

RESEARCH ARTICLE

Exploring the Interplay between Emotional Eating, Eating Behavior Traits, and Disordered Eating Behavior in Adults: A Cross-Sectional Study Eman Fatima, Ayesha Muneer & Farryha Naeem

Abstract

Background: Emotional eating is a significant global concern that is closely associated with weight-related outcomes in both adolescents and adults, and it often serves as a precursor to more severe eating disorders. Disordered eating behaviors are well known as important risk factors contributing to weight gain and the growth of full-syndrome eating disorders in different populations. Furthermore, eating behavior traits exhibit potential as indicators capable of recognizing tendencies towards extreme food consumption. However, previous studies have revealed separate links between emotional eating and disordered eating behavior in adults, and despite the moderating role of eating behavior traits in separate studies, the broad investigation of their combined relationship remains unexplored, and this topic is open for further debate.

Method: The study was conducted using the purposive sampling technique and a cross-sectional research design. Two hundred adults (males, n = 76; females, n = 124), whose ages ranged from 18 to 35 (M = 21.5, SD = 7.02) years, were recruited from various public and private universities in Rawalpindi and Islamabad, Pakistan, from August 1, 2023, to September 30, 2023. Three standard psychological instruments were employed to assess emotional eating behavior, disordered eating behavior, and eating behavior traits in adults.

Results: This study explored the correlation and moderation effects of emotional eating and disordered eating behavior in adults. The findings exposed a significant positive association between emotional eating disorder, eating behavior traits, and disordered eating behavior. However, young adults who were overweight or obese exhibited more inclinedness towards emotional eating and eating behavior traits as compared to an underweight or normal weight. Moreover, food preferences did not significantly predict eating behavior traits or disordered eating behavior. Additionally, eating behavior traits did not act as moderators between emotional eating and disordered eating behavior in adults.

Conclusions: The present study highlights the importance of understanding the interplay between emotional eating, eating behavior traits, and disordered eating behavior in adults. These results have implications for prevention and interventions targeting disordered eating and highlight the dire need for multifaceted approaches to address and comprehend emotional eating and related behaviors in Pakistani adults.

Keywords: Emotional eating, eating behavior traits, and disordered eating behavior

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Background

Emotion regulation is a very complex process globally that comprises the ability to understand and admit experienced emotions while still adhering to personal ideas, even in the presence of adverse emotions, and regulate impulsive behaviors (Ageel et al., 2021; Chaman et al., 2022; Esin & Ayyıldız, 2024; Gratz & Roemer, 2004; Guerrini-Usubini et al., 2023; Mikhail et al., 2024; Munawar et al., 2021; Naeem et al., 2021; Noor et al., 2016; Peschel et al., 2024; Rogoff et al., 1984). It plays a major role in both mental and physical health in adults (Esin & Ayyıldız, 2024; Gross & Muñoz, 1995; Mikhail et al., 2024; Peschel et al., 2024). Many prior studies have revealed that adaptive emotion regulation strategies act as a protective or defensive factor against adverse emotions that assist people in coping with stressful and negative life events (Bonanno et al., 2004; Mikhail et al., 2024). On the other hand, failures in emotion regulation have also been associated with a broad array of psychological and physical challenges, including psychological distress, anxiety disorder, depression disorder, post-traumatic stress disorder, borderline personality disorder, and sleep disturbances (Bhatti et al., 2023; Darling et al., 2020; Forman et al., 2009; Gal et al., 2024; Mennin et al., 2002; Miano et al., 2017; Mikhail et al., 2024; Shuja et al., 2022; Vandekerckhove & Wang, 2018). Moreover, when emotions are dysregulated, people may engage in impulsive eating behaviors as a means of coping with adverse feelings or thoughts. This phenomenon is also well known emotional eating (Mikhail et al., 2024; Vandekerckhove & Wang, 2018; Wu et al., 2024).

Emotional eating is well-defined as the ability to eat in response to adverse emotions (Esin & Ayyıldız, 2024; Mikhail et al., 2024; van Strien et al., 1986). It is associated with overwhelming high-calorie foods (Aqeel et al., 2021; Ageel & Akhtar, 2017; Jones & Doley, 2024; Peter et al., 2017; Pinaquy et al., 2003; Shuja et al., 2021). it has been associated with different physical issues, such as weight gain, and negative mental health outcomes, including distress, depression, and eating disorders, as well as reduced psychological well-being and quality of life (Cecchetto et al., 2021; Chu et al., 2022; Gal et al., 2024; Guerrini-Usubini et al., 2023; Spinosa et al., 2019). Functioning as a disordered eating behavior and a coping defense mechanism for adverse emotions, emotional eating frequently arises in reaction to traumatic or stressful events. Particularly, the prevalence of emotional eating has surged since the start of the COVID-19 epidemic (Echeverri-Alvarado et al., 2020; Mikhail et al., 2024).

