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Eating behavior of early adults: A cross-sectional analysis

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ABSTRACT

Objectives: The present study aims to find out the relationship between the three types of eating behavior with emotional intelligence (EI), Big Five personality traits, and frustration intolerance of early adults using online food delivery system.

Material and Methods: A sample size of 258 was collected using the technique of convenient sampling. This cross-sectional research employs Spearman's Rank correlation and Mann–Whitney U-test for data analysis.

Results: There is negative relationship between emotional eating (EE) and EI, there is negative relationship between cognitive restraint (CR) eating and extraversion, there is negative relationship between uncontrolled eating (UE) and conscientiousness, there is positive relationship between EE and openness, there is positive relationship between CR eating and emotional intolerance (EIn), there is positive correlation between UE and entitlement, there is positive correlation between EE and discomfort intolerance, there is significant difference in the openness, agreeableness, and neuroticism of males and females using online food delivery system, and there is significant difference in the EIn of females and males using online food delivery system.

Conclusion: The study emphasizes the relevance of healthy eating behavior in early adults for maintaining their mental health.

Keywords: Eating behavior, Personality, Emotional intelligence, Frustration intolerance, Online food delivery system, Early adults

INTRODUCTION

Eating behavior has a significant role in the cognitive, emotional, and behavioral development and functions of an individual. Literature suggests that there exists a relationship between chronotype, executive function, emotional intelligence (EI), personality traits, and frustration intolerance (FI) with eating behavior.[1-3] The patterns of food consumption that is impacted by an individual's attitudes, beliefs, and behavioral intentions are referred to as eating behavior.[4] The three-factor eating questionnaire (TFEQ)-R18 distinguishes three styles of eating called cognitive restraint eating (CR), uncontrolled eating (UE), and emotional eating (EE). An intentional limitation of food intake for controlling body weight is called CR; UE is the tendency to overeat as a result of loss of control; while EE refers to excessive eating during low mood.[5] Poor mental health, increased stress, depressive symptoms, decreased academic success, increased risk of chronic diseases, and obesity are all linked to unhealthy eating habits.[6] These eating styles are also influenced by various demographic variables such as age, gender, and culture.[6]

Individuals with disordered eating behavior have low EI.[7] The importance of EI has been well documented in the literature, with data indicating that it is linked to the growth of eating disorders (ED).[8] Salovey and Mayer held that EI is "the ability to perceive emotions, to access and generate emotions so as to assist thought, to understand emotions and emotional knowledge, and to reflectively regulate emotions so as to promote emotional and intellectual growth."[9] Research portrays a negative correlation concerning ED and EI.[10] This signifies the influence of EI on the eating behavior of individuals. EI can be a trait or ability. This means that EI can arise in an individual as a dispositional trait or it can be achieved and improved through various techniques such as self-monitoring, social skills, mindfulness, and self-regulation.

Personality traits have been found to be reliable indicators of important health outcomes linked to eating habits.[11] Personality traits are the distinct, long-lasting internal and exterior aspects of an individual's character that influence their behavior in various settings.[12] Specific personality traits influence the eating behavior of individuals. EE was positively linked to neuroticism, particularly impulsivity, and depression, as well as reduced conscientiousness, mostly manifested in a lack of self-control, and lower extraversion.[1] Higher agreeableness, conscientiousness, emotional stability, and openness are associated with eating healthier meals, as are improved self-rated health and a lower body mass index (BMI).[11] Consumption of unhealthy foods, on the other hand, was linked to the reduction of these traits, regardless of socioeconomic position.[11] Neuropsychological studies indicate that traumatic brain injury of frontal lobe structures can cause changes in personality and a lack of self-restraint in eating.[13] The effect of personality on eating behavior was not only analyzed with five factor inventory (FFI) but also with various other personality tools such as the Minnesota Multiphasic Personality Inventory, California Personality Inventory, and Karolinska Scales of Personality and proved to be associated.[14]

FI is the reluctance to embrace the inconsistency between need and reality, that is, the feeling that one cannot stand not getting what one really want.[15] According to Harrington, there are four factors that underlie FI, namely, emotional intolerance (EIn), discomfort intolerance (DI), entitlement (En), and achievement (Ach).[15] The perception that thoughts and sensations connected with emotional discomfort are unbearable is known as EIn. The second aspect is the inability to tolerate common discomfort or difficulty as a result of these beliefs. The attitude that others should not frustrate one's aspirations is known as the En factor. Finally, Ach portrays perfectionist Ach beliefs. Frustration can stimulate appetite.[16] Frustration is a negative affectivity linked to neuroticism, one of the Big Five personality traits.[17,18] Negative emotions and maladaptive emotional regulation are correlated with binge eating.[19] Moreover, mood tolerance is significantly associated with ED symptoms in the non-clinical population.[20] Hence, FI can also influence unhealthy eating behavior. Nevertheless, this construct appears to be unexplored in the area of study.

