, ARFID is defined as an eating behavior disorder that is not associated with image and weight concerns, but with psychosocial functioning problems that cause inadequate energy and food intake. Although PE is generally known as a common eating behavior in childhood, one out of every three people among adults exhibits this eating behavior. The lifetime prevalence of PE has been reported to reach approximately 15-35 [4-6]. PE is thought to have a familial predisposition. It has been reported that adults who have negative experiences about foods in childhood may lead to avoidance of certain foods or food groups in the future. PE behavior in childhood is usually persistent in adulthood. It has been reported that these individuals experience increased anxiety and anxiety levels when trying new or different foods [7]. PE in adults has been reported to interfere with healthy eating in various racial and socioeconomic groups [4]. PE leads to decreased satisfaction with food-related life and impaired eating-related quality of life as well as decreased overall quality of life in adults [8]. Furthermore, adult picky eaters show higher disgust sensitivity than normal eaters, and previous studies have shown that disgust is closely linked to food rejection [4, 9]. In addition, among adults, picky eaters report more psychological problems such as depression and obsessive-compulsive symptoms. They are more likely to score higher on these

psychological problems in the clinic than non-picky eaters [4, 10].

Chemical sensory hedonic capacities, defined as the ability to experience taste and odor-induced pleasure, are among the important factors affecting PE [11]. Chemosensory processing may involve multiple mechanisms, including nutrient sensing mechanisms in the brain and gut, learning, memory and reward systems in the brain.Therefore, the chemosensory receptor may provide the ability to sense nutrients in response to metabolic changes and may contribute to guidance for nutritional welfare [12]. The reduction in the hedonic value of food was also found to be strongly associated with a high reluctance to try new foods [13, 14]. The diminished sense of enjoyment associated with the food experience leads to a reduction in olfactory behavior. Odor identification is known to be positively correlated with the degree of a person's experience of the olfactory world, which affects olfactory ability. Therefore, it is possible to hypothesize that the inadequate olfactory experience and exploratory behavior described in picky eaters may also affect the ability to find the correct name for an odor [15]. Assessment of diet quality is important in studies examining PE behavior that causes eating disorders.

The Mediterranean diet (MD) is one of the healthiest and most balanced dietary patterns worldwide. This dietary pattern includes healthy unsaturated fats, especially from olive oil and nuts; fiber from legumes, fruits and vegetables; low levels of non-starchy carbohydrates; and minimal amounts of animal protein, preferably from fish and seafood [16]. Adherence to the MD is often associated with healthy eating behaviors. Having emotional and extrinsic eating behaviors leads individuals to prefer foods that are high in energy and intense in flavor, which is different from the MD model. However, unlike these, individuals with restrictive eating behavior due to an effort to reject unhealthy foods are less likely to adhere to MD [17, 18]. In summary, in the limited number of studies examining the PE behaviors of adults, it has been shown that adults with PE behaviors have a limited diet, do not prefer fruits and vegetables in particular, avoid trying new foods, show clinical depressive symptoms and have high levels of anxiety in social eating environments [5, 19, 20]. When the studies on PE behaviors in the literature are examined, it is seen that the findings obtained from ARFID studies, food diversity, and food neophobia are used to determine the findings. Therefore, it is seen that the specific attitudes and behaviors that can define PE behavior are insufficient to measure [10, 21, 22]. There are insufficient studies examining the effects of PE behavior on adults and their relationship with other eating behaviors. Studies on PE have been limited by inconsistent and varied measurement approaches, and this has reduced the ability to interpret correlations, results and relationships between samples [1, 5].

The primary aim of this study is to examine the relationship between PE behavior and chemosensory pleasure in adult individuals. The secondary aim of the study was to evaluate the relationship between this PE and chemosensory pleasure and adherence to MD, a reliable dietary quality and eating pattern.