Emotional eating is characterized by consuming food in response to adverse emotions, as compared to hunger cues that are frequently activated via external stimuli, which are leading to tedious eating patterns in adults (Evgin & Kılıç, 2023; Ferrell et al., 2020; Lora et al., 2012). This maladaptive eating behavior has been most prevalent in both adults and adolescents in the last few years and is also linked to selecting energy-dense and pleasant foods as a transitory means to suppress adverse feelings or thoughts and improve positive emotions (Aqeel et al., 2020; Favieri et al., 2021; Shuja et al., 2020; Usubini et al., 2023). Conversely, emotional eating acts as a temporary disturbance from adverse feelings, as per the Psychosomatic

Theory (Geliebter & Aversa, 2003; Kaplan, 1956; Kaplan & Kaplan, 1957). Persons may adapt to it over a period of time to handle emotional distress and emotional eating problems (Jones & Doley, 2024; Oliver et al., 2000). Although it provides temporary relief, emotional eating is also linked to weight gain and dimension weight loss over time, mainly in both young adults and adolescents experiencing high levels of stress (Frayn & Knäuper, 2018; Johnson et al., 2020; Kalantzis et al., 2024). Emotional eating has been recognized as a possible precursor or cause of more severe disordered eating in adolescents and adults (Kalantzis et al., 2024; Stice, 2002), a spectrum of psychopathological behaviors such as excessive exercise, food restriction, binge eating, and purging (Young et al., 2014). Disordered eating behaviors are more commonly found in women who have a higher body mass index (BMI), and they have been linked to an enhanced r risk of developing clinical eating disorders as well as pose substantial problems to both mental health and physical health in adults (Goldschmidt et al., 2019; Kalantzis et al., 2024; Khraisat et al., 2022; Wu et al., 2019). These results highlight the importance of considering eating behavior traits as moderators in comprehending the intricate interplay between emotional eating and disordered eating behaviors and their influence on people's well-being(Gal et al., 2024; Goldschmidt et al., 2019).

Moreover, eating behavior traits are persistent features of people that consistently reflect food-related behaviors over a period of time in adults (Blundell et al., 2012; Bryant et al., 2008; French et al., 2012; Gal et al., 2024; McDonald et al., 2015). They act as valuable indicators for classifying trends towards overconsumption (Aqeel et al., 2017; Fatima et al., 2022; Finlayson et al., 2012; Peschel et al., 2023, 2024; Peters & Aqeel, 2020), as revealed by constructs including cognitive restriction, susceptibility to hunger, or disinhibition in measures (O'Connor et al., 2023; Stunkard & Messick, 1985). Prior studies have linked eating behavior traits with enhanced food consumption (Espel-Huynh et al., 2019; O'Connor et al., 2023; Vainik et al., 2019). Nevertheless, the interplay among emotional eating, eating behavior traits, and disordered eating behavior remains open for further debate and exploration in the adult and adolescent pupations. Therefore, the present study endeavors to elucidate the relationship among emotional eating, eating behavior traits, and disordered eating behavior. Moreover, this study is examining the moderating role of eating behavior traits on the relationship between emotional eating and disordered eating behavior in Pakistani adult population. Furthermore, this study explored food preferences-based comparisons of emotional eating disorder, disordered eating behavior, and eating behavior traits between adults who prefer healthy foods and those who favor junk foods.

Method

Research design and objectives

This study utilized a cross-sectional design and employed purposive sampling techniques. The primary study's aim was to examine the relationships among emotional eating, eating behavior traits, and disordered eating behavior in adults. Additionally, the study sought to investigate the moderating role of eating behavior traits between emotional eating and disordered eating behavior. Furthermore, this study

explored food preferences-based comparisons of emotional was calculated using Cronbach's alpha reliability index. eating disorder, disordered eating behavior, and eating Three-Factor Eating Questionnaire behavior traits between adults who prefer healthy foods and those who favor junk foods. Moreover, this study explored R18), developed by de Lauzon et al. (2004), is a designed to difference between young adults who were overweight or measure three factors of eating behavior: cognitive restraint obese on emotional eating and eating behavior traits compared (CR), uncontrolled eating (UE), and emotional eating to adults with low underweight and normal weight.

Sample

This study used a cross-sectional research design to recruit two hundred adults (males, n = 76; females, n = 124), whose ages ranged from 18 to 35 (M = 21.5, SD = 7.02) years. All of the participants were recruited from various public and private universities in Rawalpindi and Islamabad, Pakistan, from August 1, 2023, to September 30, 2023. The inclusion criteria of the study specified the selection of 110 students who preferred healthy food choices, while the rest of the 90 students preferred junk food. Moreover, only students with a normal body mass index (BMI) were included(Mohajan & Mohajan, 2023). On the other hand, the study's exclusion criteria were fixed to exclude students with diagnosed eating disorders or any other psychological or physical ailments from participating in the study.

Measures

All the instruments were self-reported. The study employed three standardized psychological instruments: the emotional eating questionnaire, the disordered eating attitude scale, and the eating behavior traits scale. Participants completed the instruments, which are described below. The study also gathered demographical data, including sex, nationality, age, and physiological data such as weight and height. Moreover, body mass index was calculated using the following formula: Kg/m2 in the present study(Mohajan & Mohajan, 2023).

Emotional Eating Questionnaire

The Emotional Eating Questionnaire (EEQ), developed by Garaulet (2012), was designed to assess eating disturbances in adults (Garaulet et al., 2012). This scale encompasses three factors that measure (1) disinhibition, (2) type of food, and (3) guilt. It consisted of 10 items. Response options range from 1 (never) to 4 (always). Lower scores on the overall scale demonstrate healthier eating behaviors, while higher scores reflect abnormal eating behaviors. The internal consistency of the three instruments was calculated using Cronbach's alpha reliability index.