Recent years have seen a shift from the normal food consumption behavior to an advanced level of online food delivery system. Ordering food online, according to health experts, exposes children and adults to significant obesity risks while also exacerbating sedentary behavior.[21] Apart from the health risks like obesity, various psychological dysfunctions could also be promoted by uncontrolled consumption through online food delivery system. As it is observed that consumption through online food delivery system enhances craving for restaurant foods, its association with psychological aspects is visible.[16]

The restoration of healthy dietary habits is the prime concern of the "Eat Right Movement" launched by the Government of India. Obesity affects more than 135 million people in India. Furthermore, according to Hadaye, *et al.*, the incidence of obesity was 10.03% among young adults, while the occurrence of overweight or obese (i.e., BMI 25 kg/m^2) was 42.01%.[22] This depicts the need to study the cognitive, emotional, and behavioral factors associated with eating behavior to fathom the risk of obesity and negative effect of online food delivery system.

MATERIAL AND METHODS

This is a cross-sectional study conducted among young adults through an online survey. The study aims to explore the relationship and difference between three types of eating behavior, EI, FI, and Big Five personality traits among early adults using online food delivery system. The difference in gender is also examined in connection with the variables. The selected samples were requested to complete the survey through Google Forms using a convenient sampling method. The participant who is between the age of 18 and 40 years[23] and uses online food delivery system within Kerala was chosen for the study. The sample size consists of 258 participants (113 males and 145 females). Before collecting the data, the participants' informed consent was sought elaborating the purpose and rationale for the study. The inclusion criteria for the study were male and female early adults using online food delivery system who can read and understand English. The exclusion criteria for the study are individuals diagnosed with major and minor psychological and physical disorders. The predictor variables of the study are personality EI and FI, and outcome variables are the three styles of eating behavior. The study received ethical approval from the Rajagiri Institutional Ethics Committee for the first author (Ref number: RCSS/IEC/0015/2022). The study followed the principles of the Declaration of Helsinki. The responses were collected and scored according to the scoring and interpretation procedures of the respective tools used. The tools used in the study are the (TFEQ-18), Brief EI Scale (BEIS-10), Big Five Inventory-

Short, and Frustration Discomfort Scale. As the study aims to find out the relationship and difference between the predictor and outcome variables, correlation and t-test were decided for analysis. The non-parametric tests, the Spearman rank correlation and Mann–Whitney U-test, were used for statistical analysis as the data were not normally distributed. The Spearman's ρ was used to understand the relationship between the three eating types and (i) EI, (ii) personality traits, and (iii) FI. The U-test was used to analyze the gender difference in (i) EI, (ii) personality traits, (iii) FI, and (iv) eating behavior of early adults using online food delivery system. Apart from that, the sociodemographic information collected from the participants were also used for analysis [Table 1].

RESULTS

The first investigation targeted to check the null hypothesis that there will not be a significant relationship between EI and eating behavior.

The study finds a negative relationship between EE and EI in early adults using online food delivery system (correlation = −0.211, *P* value ≤ 0.01). There is no association between CR eating and EI, and UE and EI.

The next proposed hypothesis was that there is no significant relationship between personality traits and eating behavior.

The analysis shows a negative relationship between CR eating and extraversion ($\rho = -0.027$, $P \leq 0.01$) in early adults. There is negative correlation between UE and conscientiousness ($\rho = -0.122$, $P \leq 0.01$) in early adults. There is negative correlation between EE and openness ($\rho = 0.038$, $P \leq 0.01$) in early adults.

The present study postulates a hypothesis that there will not be a significant relationship between FI and eating behavior.

Table 1: The sociodemographic details of the sample collected for the study.

Variables	Mean	Standard deviation
Cognitive restraint eating	15.969	4.1927
Uncontrolled eating	20.357	4.7674
Emotional eating	6.438	2.4268
Chronotype	51.391	8.5409
Emotional intelligence	37.116	6.2902
Openness	15.860	3.4747
Conscientiousness	13.950	2.7996
Extraversion	13.078	3.9305
Agreeableness	14.798	3.1804
Neuroticism	12.965	3.8049
Discomfort intolerance	22.333	4.7495
Entitlement	23.178	4.8357
Emotional intolerance	23.291	5.2097
Achievement	23.671	4.5919

The study indicates a positive association between CR eating and EIn ($\rho = 0.120$, $P \leq 0.01$) in early adults. There is positive relationship between UE and En ($\rho = 0.198$, $P \leq 0.01$) in early adults. There is positive relationship between EE and DI ($\rho = 0.098$, $P \leq 0.01$) in early adults.