METHODS

Data was collected through a web-based questionnaire administered to a sample of 1,362 adults (951 women, 411 men) aged between 18 and 65 years. Participants were selected based on their agreement to participate voluntarily by ticking the 'I consent to participate in this study voluntarily' box at the start of the form and completing the questionnaire in its entirety. This study was approved by the Scientific Research Ethics Committee at the University of Health Sciences Gülhane in September 2023 with approval code 2023-291. All study procedures adhered to the principles outlined in the Declaration of Helsinki. The questionnaire assessed various factors, including demographic characteristics (such as gender, age, educational attainment, and income level), anthropometric measurements (body weight and height), adherence to the MD, PE behavior and chemosensory pleasure scale (CPS). Inclusion criteria is to be an adults between the ages of 18 and 65. Exclusion criteria is pregnant and lactating women, people with any chronic disease and depression, people with any syndrome and/or systemic disease, those who take medications (cortisone, antidepressants, metformin, etc.) that will affect their appetite, users of hormone supplements, people on an energy-restricted diet.

Anthropometric Measurements

Anthropometric measurements (including body weight, height, and waist circumference) were based on self-reports from participants. Instructions for measuring these variables were provided in the questionnaire. The body mass index (BMI) was computed by dividing the body weight (in kilograms) by the square of the height (in meters). BMI values were categorized as follows: underweight for BMI below 18.50 kg/m^2, normal weight for BMI between 18.50 and 24.99 kg/m^2, overweight for BMI between 25.00 and 29.99 kg/m^2, and obese for BMI above 30.00 kg/m^2 [23].

The Mediterranean Diet Adherence Scale

The Mediterranean diet adherence scale (MEDAS) was utilized to assess participants' adherence to the MD pattern. The MEDAS [24] has been validated and its reliability established in Turkey [25]. This scale comprises 14 items related to the consumption of components typical of MD, such as olive oil, fruits, and vegetables. Each item is scored either 0 or 1 based on the frequency of consumption, and the total score is computed accordingly. The MEDAS score ranges from 0 to 14, with a score of 7 or higher indicating a satisfactory level of adherence to the MD [24].

Adult Picky Eating Questionnaire

The adult picky eating questionnaire (APEQ) is a 16-item self-report instrument designed to assess PE behaviors and attitudes in adults [5]. The Turkish validity and reliability of this scale were established in [26]. The APEQ comprises four subscales: 'meal presentation' (items 1, 5, 9, 12, 14, 15, and 16), 'food variety' (items 2, 6, 10, and 13), 'meal disengagement' (items 3, 7, and 11), and 'taste aversion' (item 4 and item 8). Each item is rated on a 5-point Likert scale ranging from 1 ('never') to 5 ('always'). A higher total score on the APEQ indicates greater levels of PE behaviors and attitudes."

Chemosensory Pleasure Scale

The CPS [27] is designed to assess an individual's hedonic response to the pleasures of smell and taste. The Turkish adaptation of this scale, including its validity and reliability, was conducted in [28]. The CPS is a self-report measure that evaluates the enjoyment derived from olfactory and gustatory stimuli. It comprises 12 items distributed across three factors:

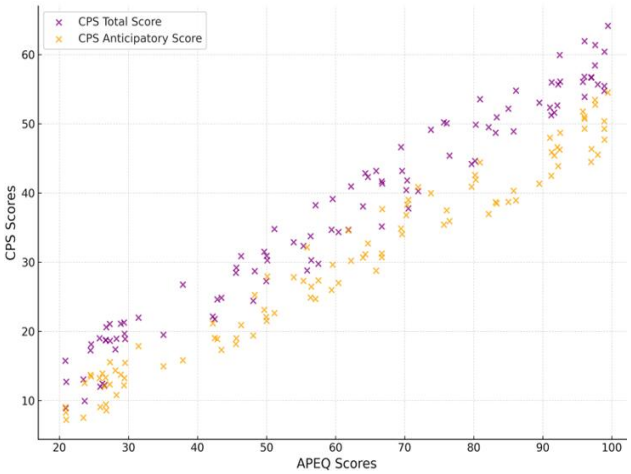

Figure 1. Correlation between APEQ and CPS scores (Source: Authors' own elaboration)

'consummatory' (related to hedonic eating), 'anticipatory' (pertaining to the anticipation of food), and 'purely olfactory' (reflecting the enjoyment of natural scents).

Participants rate their hedonic experience of smell and taste on a 6-point Likert scale ranging from 1 ('very false for me') to 6 ('very true for me'). A lower score on the Turkish version of the CPS (CPS-TR) indicates greater severity of chemosensory anhedonia.