Disordered Eating Attitude Scale

The Disordered Eating Attitude Scale (DEAS), developed by Fairburn and Beglin (1994), is used to measure disordered eating attitudes, which incorporate abnormal beliefs, thoughts, feelings, behaviors, and relationships related to food(Fairburn & Beglin, 1994). It comprises 25 items, with questionnaire items rated on a five-point Likerttype scale. Response categories range from 1 (rarely or never) to 5 (always). The scale includes five subscales: 1) Relationship with food, encompassing items 8, 10, 13, 17, 18, 19, 20, 21, 22, 23, 24; 2) Concerning food and weight gain, comprising items 5, 14, 15, and 16; 3) Restrictive and compensatory practices, including items 4, 6, 7, and 12; 4) Feelings towards eating, featuring items 2, 3, and 9; and 5) Idea of normal eating, consisting of items 1 and 11. Lower scores on the overall scale demonstrate healthier eating behaviors, while higher scores reflect abnormal eating behaviors. The internal consistency of the three instruments

The Three-Factor Eating Questionnaire (TFEQ-(Fairburn & Beglin, 1994). It encompasses three distinct subscales: Cognitive Restraint, encompassing items 2, 11, 12, 15, 16, and 18; Uncontrolled Eating, consisting of items 1, 4, 5, 7, 8, 9, 13, 14, and 17; and Emotional Eating, which includes items 3, 6, and 10. The internal consistency of the three instruments was calculated using Cronbach's alpha reliability index(Fairburn & Beglin, 1994).

Procedure

This study was approved by the Ethical Review Board of the Department of Psychology, Foundation University Islamabad, Pakistan, and adhered to the ethical guidelines outlined by the American Psychological Association. Two hundred students were recruited from various public and private universities in Rawalpindi and Islamabad, Pakistan. Approval to conduct this study was obtained from the relevant authorities within these institutions before commencing the research. Participants were assured of the confidentiality of their personal information, which would be used solely for research purposes. Both verbal and written informed consent were obtained from all volunteer participants. The study employed three standardized psychological instruments: the emotional eating questionnaire, the disordered eating attitude scale, and the eating behavior traits scale. Statistical analyses, including Pearson correlation, independent sample t-test, and moderational analysis, were conducted using SPSS-23 to fulfill the study objectives (Field, 2013).

Results

In Table 1, the Cronbach's alpha reliability coefficients reveal the internal consistency of three measures: emotional eating disorder ($\alpha = 0.78$), disordered eating behavior ($\alpha = 0.81$), and eating behavior traits ($\alpha = 0.84$), which reflect good reliability for all three instruments in the adult sample. This study's findings revealed that EED was statistically significant and positively associated with DEB (r = 0.19, p < 0.01) and EBT (r = 0.32, p < 0.01) in adults. Moreover, *DEB* was statistically significantly correlated with EBT (r = 0.58, p < 0.001). These findings suggested that higher levels of both emotional eating disorder and disordered eating behavior were linked to higher levels of eating behavior traits in adults.

In table 2, this study's findings revealed that there were non-significant results of emotional eating disorder, disordered eating behavior, and eating behavior traits between adults who prefer healthy foods and those who favor junk foods.

The findings revealed that there was no significant difference between adults who preferred junk foods (M = 77.06, SD = 16.26) and those who preferred healthy foods (M = 74.60, SD = 18.73), t(198) = 0.98, p = .32 for disordered eating behavior. Similarly, there was also a non-significant difference between adults who preferred healthy foods, with a mean score of 53.23 (SD = 7.81), whereas those who preferred junk foods had a mean score of 51.01 (SD = 7.21), t(198) = 0.71, p = 21 for emotional eating disorder.

Table 1 *Mean and standard deviation, alpha cronbach reliability, and correlation matrix of emotional eating disorder, disordered eating behavior, and eating behavior traits in adults (N = 200).*

Variables	α	M	SD	1	2	3
1. EED	.78	13.57	5.94	-	.19***	.32**
2. <i>DEB</i>	.81	75.75	17.66		-	.58***
3. <i>EBT</i>	.84	47.36	7.45			-

Note. $EED = Emotional\ eating\ disorder;\ DEB = Disordered\ eating\ behavior;\ EBT = Eating\ behavior\ traits.$ * $p<0.05,\ **p<0.01,\ ***p<0.00$

Table 2

Food preferences based comparison of emotional eating disorder, disordered eating behavior, and eating behavior traits between adults who prefer healthy foods and those who favor junk foods (N = 200)

	Health foods (n =110)		Junk foods (n =90)				95%	CI	
Variables	$\frac{M}{M}$	SD	$\frac{(\Pi = 50)}{M}$	SD	t(df)	n	LL	UL	Cohen's d
DEB	74.60				.98(198)	.32		7.41	
					` ′				-
EED	53.23	7.81	51.01		.71(198)	.21	-1.31	3.21	-
EBT	31.01	6.01	30.01	6.11	.56(198)	.31	-2.32	4.30	-

Note. EED = Emotional eating disorder; DEB = Disordered eating behavior; EBT = Eating behavior traits.

Table 3

One-way analysis of variance on emotional eating disorder, disordered eating behavior, and eating behavior traits across low BMI (underweight), average BMI (normal weight), and high BMI (overweight or obese) (N = 200).

	Low	BMI	Average	BMI	High BN	ΛI			
	(N=	19)	(N=150))	(N=3)	1)			
Variables	Mean	SD	Mean	SD	Mean	SD	 F	μ^2	Post-hoc
EED	11.63	4.69	12.88	5.62	18.12	6.14	12.4***	0.11	3>2>1
EBT	44.68	9.08	47.08	7.44	50.32	5.44	3.88**	0.03	3>2>1

Note: Only significant results are reported here. Low BMI (underweight), Average BMI (normal weight), High BMI (Overweight/Obese): $EED = emotional\ eating\ disorder;\ EBT = eating\ behaviour\ traits.\ *p<0.05,\ **p<0.01,\ ***p<0.00.$

Table 4 The moderation analysis of eating behavior traits on the relationship between emotional eating and disordered eating in adults (N = 200).