Another hypothesis of the study is that there is no significant difference in the eating behavior of males and females using online food delivery systems.

The eating behavior of early adults using online food delivery system does not have a significant difference on the basis of gender ($U = 7470.500$, $P \geq 0.05$).

The study holds a null hypothesis that there is no significant difference in the EI of males and females using online food delivery systems.

The EI of early adults using online food delivery system shows no significant difference on the basis of gender ($U = 7702.000$, $P \geq 0.05$).

The null hypothesis is that there is no significant difference in the Big Five personality traits of male and female early adults using online food delivery systems.

Since $U = 6507.500$, $P \leq 0.01$, there is a significant difference in the personality trait of openness between females (*Mean rank = 141.12, Sum of ranks = 20462.50*) and males (*Mean rank = 114.59, Sum of ranks = 12948.50*) using online food delivery systems. Since $U = 6708.500$, $P \leq 0.05$, there is a significant difference in the personality trait of agreeableness between females (*Mean rank = 139.73, Sum of rank = 20261.50*) and males (*Mean rank = 116.37, Sum of rank = 13149.50*) using online food delivery systems. Since $U = 6437$, $P \leq 0.01$, there is a significant difference in the personality trait of neuroticism between females (*Mean rank = 141.61, Sum of rank = 20533.00*) and males (*Mean rank = 113.96, Sum of rank = 12878.00*) using online food delivery systems.

The null hypothesis states that there is no significant difference in the FI of male and female early adults using food delivery systems.

Since $U = 6696$, $P \leq 0.05$, there is a significant difference in the EIn of females (*Mean rank = 139.82, Sum of rank = 20274*) and males (*Mean rank = 116.26, Sum of rank= 13137*) using online food delivery systems.

DISCUSSION

Table 2 indicates that there exists a significant negative correlation between EE and EI of early adults using online food delivery system. Research portrays that the negative relationship between EI and EE is mediated by anxiety levels.[7] The ability of self-regulation, self-awareness, and tolerance to frustrations can help manage anxiety and the associated EE.[8] Deficits in EI, according to Romero-Mesa *et*

al., may lead to low self-esteem and excessive anxiety, both of which are linked to increased ED symptoms.[24] EI can arise in an individual as a dispositional trait or it can be achieved and improved through various techniques such as self-monitoring, social skills, mindfulness, and self-regulation. EI instills self-compassion and subjective well-being by buffering disordered eating and associated negative perceptions.[25] Literature suggests that trait EI is more associated with EE and other disordered eating behaviors.[26] Foye *et al*., hold that EI can be used as a screening tool to identify at-risk populations with disordered eating behaviors.[10] As a result, the findings support previous researches that found EI to be closely linked to disordered eating attitudes and behaviors, with low EI scores indicating higher levels of disordered eating, that is, EE.

Table 3 indicates the relationship between the three eating behaviors and the Big Five personality traits. The analysis shows that there is a significant negative correlation between the following domains; (i) CR eating and extraversion and (ii) UE and conscientiousness, and a significant positive correlation between EE and openness. Extraverts are people who are warm and friendly and who are willing to sample new foods from different cultures in addition to the foods that they are familiar with.[27] Extraverts have a strong desire to eat.[27] However, extroverted people's higher sociability, which is generally regarded as a health-promoting psychological resource, appears to have negative health consequences.[28] Hence, low extraversion can lead to high CR eating.[29] Studies show that BMI[30] and chronotype[29] tend to mediate the relationship between CR eating and extraversion. Literature suggests that high conscientiousness predicts healthy eating behavior.[29] As a result, people who are influenced by external influences, as well as those who are impulsive and disorganized, have poor conscientiousness.

Table 2: Result of Spearman's correlation for three eating types and EI.