The CPS demonstrated a high internal consistency with Cronbach's alpha coefficient of 0.93 and a test-retest reliability of 0.73. The first factor, 'food,' comprised 5 items and explained 46.979% of the variance. The second factor, 'imagination,' consisted of 4 items and accounted for 14.968% of the variance, while the third factor, 'nature,' included 3 items and explained 10.634% of the variance.

Statistical Analysis

Data analysis was conducted using statistical package for social sciences version 26.0. Initially, normality tests were performed to evaluate the distribution and skewness of the data, which were then summarized using mean (M) and standard deviation (SD) values. For comparing differences between two independent groups, the Mann-Whitney U test, a nonparametric test appropriate for numerical/quantitative data, was employed, along with the Pearson Chi-square test for categorical data. To examine the relationships between numerical variables, Spearman's rank correlation analysis was utilized and is also shown in **Figure 1**.

A linear regression analysis was conducted to predict PE behavior (APEQ total score) as the dependent variable, with CPS total score, age, BMI, and gender as independent variables. Variables that were not normally distributed were logarithmically transformed to better approximate normality for linear regression analysis. Statistical significance was determined by $p < 0.05$.

RESULTS

The general characteristics of the participants are summarized in **Table 1**. A total of 1,362 individuals participated in the study, with an average age of 27.83 ± 10.98 years. The mean BMI was calculated as 23.70 ± 4.41 kg/m^2. The average MEDAS score was 6.44 ± 2.20, suggesting that most participants did not adhere to the MD. Additionally, the mean APEQ total score was 2.43 ± 0.58. Most participants were university graduates (75.6%), while 14.1% completed high school, and 4.9% attained a master's degree or doctorate. Additionally, 27.0% of the participants reported that their income was insufficient to cover their expenses. Most participants (59.5%) had a normal BMI, while 23.7% were overweight, 8.5% were underweight, and 8.3% were categorized as obese. 46.5% of participants adhered to the MD, whereas 53.5% did not. Significant differences were observed in key variables such as age, BMI, income status, and BMI classification among subgroups ($p < 0.05$) based on gender comparisons. However, adherence to the MD did not differ significantly between groups ($p = 0.237$).

Table 1. General characteristics of individuals

Variables	Female (n = 951)	Male (n = 411)	Total (n = 1,362)	p
Age (years)	26.47 ± 9.83	30.95 ± 12.74	27.83 ± 10.98	0.000**
BMI (kg/m^2)	22.99 ± 4.36	25.36 ± 4.08	23.70 ± 4.41	0.000**
MEDAS total score	6.46 ± 2.13	6.41 ± 2.34	6.44 ± 2.20	0.972
APEQ total score	2.43 ± 0.56	2.43 ± 0.62	2.43 ± 0.58	0.871
Meal presentation	2.57 ± 0.68	2.48 ± 0.71	2.54 ± 0.69	0.023*
Food variety	2.25 ± 0.82	2.31 ± 0.88	2.27 ± 0.84	0.364
Meal disengagement	2.55 ± 0.89	2.62 ± 0.90	2.57 ± 0.90	0.233
Taste aversion	2.10 ± 0.84	2.25 ± 0.90	2.14 ± 0.86	0.007*
CPS total score	55.75 ± 11.47	53.10 ± 13.20	54.95 ± 12.08	0.002*
Consummatory	20.24 ± 4.30	19.45 ± 4.98	20.01 ± 4.53	0.029*
Anticipatory	20.42 ± 5.77	19.71 ± 6.40	20.21 ± 5.97	0.138
Purely olfactory	15.08 ± 3.26	13.92 ± 3.66	14.73 ± 3.43	0.000*
	n (%)	**n (%)**	**n (%)**	
Education level				0.003
Primary school	24 (2.5)	11 (2.7)	35 (2.6)	
Middle school	21 (2.2)	17 (4.1)	38 (2.8)	
High school	119 (12.5)	73 (17.8)	192 (14.1)	
University	747 (78.5)	283 (68.9)	1,030 (75.6)	
MSc/PhD	40 (4.2)	27 (6.6)	67 (4.9)	
Income status				0.000**
Income more than expenses	164 (17.2)	134 (32.6)	298 (21.9)	
Income equal to expenses	505 (53.1)	191 (46.5)	696 (51.1)	
Income less than expenses	282 (29.7)	86 (20.9)	368 (27.0)	
BMI classification				0.000**
Underweight (<18.50 kg/m^2)	103 (10.9)	13 (3.2)	116 (8.5)	
Normal (18.50-24.99 kg/m^2)	613 (64.7)	95 (47.4)	808 (59.5)	
Overweight (25.00-29.99 kg/m^2)	166 (17.5)	156 (38.8)	322 (23.7)	
Obese (≥ 30.0 kg/m^2)	66 (7.0)	47 (11.4)	113 (8.3)	
MEDAS classification				0.237
No compliance with MD (< 7 points)	519 (54.6)	210 (51.1)	729 (53.5)	
Compliance with MD (≥ 7 points)	432 (45.4)	201 (48.9)	633 (46.5)	