	M		
Variables	В	β	SE
Constant	76.25***		1.06
EED	.19	.01	1.09
EBT	9.69***	.54***	1.15
EED * EBT	-1.59	10	.97
\mathbb{R}^2	0.34		
\mathbb{R}^2	0.01		

Note. $EED = Emotional\ eating\ disorder;\ EBT = Eating\ behavior\ traits;\ EED * EBT = interaction\ between\ emotional\ eating\ disorder\ and\ eating\ behavior\ traits.\ *p<0.05,\ **p<0.01,\ ***p<0.00$

Likewise, there was a non-significant difference between adults who preferred healthy foods with a mean score of 31.01 (SD = 6.01), while those who preferred junk foods had a mean score of 30.01 (SD = 6.11), t(198) = 0.56, p = .31 for eating behavior traits.

These results suggest that adults who preferred junk foods did not display significantly different levels of disordered eating behavior in comparison to those who preferred healthy foods. Interesting. These non-significant findings highlight that food preference alone may not be a strong predictor of disordered eating behavior in adults.

In Table 3, a one-way analysis of variance (ANOVA) was carried out to examine the differences in emotional eating disorder, disordered eating behavior, and eating behavior traits across different BMI levels in adults. The results exposed significant differences in both emotional eating disorder (F (2, 197) = 12.4, p < .001) and eating behavior traits (F (2, 197) = 3.88, p = .001) across underweight, normal weight, and overweight/obese adults. The findings showed that young adults who were overweight or obese exhibited more tendencies towards emotional eating and eating behavior traits as compared to adults with an underweight or normal weight. Post-hoc analysis also revealed that adults who were overweight or obese exhibited significantly higher levels of both emotional eating disorder and eating behavior traits in comparison to those who were underweight or normal weight. Conversely, adults who were underweight demonstrated the lowest level of both emotional eating disorder and eating behavior traits. These results suggested that different levels of BMI are linked to variations in emotional eating disorder and eating behavior traits, such as higher BMI levels correlating with increased tendencies towards emotional eating and more inclined eating behavior traits.

In table 4, the moderation analysis revealed the influence of eating behavior traits on the relationship between emotional eating disorder and disordered eating in Pakistani adults. The findings revealed that emotional eating disorder was statistically non-significant, predicting (B = 0.19, $\beta = 0.01$, SE = 1.09) disordered eating in adults. Moreover, eating behavior traits exhibited a statistically significant positive predictive (B = 9.69, β = 0.54, SE = 1.15) for disordered eating, which also demonstrates that higher levels of eating behavior traits are associated with a higher level of disordered eating tendencies in adults. Notably, the interaction between emotional eating disorder and eating behavior traits (EED * EBT) did not exhibit a significant moderation effect (B = -1.59, β = -0.10, SE = 0.97), which suggests that eating behavior traits do not serve as moderates in the association between emotional eating disorder and disordered eating in Pakistani adults. Moreover, the model accounted for 34% of the variance in disordered eating behavior. These results highlight the substantial role of eating behavior traits in predicting disordered eating in young adults, independent of the interaction with emotional eating disorders.

Discussion

The aim of the present study was to examine the relationship among emotional eating, eating behavior traits, and disordered eating behavior in adults, while also exploring the potential moderating role of eating behavior traits between emotional eating and disordered eating behavior. Moreover, the study aimed to compare emotional

eating disorders, disordered eating behaviors, and eating behavior traits based on food preferences and BMI categories. This study contributes to the existing knowledge on disordered eating behavior and provides deep insights into potential avenues for prevention and intervention strategies.

The primary aim of the study was to explore the relationship among emotional eating, eating behavior traits, and disordered eating behavior in adults. The study's findings exposed a significant positive relationship among emotional eating, disordered eating behavior, and eating behavior traits in Pakistani adults. Specifically, emotional eating behavior was found to be significantly positively associated with disordered eating behavior. These results are consistent and support previous studies (Ageel et al., 2021; Chaman et al., 2022; Esin & Ayyıldız, 2024; Gratz & Roemer, 2004; Guerrini-Usubini et al., 2023; Mikhail et al., 2024; Munawar et al., 2021; Naeem et al., 2021; Noor et al., 2016; Peschel et al., 2024; Rogoff et al., 1984). Likewise, eating behavior traits showed a significant positive association with disordered eating behavior, which also confirmed previous findings. Several previous studies have reported similar associations, which directly supports our study results. For instance, a similar study carried out by Usubini et al. (2023) explored the association between emotional eating and disordered eating behaviors in college students(Guerrini-Usubini et al., 2023). They observed that emotional eating was positively linked to different disordered eating behaviors, including restrictive eating patterns and binge eating. A similar study conducted by Usubini et al. (2023) explored the link between eating behavior traits and disordered eating behavior in adults. They observed a significant positive link between eating behavior traits, emotional eating, and disordered eating behavior in adults. These results are consistent with our study result, which shows a significant positive association between eating behavior traits and disordered eating behavior (Esin & Ayyıldız, 2024; Gross & Muñoz, 1995; Mikhail et al., 2024; Peschel et al., 2024).

Moreover, the study explored the differences based on food preferences on emotional eating disorder, disordered eating behavior, and eating behavior traits in Pakistani adults. The present study's findings revealed that there was a non-significant difference between adults who preferred junk foods and those who preferred healthy foods for emotional eating disorder, disordered eating behavior, and eating behavior traits. Whereas previous studies have reported similar findings, the particular focus on food preferences in the present study contributes a novel dimension to the existing knowledge. For example, a similar study conducted by French et al. (2012) examined the association between food preferences and disordered eating behaviors in adolescents(French et al., 2012). They observed that certain food preferences, including a preference for high-calorie foods, were linked to a high risk of disordered eating behaviors. Whereas the present study did not report a significant difference between adults who preferred junk foods and those who preferred healthy foods in terms of emotional eating disorder and disordered eating behavior, this contrasts with the findings of previous studies(Bhatti et al., 2023; Darling et al., 2020; Forman et al., 2009; Gal et al., 2024; Mennin et al., 2002; Miano et al., 2017; Mikhail et al., 2024; Shuja et al., 2022; Vandekerckhove & Wang, 2018).