Eating types	EI
Cognitive restraint eating	0.027
Emotional eating	−0.211**
Uncontrolled eating	−0.042

**Significant at the 0.01 level (two-tailed). EI: Emotional intelligence

It is observed that negative affective states have a greater influence on impulsive people's EE.[1] This can increase the tendency toward ordering food through online food delivery system. The positive association between EE and openness (O) reveals that higher the openness to experience higher the chance for EE.[31] Lot of emotional experience requires a platform to ventilate it which could be satisfied by EE. EE can also lead to increased ordering of food through online food delivery system among early adults. There are also studies that demonstrate contradictory findings in relation to eating behavior and openness.[1]

In Table 4, the correlational analysis of eating behaviors and FI is illustrated. The analyses demonstrate that there exists a positive correlation between CR eating and EIn. This means that high CR eating denotes high EIn among the population. Food consumption has been linked to CR during stressful situations, with highly restrained eaters increasing their food intake and unrestrained eaters lowering it.[32] Literature suggests that high CR eating can lead to a higher concentration of cortisol in the body. Cortisol is known as the stress hormone indicating the probability for EIn to stressful situations. Moreover, frustration and stress can reduce appetite.[16] It is believed that those who actively try to limit their food aperture deplete their cognitive resources needed to cope with stressors, decreasing their self-control, and hence increasing their risk of excessive eating.[32]

The positive correlation between UE and En shows that when there is high uncontrolled eating, there is high En. Lack of En results in dissatisfaction, feeling of mistreated, and loss of control. The belief that one's needs must be fulfilled and that others should gratify those needs rather than frustrate them is known as En.[15] Intolerance to need gratification is the factor that is considered in the current study. This way individuals who have a high need for gratification may tend to indulge in UE behavior causing ordering food through online food delivery systems.

Likewise, the positive correlation between EE and DI shows that when there is high EE, there is high DI. EE is characterized by an increase in appetite in response to an unpleasant feeling.[33] Individuals with intolerance of discomfort and distress tend to engage in EE which can

Table 3: Result of Spearman's correlation for three eating types and big five personality traits.

Eating types	Big five personality traits				
	O	C	E	A	N
Cognitive restraint eating	0.000	0.062	−0.027**	−0.064	−0.025
Uncontrolled eating	−0.175	−0.122**	−0.022	−0.220	0.010
Emotional eating	0.038**	−0.046	0.120	−0.112	−0.037

**Significant at the 0.01 level (two-tailed), N: Neuroticism, A: Agreeableness, E: Extraversion, C: Conscientiousness, O: Openness to experience

Table 4: Result of Spearman's correlation for three eating types and frustration intolerance.

Eating types	Frustration intolerance			
	Discomfort intolerance	Entitlement	Emotional intolerance	Achievement
Cognitive restraint eating	0.075	0.112	0.120**	0.157
Uncontrolled eating	0.141	0.198**	0.138	0.115
Emotional eating	0.098**	0.145	0.076	0.168

**Significant at the 0.01 level (two-tailed)

Table 5: Summary of comparing the scores of eating behavior of male and female early adults using online food delivery.

Variables		*N*	Mean rank	Sum of Ranks	*U* test	*P* value
Cognitive restraint eating	F	145	126.38	18324.50	7739.500	0.445
	M	113	133.51	15086.50		
Uncontrolled eating	F	145	123.11	17850.50	7265.500	0.118
	M	113	137.70	15560.50		
Emotional eating	F	145	134.48	19499.50	7470.500	0.220
	M	113	123.11	13911.50		

N: Total, F: Females, M: Males

have various adverse health effects such as obesity, diabetes, long-term weight fluctuations, and long-term weight gain.[33] Hyperpalatable meals alleviate unwanted distress by acting as self-medication.[32] Individuals with high cortisol sensitivity, according to Yau and Potenza, snack more in reaction to daily stressors.[32] On the other hand, improved mood, according to Annesi and Johnson, can help people lose weight by reducing EE, and vice versa.[34] Therefore, early adults using online food delivery systems tend to order food when faced with stressful situations of daily life. Their intolerance to distress makes them indulge in EE.

Table 5 displays that there is no significant difference in the eating behavior of male and female early adults using online food delivery system. This is a contradictory finding in comparison to the research literature. Shiozawa *et al.,* studied that only in females was there a strong association between CR eating and BMI, and only in men was there a relationship between hunger and BMI.[35] Apart from that, several researches confirm the existence of significant difference in eating behavior. On the other hand, the occurrence of such a result would be due to the selection of the special population, that is, early adults using online food delivery system. Early adults using online food delivery tend to consume food due to various psychological and emotional factors which make them use the online food delivery system.

Table 6 indicates that there is no gender difference in the EI of early adults using online food delivery system. On the other hand, the literature suggests a significant difference between the genders in EI in association with disordered eating.[7,10,36-37] This study also pointed out that women tend to score high in EI and healthy eating behavior. In the present study, the difference in findings might have occurred due to the special characteristic of the population, that is, early adults consuming from online food delivery system.