Note. Mann Whitney U test; Chi-square test; *p < 0.05; & **p < 0.001

Table 2. The relationship between MEDAS, APEQ, and CPS

Variables	MEDAS TS	APEQ TS	MP	FV	MDI	TA	CPS TS	C	Anticipatory	PO
MEDAS TS	-									
APEQ TS	-0.025	-								
MP	-0.023	0.872**	-							
FV	-0.050	0.724**	0.442**	-						
MDI	0.011	0.558**	0.319**	0.360**	-					
TA	0.035	0.530**	0.310**	0.352**	0.169**	-				
CPS TS	-0.033	0.095**	0.208**	-0.052	-0.038	-0.052	-			
C	-0.102**	0.052	0.173**	-0.067*	-0.075*	-0.108**	0.841**	-		
Anticipatory	-0.035	0.131**	0.219**	0.003	-0.025	0.010	0.919**	0.687**	-	
PO	0.081*	0.025	0.102**	-0.093**	0.028	-0.094**	0.635**	0.454**	0.391**	-

Note. Spearman rank correlation coefficient test was applied between groups according to compliance with MD; *p < 0.05; **p < 0.001; TS: Total score; MP: Meal presentation; FV: Food variety; MDI: Meal disengagement; TA: Taste aversion; C: Consummatory; & PO: Purely olfactory

Table 3. Evaluation of participants' compliance with the MD

Variables	Compliance with the MD	No compliance with the MD	p
Age (years) (M ± SD)	29.14 ± 11.68	26.68 ± 10.21	0.000*
Gender (n [%])			0.237
Female	432 (68.2)	519 (71.2)	
Male	201 (31.8)	210 (28.8)	
Education level			0.063
Primary school	13 (2.1)	22 (3.0)	
Middle school	100 (15.8)	92 (12.6)	
High school	22 (3.5)	16 (2.2)	
University	461 (72.8)	569 (78.1)	
Master's degree/PhD	37 (5.8)	30 (4.1)	
Income status			0.244
Income more than expenses	149 (23.5)	149 (20.4)	
Income equal to expenses	324 (51.2)	372 (51.1)	
Income less than expenses	160 (25.3)	208 (28.5)	
BMI (kg/m^2)			0.873
BMI classification			0.436
Underweight (< 18.50 kg/m^2)	56 (8.9)	60 (8.3)	
Normal (18.50-24.99 kg/m^2)	373 (59.0)	435 (59.8)	
Overweight (25.00-29.99 kg/m^2)	143 (22.6)	179 (24.6)	
Obese (≥ 30.0 kg/m^2)	60 (9.5)	53 (7.3)	
MEDAS total score	8.36 ± 1.39	4.78 ± 1.17	0.000*
APEQ total score	2.43 ± 0.61	2.43 ± 0.55	0.647
Meal presentation	2.54 ± 0.73	2.54 ± 0.67	0.577
Food variety	2.24 ± 0.84	2.30 ± 0.83	0.144
Meal disengagement	2.59 ± 0.89	2.55 ± 0.91	0.200
Taste aversion	2.18 ± 0.90	2.11 ± 0.83	0.230
CPS total score	54.38 ± 12.48	55.44 ± 11.70	0.110
Consummatory	19.55 ± 4.74	20.40 ± 4.30	0.000*
Anticipatory	19.97 ± 6.08	20.41 ± 5.88	0.132
Purely olfactory	14.85 ± 3.46	14.62 ± 3.39	0.053