Furthermore, the study explored the differences in emotional eating disorder, disordered eating behavior, and eating behavior traits across low BMI (underweight), average BMI (normal weight), and high BMI (overweight or obese) in adults. The findings showed that young adults who were overweight or obese exhibited more tendencies towards emotional eating and eating behavior traits as compared to adults with an underweight or normal weight. This study's findings are consistent with Schulte et al. (2016) findings. They conducted a study examining the relationship between different BMI levels and emotional eating in adults and found that emotional eating was statistically positively linked to higher BMI levels (Schulte et al., 2016). In a similar study conducted by Macht and Mueller (2007), they also investigated the association between emotional eating and weight status in adults and noted that emotional eating was more prevalent in adults with higher BMI levels (Macht & Mueller, 2007; Macht & Simons, 2000).

Additionally, this study explored the potential moderating role of eating behavior traits between emotional eating and disordered eating behavior in adults. The findings of the present study revealed that eating behavior traits did not act as moderators between emotional eating and disordered eating behavior in adults. Previous studies have observed different factors that may serve as moderators in the relationship between emotional eating and disordered eating behavior, including coping strategies, personality traits, and cognitive factors (Lavender et al., 2015; Masheb & Grilo, 2006; Usubini et al., 2023). A similar study conducted by Masheb and Grilo (2006) examined the moderating role of psychiatric comorbidity between binge eating behaviors and emotional eating in p patients with binge eating disorder. They observed that psychiatric comorbidity was linked to higher binge eating behaviors, but it also did not significantly act as a moderator in the relationship between emotional eating and binge eating disorder. These prior results are consistent with our study's results, which propose that eating behavior traits may not necessarily act as moderators between disordered eating behavior and emotional eating in adults. However, more studies are required to explore other possible moderators and mediators, as well as the underlying mechanisms that could affect this complex relationship in adults.

Limitations and implications

The present study has many drawbacks that warrant consideration. First of all, the use of a cross-sectional or quantitative research design in this study impedes the establishment of causal inferences among the variables examined. Future research should use longitudinal designs that may provide a more deep understanding of these relations over a period of time. Moreover, this study's reliance on self-report instruments raises the possibility of social desirability effects and response bias, which could affect the validity and reliability of the results. Additionally, the current study sample was limited to Pakistani adults, which could limit the generalizability of the results to other Received: January 07, 2024 Accepted: 24 April 2024:

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populations. Lastly, the exclusion and inclusion of certain demographic factors, including socioeconomic status, gender, and age, may have ignored important variables that may affect eating behaviors. In spite of these restrictions, the findings of the study have important implications for both practice and research. This study contributes to previous literature to examine the complex interplay between emotional eating, eating behavior traits, and disordered eating behavior in adults. This study also adds to the previous knowledge in terms of eating behaviors and informs prevention and interventions aimed at preventing disordered eating behaviors and encouraging healthier eating habits in Pakistani adults. Moreover, the results highlights the significance of considering contextual factors in comprehending eating behaviors and highlight the dire demand for additional study to examine these associations in diverse populaces through more advance methodologies.

Conclusion

In conclusion, the present study exposed a significant positive association among emotional eating, eating behavior traits, and disordered eating behavior in Pakistani adults. Whereas both eating behavior traits and emotional eating were found to be related to disordered eating behavior in adults. This study revealed that nonsignificant differences were reported based on food preferences in an adult sample. These results highlight the dire need for targeted prevention and interventions to address both eating behavior traits and emotional eating in the prevention and intervention of disordered eating behaviors in Pakistani adults. Further studies employing advanced longitudinal research designs and considering other demographic factors are necessary to improve our understanding of underlying mechanisms and relationships and inform more effective prevention and intervention.

Ethical Consideration

The study was approved by Department of Psychology, Foundation University School of Science and Technology, Pakistan. Consent Form was taken before taking data and participants were asked to take voluntary participation.

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Availability of data and materials

The data sets used and analyzed during the current study are available from the corresponding author on reasonable request.

Authors' contributions/Author details

Ayesha Muneer performed this study under the guidelines of Muhammad Ageel.