Table 7 suggests that there is a significant difference in the openness to experience, agreeableness, and neuroticism of male and female early adults using online food delivery system. Eating nutritious foods were linked to increased agreeableness, conscientiousness, neuroticism, openness, perceived health, and a reduced BMI, according to Weston *et al.*[11] Eating unhealthy meals, on the other hand, is linked to poorer agreeableness, conscientiousness, neuroticism, openness, and perceived health.[11] Any proven correlations between Big Five personality traits and food intake variables, according to the literature, could be attributed to gender variations.[27]

The present study also exposes the significant difference between male and female early adults using online food delivery system in agreeableness trait. Weisberg *et al.*, suggested that women have a tendency toward higher agreeableness compared to men.[38] Hence, in the present study, this trait in females may influence them to order food through online food delivery systems as gestures of prosocial behavior and tend to engage in neophagia.[27]

Women tend to score higher in neuroticism than men.[38] This substantiates the significant difference in neuroticism between male and female early adults using online food delivery. Hence, females with high neuroticism may have a tendency to order unhealthy food through online food delivery systems than males. As a result, to avoid EDs, it is vital to not only implement a nutrition-based program but also to extensively analyze personality traits that may be predictive of these pathogens.

Table 8 illustrates a significant difference between male and female early adults using online food delivery in EIn. Aguera *et al*., conducted an experimental study in which the results presented that males and females with EDs had more difficulty managing their emotions.[39] Moreover, there is scarce literature on gender-related difference in EIn. Opwis *et al*., held that females have higher degrees of rumination and eating pathology than males.[40] Hence, in the present study, females may have a tendency to buy food through online food delivery systems as a result of their rumination and abnormal eating behavior.

Table 6: Summary of comparing the scores of EI of male and female early adults using online food delivery system.

Variables	*N*		Mean rank	Sum of Ranks	*U* test	*P* value
EI	F	145	132.88	19268.00	7702.000	0.409
	M	113	125.16	14143.00		

EI: Emotional intelligence, N: Total, F: Female, M: Male

Table 7: Summary of comparing the scores of personality of early adults using online food delivery on the basis of gender.

Variables	*N*		Mean rank	Sum of Ranks	*U* test	*P* value
O	F	145	141.12	20462.50	6507.500	0.004**
	M	113	114.59	12948.50		
C	F	145	129.78	18818.00	8152.000	0.945
	M	113	129.14	14593.00		
E	F	145	130.82	18968.50	8001.500	0.747
	M	113	127.81	14442.50		
A	F	145	139.73	20261.50	6708.500	0.012*
	M	113	116.37	13149.50		
N	F	145	141.61	20533.00	6437.000	0.003**
	M	113	113.96	12878.00		

*$P \leq 0.05$, **$P \leq 0.01$, N: Total, F: Female, M: Male, O: Openness to experience, C: Conscientiousness, E: Extraversion, A: Agreeableness

Table 8: Summary of comparing the scores of frustration intolerance of male and female early adults using online food delivery system.

Variables	*N*		Mean rank	Sum of Ranks	*U* test	*P* value
Discomfort intolerance	F	145	132.51	19214.00	7756.000	0.462
	M	113	125.64	14197.00		
Entitlement	F	145	133.11	19301.50	7668.500	0.377
	M	113	124.86	14109.50		
Emotional intolerance	F	145	139.82	20274.00	6696.000	0.012*
	M	113	116.26	13137.00		
Achievement	F	145	133.61	19374.00	7596.000	0.315
	M	113	124.22	14037.00		

*$P \leq 0.05$, N: Total, F: Female, M: Male

CONCLUSION

Thus, study reveals that eating behavior has a significant relationship with EI, certain personality traits (extraversion, conscientiousness, and openness), and frustration tolerance (EIn, DI, and En) of early adults using online food delivery system. Healthy eating behavior is important to protect humankind from various mental and physical disorders such as obesity, ED, and stress-related disorders. This predominance observed in the study can be effectively resolved using behavior therapy techniques such as stimulus control, contingency contracting and self-reinforcement, appropriate skills training, emotional regulation methods, and habit control methods.

Ethical approval

The author(s) declare that they have taken the ethical approval from IEC (Ref. number: RCSS/IEC/0015/2022).

Declaration of patient consent

Patient's consent not required as there are no patients in this study.

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Conflicts of interest

There are no conflicts of interest.

Use of artificial intelligence (AI)-assisted technology for manuscript preparation

The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript and no images were manipulated using AI.

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