Note. *p < 0.05; Mann Whitney U test; Chi-square test; & *p < 0.05

Table 2 presented the correlation coefficients between variables measured by the MEDAS, APEQ, and CPS along with their subcomponents. "The MEDAS total score did not show significant correlations with most other variables, except for a weak positive association with the purely olfactory subcomponent of CPS ($r = 0.081$, $p < 0.05$). Additionally, there was a weak but significant negative correlation with consummatory pleasure ($r = -0.102$, $p < 0.01$), indicating a slight inverse relationship. The APEQ total score exhibited strong correlations with all its subcomponents, highlighting a consistent relationship among PE behaviors. Additionally, APEQ showed a weak positive association with the CPS total score ($r = 0.095$, $p < 0.01$). The CPS total score correlated strongly with its subcomponents, particularly consummatory ($r = 0.841$, $p < 0.01$) and anticipatory ($r = 0.919$, $p < 0.01$). However, the CPS total score showed weak or no significant correlations with the other variables, such as APEQ and MEDAS, except for meal presentation ($r = 0.208$, $p < 0.01$). Furthermore, **Figure 1** illustrates the positive correlations between APEQ scores and CPS total scale score as well as its anticipatory subscale. The scatter plot highlights the association between PE behaviors and chemosensory pleasure, emphasizing anticipatory sensory responses

Table 3 includes a comparison of various demographic, anthropometric, APEQ and CPS scores according to individuals' compliance with the MD. Individuals who complied with the MD were significantly older. However, no significant differences were found in PE behaviors or overall CPS scores between the two groups. Furthermore, a significant difference was found in the consummatory subcomponent ($p = 0.000$), with those who adhered to the MD scoring lower (19.55 ± 4.74) compared to those who did not comply (20.40 ± 4.30).

Table 4. Linear regression analysis for prediction of adult PE level

	APEQ total score		
Model	**Beta**	**t**	**p-value**
CPS total score	0.096	3.422	0.001*
Age (years)	-0.064	-2.091	0.037*
BMI (kg/m^2)	-0.034	-1.118	0.264
Gender	0.030	1.077	0.282
$R^2 = 0.140$; $p < 0.001$*			

Note. Gender: 1: female & 2: male & *Significant at p-value < 0.05

Table 4 presents the results of a linear regression analysis aimed at predicting the total score on the APEQ based on several variables. When the factors that could affect the APEQ total score were evaluated with linear regression analysis, the model was deemed important ($R^2 = 0.140$; $p < 0.001$). It was determined that CPS total score and age affected the APEQ total score ($p < 0.05$). BMI and gender factors did not affect the APEQ total score.

DISCUSSION

There are limited studies in literature examining the relationship between the MD and APEQ. However, there are very few studies investigating the compatibility of PE with the MD in adults. The majority of previous studies on PE have focussed on nutritional effects and growth during childhood [29, 30]. Additionally, to our knowledge, no study has examined the relationship between chemosensory pleasure, PE behavior, and MD together. The main aim of this study was to evaluate the relationship between adherence to the MD, PE behavior, and chemosensory pleasure in young adult male and female individuals. Main finding of our study was a significant positive relationship between total scores of PE and total scores of CPS.

Social environment, experiences and genetic predisposition play a role in food choice. PE begin early in life, in infancy, and continue throughout life as eating behavior in adult [31]. Picky eaters can often show cautious behavior in their food preferences. It is stated that the basis of this eating behavior is firstly sensory attitudes (not liking the sensory characteristics of the food such as appearance, smell, and taste), secondly, expectations about whether the consumption of the food will be beneficial or harmful in the long term, and thirdly, positive evaluation of the food or defining it as disgusting [32].

In line with these observations, the mean age of those who adapted to MD was found to be significantly higher in this study. In this study, the mean age of those who adapted to the MD was found to be significantly higher. This result is consistent with the results of previous studies showing that they are more determined to consume healthy foods as they get older [33, 34]. In the study evaluating the diets of young adults with PE in childhood, it was found that individuals currently consumed fruits, vegetables and whole grains less frequently and consumed unhealthy snacks such as fast-food, sugar-sweetened drinks and foods more frequently. Individuals with PE in childhood may be at risk for nutritional deficiencies in adulthood [35]. In another study, similar to these results, it was found that among all participants, individuals with high levels of food neophobia had low diet quality and consumed less healthy foods such as fruits and vegetables [36]. In this direction, it is thought that it is important to determine the foods in the diets of individuals with neophobia and PE and the interventions to be applied to increase the variety of foods consumed, especially fruit and vegetable consumption.