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References

- Ageel, M., & Akhtar, T. (2017). Self or Others: Exploring the Role of Truancy as the link between Personality Traits and Peer Influences found in Truant Students. GSTF Journal of Psychology, 3(2), 11–17. https://doi.org/10.5176/2345-7872 3.2 44
- Aqeel, M., Jami, H., & Ahmed, A. (2017). Translation, adaptation, and cross-language validation of student: thinking about my homework scale (STP). International Journal of Human Rights in Healthcare, 10(5), 296-309. https://doi.org/10.1108/IJHRH-05-2017-0019
- Ageel, M., Nisar, H. H., Rehna, T., & Ahmed, A. (2021). Selfharm behaviour, psychopathological distress and suicidal ideation in normal and deliberate self-harm outpatient's adults. Journal of the Pakistan Medical Association, 71(9), 2143-2147. https://doi.org/10.47391/JPMA.03-379
- Ageel, M., Rehna, T., & Sarfraz, R. (2021). The association among perception of osteoarthritis with adverse pain anxiety, symptoms of depression, positive and negative affects in patients with knee osteoarthritis: A cross sectional study. Journal of the Pakistan Medical 645-650. Association, 71(2 B), https://doi.org/10.47391/JPMA.862
- Ageel, M., Shuja, K. H., Abbas, J., Rehna, T., & Ziapour, A. (2020). The Influence of Illness Perception, Anxiety and Depression Disorders on Students Mental Health during COVID-19 Outbreak in Pakistan: A Web-Based Cross-Sectional Survey. International Journal of Human Rights in Healthcare. https://doi.org/10.21203/rs.3.rs-30128/v1
- Bhatti, M. M., Shuja, K. H., Aqeel, M., Bokhari, Z., Gulzar, S. N., Fatima, T., & Sama, M. (2023). Psychometric development and validation of victim gaslighting questionnaire (VGQ): across female sample from Pakistan. International Journal of Human Rights in Healthcare, 16(1), 4–18.
- Blundell, J. E., Caudwell, P., Gibbons, C., Hopkins, M., Naslund, E., King, N., & Finlayson, G. (2012). Role of resting metabolic rate and energy expenditure in hunger and appetite control: A new formulation. DMM Disease Models and Mechanisms. 5(5),608-613. https://doi.org/10.1242/dmm.009837
- Bonanno, G. A., Wortman, C. B., & Nesse, R. M. (2004). Prospective patterns of resilience and maladjustment during widowhood. Psychology and Aging, 19(2), 260-271. https://doi.org/10.1037/0882-7974.19.2.260
- Bryant, E. J., King, N. A., & Blundell, J. E. (2008). Disinhibition: its effects on appetite and weight regulation. Obesity Reviews, 9(5), 409-419.
- Cecchetto, C., Aiello, M., Gentili, C., Ionta, S., & Osimo, S. A. (2021). Increased emotional eating during COVID-19 associated with lockdown, psychological and social distress. Appetite, 160(1),105122. https://doi.org/10.1016/j.appet.2021.105122
- Chaman, A., Shuja, K. H., & Rani, M. (2022). A Web-Based Cross-Sectional Survey of Coping Mechanisms, Psychological Symptoms, and Mental Health in Pakistan Finlayson, G., Cecil, J., Higgs, S., Hill, A., & Hetherington, M. during the Covid-19 Outbreak. Nature-Nurture Journal of Psychology, http://thenaturenurture.org/index.php/nnjp/article/view/26
- Chu, J., Raney, J. H., Ganson, K. T., Wu, K., Rupanagunta, A., Testa, A., Jackson, D. B., Murray, S. B., & Nagata, J. M.

- (2022). Adverse childhood experiences and binge-eating disorder in early adolescents. Journal of Eating Disorders, 10(1), 168. https://doi.org/10.1186/s40337-022-00682-y
- Darling, K. E., Ranzenhofer, L. M., Hadley, W., Villalta, D., Kasper, V., & Jelalian, E. (2020). Negative childhood experiences and disordered eating in adolescents in a weight management program: The role of depressive symptoms. Eating Behaviors, 38(1), 101402. https://doi.org/10.1016/j.eatbeh.2020.101402
- De Young, K. P., Lavender, J. M., Crosby, R. D., Wonderlich, S. A., Engel, S. G., Mitchell, J. E., Crow, S. J., Peterson, C. B., & Le Grange, D. (2014). Bidirectional associations between binge eating and restriction in anorexia nervosa. An ecological momentary assessment study. Appetite, 83, 69-74. https://doi.org/10.1016/j.appet.2014.08.014
- Echeverri-Alvarado, B., Pickett, S., & Gildner, D. (2020). A model of post-traumatic stress symptoms on binge eating through emotion regulation difficulties and emotional Appetite, 104659. eating. 150(1),https://doi.org/10.1016/j.appet.2020.104659
- Esin, K., & Ayyıldız, F. (2024). Relationship Between Chronotype With Emotional Eating, Eating Disorder Risk and Depression: A Cross-Sectional Study. SAGE Open, 14(1), 21582440231224220. https://doi.org/10.1177/21582440231224221
- Espel-Huynh, H. M., Muratore, A. F., Virzi, N., Brooks, G., & Zandberg, L. J. (2019). Mediating role of experiential avoidance in the relationship between anxiety sensitivity and eating disorder psychopathology: A clinical replication. Behaviors, 101308. Eating *34*(1), https://doi.org/10.1016/j.eatbeh.2019.101308
- Evgin, D., & Kılıç, K. M. (2023). Relationship between healthy life awareness, emotional eating, obesity awareness, and coping stress in adolescents. Psychology in the Schools, 60(6), 1898–1917. https://doi.org/10.1002/pits.22834
- Fairburn, C. G., & Beglin, S. J. (1994). Assessment of eating disorders: Interview or self-report questionnaire? *International Journal of Eating Disorders*, 16(4), 363–370.
- Fatima, S. H., Ageel, M., Anwar, A., & Tarig, M. (2022). Body image perception as predictor of positive and negative selfconcept scale for young adults (BIPS). International *Journal of Human Rights in Healthcare*, 15(3), 227–244.
- Favieri, F., Marini, A., & Casagrande, M. (2021). Emotional regulation and overeating behaviors in children and adolescents: A systematic review. Behavioral Sciences, 11(1), 11. https://doi.org/10.3390/bs11010011
- Ferrell, E. L., Watford, T. S., & Braden, A. (2020). Emotion regulation difficulties and impaired working memory interact to predict boredom emotional eating. Appetite, 104450. https://doi.org/10.1016/j.appet.2019.104450
- Field, A. (2013). Andy Field Discovering Statistics Using IBM SPSS Statistics. In Lavoisier.Fr (Vol. 58). SAGE **Publications** Limited. http://www.lavoisier.fr/notice/frMJO3AKKA6RIXLO.ht ml%5Cnpapers2://publication/uuid/01872072-935D-4D89-AB3D-D7F41393EC7D
- (2012). Susceptibility to weight gain. Eating behaviour traits and physical activity as predictors of weight gain during the first year of university. Appetite, 58(3), 1091-1098. https://doi.org/10.1016/j.appet.2012.03.003
- Forman, S. G., Olin, S. S., Hoagwood, K. E., Crowe, M., & Saka,

- N. (2009). Evidence-Based Interventions in Schools: Developers' Views of Implementation Barriers and Facilitators. School Mental Health, 1(1), 26–36. https://doi.org/10.1007/s12310-008-9002-5
- Frayn, M., & Knäuper, B. (2018). Emotional Eating and Weight in Adults: a Review. Current Psychology, 37(4), 924–933. https://doi.org/10.1007/s12144-017-9577-9
- French, S. A., Epstein, L. H., Jeffery, R. W., Blundell, J. E., & Wardle, J. (2012). Eating behavior dimensions. Associations with energy intake and body weight. A review. Appetite, 59(2), 541–549.
- Gal, A. M., Iatcu, C. O., Popa, A. D., Arhire, L. I., Mihalache, L., Gherasim, A., Nita, O., Soimaru, R. M., Gheorghita, R., & Graur, M. (2024). Understanding the Interplay of Dietary Intake and Eating Behavior in Type 2 Diabetes. Nutrients, 16(6), 771.
- Garaulet, M., Canteras, M., Morales, E., López-Guimerà, G., Sánchez-Carracedo, D., & Corbalán-Tutau, M. D. (2012). Validation of a questionnaire on emotional eating for use in cases of obesity; the Emotional Eater Questionnaire (EEQ). Nutrición Hospitalaria, 27(2), 645–651.
- Geliebter, A., & Aversa, A. (2003). Emotional eating in overweight, normal weight, and underweight individuals. Eating Behaviors, 341-347. 3(4),https://doi.org/10.1016/S1471-0153(02)00100-9
- Goldschmidt, A. B., Smith, K. E., Lavender, J. M., Engel, S. G., & Haedt-Matt, A. (2019). Trait-level facets of impulsivity and momentary, naturalistic eating behavior in children and adolescents with overweight/obesity. Journal of 24 - 30. *Psychiatric* Research, 110(1),https://doi.org/10.1016/j.jpsychires.2018.12.018
- Gratz, K. L., & Roemer, L. (2004). Multidimensional Assessment of Emotion Regulation and Dysregulation: Development, Factor Structure, and Initial Validation of Psychopathology and Behavioral Assessment, 26(1), 41-54.
 - https://doi.org/10.1023/B:JOBA.0000007455.08539.94
- Gross, J. J., & Muñoz, R. F. (1995). Emotion Regulation and Mental Health. Clinical Psychology: Science and Practice, 151–164. https://doi.org/10.1111/j.1468-2850.1995.tb00036.x
- Guerrini-Usubini, A., Cattivelli, R., Scarpa, A., Musetti, A., Varallo, G., Franceschini, C., & Castelnuovo, G. (2023). interplay between emotion dysregulation, psychological distress, emotional eating, and weight status: A path model. International Journal of Clinical and Health Psychology, 100338. *23*(1). https://doi.org/10.1016/j.ijchp.2022.100338
- Johnson, G. A., Shriver, S. K., & Du, S. (2020). Consumer privacy choice in online advertising: Who opts out and at what cost to industry? Marketing Science, 39(1), 33-51. https://doi.org/10.1287/mksc.2019.1198
- Jones, M. E., & Doley, J. R. (2024). Psychological Distress Mediates the Relationship Between Bisexual Discrimination and Disordered Eating Behaviors in Bi+ Women. Journal of Bisexuality, 12(1), 1–31.
- Kalantzis, M. A., Braden, A. L., & Haidar, A. (2024). Disordered eating and emotional eating in Arab, middle eastern, and north African American women. Eating Behaviors, 53(1), 101868.
- Kaplan, H. (1956). The psychosomatic concept of peptic ulcer. Journal of Nervous and Mental Disease, 123(2), 93-111.