Individuals with PE behaviors may also tend to reject foods that are lumpy in texture (e.g., chunky sauces and nut cakes) [5]. For this reason, individuals with PE may have difficulty choosing food at meals and food diversity may decrease. Attitudes towards new food, food selection and consumption may vary depending on the individual [37]. This situation negatively affects the eating behavior of individuals. Unhealthy eating behaviors like not consuming vegetables, fruits, legumes and fish have been observed in adults with PE. In addition, it has been reported that they frequently consume foods containing high fat and processed refined carbohydrates found in Western-style diets [38]. A study of adults in Italy showed a negative association between adherence to the MD and PE [39].In this study, we found the mean scores of PE in those with and without adherence to the MD were similar. It is suggested that the different results in the studies may be due to factors such as individuals' eating habits, social norms and lifestyles, as well as food diversity shaped by the influence of climate and geographical conditions in different countries. In this study, the rates of university education were found to be similar in those who adapted to MD and those who did not. This suggests that PE may be affected by education level. There are few studies on PE in adults and the concept of PE is associated with food neophobia [4-6]. Food neophobia is less common in people with higher education levels due to increased food diversity and ease of access to new foods [37]. This may be due to the high probability of encountering different flavours.

The MD is a dietary pattern consisting of plant-based foods that are sensory challenging, including vegetables, fruit and legumes. Plant foods such as legumes, which contain high protein, have been reported to have unpleasant taste and/or oral sensations such as bitterness and astringency. It has also been reported that taste, which considers taste, aroma and trigeminal sensations, is one of the main barriers to the acceptance of plant-based foods [40]. In this study, it was observed that there was a significant negative relationship between the total scores of MEDAS and the total scores of consummatory, which is the chemosensory pleasure sub-dimension. In this context, hedonic taste sensitivity can also be considered as a factor related to adherence to the MD. In PE, food rejection is often associated with mealtime experiences of sensory sensitivities and disgust related to the taste, smell, texture, or appearance of foods [41]. Studies have found that there is a positive relationship between bitter and sour taste sensitivity and early experience behavior in picky eaters. It has also been reported that increased taste sensitivity is associated with a decrease in fruit and vegetable consumption [4, 42]. It has been found that these individuals tend to eat more foods containing their preferred flavor concentration. This is because these individuals stated that they generally do not want to taste different flavors. This creates a potential disadvantage by leading to food aversion [43]. Food palatability is a determinant of individuals' food choice and the frequency of consumption of that food. In picky eaters, both sensory and experiential factors may be linked to food rejection. However, the factors that influence food rejection are still unclear [44]. In this study, a significant positive correlation was found between CPS total scores and APEQ total scores. In addition, in the regression analysis, it was found that the increase in CPS total

scores was one of the factors affecting the APEQ total score. In other words, it can be shown that taste and odour pleasure perceived from foods play an important role in PE. Because the hedonic dimension of smell is important in olfactory perception and is associated with eating behavior such as enjoying food [45. In a study, individuals with higher CPS total scores evaluated the smells of foods as more pleasant [27].

In studies reporting from the literature, there is a decrease in the pleasure and enjoyment of food and a high level of disgust seen in PE behavior [46, 47] .The different results in this study may be due to many factors in PE behavior (age, genetic predisposition, experience with foods and habits) and differences in the design of the study used in the research (questionnaire, sensory evaluation, sample size). It is reported that women have a better sense of smell than men [48]. In a study, it was reported that there was no significant difference between men and women in terms of odor hedonic perception [49]. As a different finding in this study, the mean CPS scores of female individuals were significantly higher than male individuals. In this context, female individuals compared to males suggests that they have more information in positive sensory odour and taste experiences. In this direction, olfactory and gustatory training can be recommended to gain positive sensory awareness and increase chemosensory pleasure in male individuals [50].These contradictory results in previous studies suggest that individual factors such as gender, personality traits, education level and socioeconomic status also affect food choice. In this study, APEQ sub-scores of APEQ aversion of different tastes were found to be significantly higher in males than females. This may be considered to be higher in taste sensitivity in male individuals. The reason for these differences is thought to be the genetic predisposition of women in the development of taste preference [51]. Additionally, individual differences may arise from adverse experiences with food (vomiting, choking, allergic reactions, force-feeding) or avoidance of different tastes following gastrointestinal problems [5]. In this study, the meal presentation sub-dimension of APEQ sub-scores was found to be significantly higher in women than in men, while the other sub-dimensions were found to be lower [4]. In another study, 48% of foods were disliked due to taste, 37% due to texture and 11% due to appearance [52]. It is hypothesized that appearance is particularly important in food selection. The tendency of rejection behavior in women compared to men suggests that the foods that are rejected without tasting may be related to the color, shape, size, surface appearance and whether the food is in contact with each other . In this study, it was determined that decreasing age affected the APEQ total score.It is difficult to evaluate the relationship between age and PE because most studies are conducted on children. Although PE usually improves with age, it is likely to continue into adulthood if appropriate interventions are not provided during childhood. In the absence of appropriate intervention, PE behavior continues especially in individuals in their 20s and can lead to nutritional imbalances due to restrictions in food choices [53].

Although the number of studies examining PE behavior in adults is limited, there are studies on food neophobia and age, which are included in PE behavior. It was found that the level of neophobia decreases with age [54]. Other studies have emphasized higher levels of neophobia with increasing age [55, 56]. It is important to understand whether PE behavior is learned or innate and to determine the reasons for food refusal in individuals in order to increase food acceptance.

CONCLUSIONS

One of the main results of this study was that chemosensory pleasure was significantly positively correlated with PE. It has been revealed that chemosensory pleasure has an effect on PE behavior. It can be thought that the feeling of pleasure and appreciation that food creates in individuals has an effect on PE behavior. However, it should not be ignored that many factors have an effect on PE. One of these factors, age, has been shown to have an effect on PE behavior. Chemosensory pleasure in PE behavior can provide conscious awareness. This may prevent food PE behavior and provide healthy and balanced eating behavior. The other result is that chemosensory pleasure total score and total scores of meal presentation and different taste aversion from APEQ sub-dimensions were found to be significantly different between genders. It can be stated that there are differences in PE and chemosensory pleasure between male and female individuals. In this study, a significant negative relationship was shown between MEDAS total scores and consummatory total scores, which is the chemical sensory pleasure sub-dimension. In this context, hedonic taste sensitivity can also be considered when examining the factors associated with adherence with the MD. In future studies, the relationship between the sense of smell and taste, which are thought to have an impact on PE behavior, can be investigated in more detail. Furthermore, the behavioral mechanisms affecting adults' PE behavior and chemosensory pleasure are still unclear. Therefore, the relationship between PE behavior and chemosensory pleasure needs to be further investigated comprehensively.

Limits and Future Research Lines

The strengths of this study are that it is the study with a large sample to evaluate the relationship between chemosensory pleasure, MD adherence and PE behavior in male and female adults. Previous studies have examined the relationship of chemosensory pleasure in neuropsychiatric and neurological patients with depression, schizophrenia and autism. This study was conducted in healthy adult individuals. In addition, the evaluation of the factors affecting picky etaing behavior (age and CPS) in this study is expected to shed light on future studies. We think that examining PE behavior in adulthood together with adherence to the MD will provide awareness in terms of the relationship between eating behavior and diet. The diet quality of the individuals in our study was evaluated with the MEDAS, which is a powerful scale. The limitations of this study are that food consumption frequency, which determines which foods are preferred in PE behavior, was not used. Another limitation of this study is that body weight and height were self-reported, which may have led to measurement bias. Prior studies have shown that self-reported anthropometric data may not always align with objectively measured values, potentially underestimating or overestimating BMI classifications [23]. Although our study included a large population, the unequal number of men and women is one of the limitations. Past experiences with foods, which are among the factors affecting PE behavior and the nutritional behaviors and attitudes of the parents of these individuals can be included in the study by questioning them. Psychological states of individuals can be evaluated with PE

behavior and chemosensory pleasure. Future studies may evaluate CPS, which is thought to have an effect on PE behavior in adults, using sensory analysis.

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