- https://doi.org/10.1097/00005053-195602000-00001
- Kaplan, H. I., & Kaplan, H. S. (1957). The psychosomatic concept of obesity. The Journal of Nervous and Mental Disease, 125(2), 181-201.
- Khraisat, B. R., Al-Jeady, A. M., Alqatawneh, D. A., Toubasi, A. A., & AlRyalat, S. A. (2022). The prevalence of mental health outcomes among eating disorder patients during the COVID-19 pandemic: A meta-analysis. *Clinical Nutrition* ESPEN, 48(1), 141-147. https://doi.org/10.1016/j.clnesp.2022.01.033
- Lavender, J. M., Wonderlich, S. A., Engel, S. G., Gordon, K. H., Kaye, W. H., & Mitchell, J. E. (2015). Dimensions of emotion dysregulation in anorexia nervosa and bulimia nervosa: A conceptual review of the empirical literature. Clinical Psychology Review, 40(1), 111–122.
- Lora, A., Kohn, R., Levav, I., McBain, R., Morris, J., & Saxena, S. (2012). Service availability and utilization and treatment gap for schizophrenic disorders: A survey in 50 low- and middle-income countries. Bulletin of the World Health Organization, 90(1), 47-54. https://doi.org/10.2471/BLT.11.089284
- Macht, M., & Mueller, J. (2007). Immediate effects of chocolate on experimentally induced mood states. Appetite, 49(3), 667-674.
- Macht, M., & Simons, G. (2000). Emotions and eating in everyday life. Appetite, 35(1), 65–71.
- Masheb, R. M., & Grilo, C. M. (2006). Emotional overeating and its associations with eating disorder psychopathology among overweight patients with binge eating disorder. *International Journal of Eating Disorders*, 39(2), 141–146.
- McDonald, L., Wardle, J., Llewellyn, C. H., & Fisher, A. (2015). Nighttime sleep duration and hedonic eating in childhood. International Journal of Obesity, 39(10), 1463–1466. https://doi.org/10.1038/ijo.2015.132
- the Difficulties in Emotion Regulation Scale. Journal of Mennin, D. S., Heimberg, R. G., Turk, C. L., & Fresco, D. M. (2002). Applying an emotion regulation framework to integrative approaches to generalized anxiety disorder. Clinical Psychology: Science and Practice, 9(1), 85–90. https://doi.org/10.1093/clipsy/9.1.85
 - Miano, A., Grosselli, L., Roepke, S., & Dziobek, I. (2017). Emotional dysregulation in borderline personality disorder and its influence on communication behavior and feelings in romantic relationships. Behaviour Research and Therapy, 95(1), 148-157. https://doi.org/10.1016/j.brat.2017.06.002
 - Mikhail, M. E., Burt, S. A., Neale, M. C., Keel, P. K., Katzman, D. K., & Klump, K. L. (2024). Changes in affect longitudinally mediate associations between emotion regulation strategy use and disordered eating. International Journal of Eating Disorders, *12*(11), https://doi.org/DOI: 10.1002/eat.24162
 - Mohajan, D., & Mohajan, H. K. (2023). Body mass index (BMI) is a popular anthropometric tool to measure obesity among adults. Journal of Innovations in Medical Research, 2(4), 25 - 33.
 - Munawar, K., Aqeel, M., Rehna, T., Shuja, K. H., Bakrin, F. S., & Choudhry, F. R. (2021). Validity and Reliability of the Urdu Version of the McLean Screening Instrument for Borderline Personality Disorder. Frontiers in Psychology, *12*(1), 533526. https://doi.org/https://doi.org/10.3389/fpsyg.2021.533526
 - Naeem, B., Aqeel, M., & de Almeida Santos, Z. (2021). Marital Conflict, Self-Silencing, Dissociation, and Depression in

- Multilevel Mediating Model. Nature-Nurture Journal of Psychology, 1(2), 1–11.
- Noor, R., Gul, S., Khan, E. A., Shahzad, N., & Aqeel, M. (2016). (2016). The Impact of Coping Strategies on Psychological Adjustment across Male and Female Spinal Cord Injured Spinosa, J., Christiansen, P., Dickson, J. M., Lorenzetti, V., & Patients. J. Appl. Environ. Biol. Sci, 6(2S), 137-143.
- O'Connor, S. M., Zickgraf, H. F., Hazzard, V. M., Haller, L. L., & Wildes, J. E. (2023). Exploring differences in disordered eating and related appetitive traits among women based on childhood and current food security status. Eating Behaviors, 49, 101729.
- Oliver, G., Wardle, J., & Gibson, E. L. (2000). Stress and food choice: A laboratory study. Psychosomatic Medicine, 62(6), 853-865. https://doi.org/10.1097/00006842-200011000-00016
- Peschel, S. K. V, Fürtjes, S., Sigrist, C., Voss, C., Berwanger, J., Ollmann, T. M., Kische, H., Rückert, F., Koenig, J., & Pieper, L. (2024). Tension and disordered eating behaviors in the daily lives of adolescents and young adults from the general population: Associations and moderating role of trait emotion regulation. Scandinavian Journal of Psychology, 65(2), 252–263.
- Peschel, S. K. V, Fürtjes, S., Voss, C., Sigrist, C., Berwanger, J., Ollmann, T. M., Kische, H., Rückert, F., Koenig, J., & Beesdo-Baum, K. (2023). Temporal associations between experiential avoidance and disordered eating behaviors in adolescents and young adults: findings from an epidemiological cohort study with ecological momentary assessment. Eating and Weight Disorders-Studies on Anorexia, Bulimia and Obesity, 28(1), 58.
- Peter, S., Ageel, M., Akhtar, T., Ahmed, A., & Farooq, K. (2017). The moderating role of pregnancy status among coping strategies, depression, anxiety and stress across Pakistani married women. Foundation University Journal of Psychology, 2(5), 67–93.
- Peters, S., & Aqeel, M. (2020). Chapter Nine the Role of Coping Strategies in Developing Depression, Anxiety and Stress among Pregnant and Non-Pregnant. Psychosocial Explorations of Gender in Society, 1(1), 124.
- Pinaquy, S., Chabrol, H., Simon, C., Louvet, J. P., & Barbe, P. (2003). Emotional eating, alexithymia, and binge-eating disorder in obese women. Obesity Research, 11(2), 195-201. https://doi.org/10.1038/oby.2003.31
- Rogoff, B., Lave, J., & Murtaugh, M. (1984). Everyday Cognition: Its Development in Social Context. Harvard university press.
- Schulte, E. M., Tuttle, H. M., & Gearhardt, A. N. (2016). Belief in food addiction and obesity-related policy support. PLoS One, 11(1), e0147557.
- Shuja, K. H., Aqeel, M., & Jaffar, A. (2022). Criminal Recidivism in Pakistan: A Grounded Theory of Social & Environmental Causes and Psychological Consequences. Nature-Nurture Journal of Psychology, 2(2), 41–53.
- Shuja, K. H., Aqeel, M., & Sarfaraz, R. (2021). Chronic pain management a fundamental human right: adaptation and examination of psychometric properties of pain anxiety symptoms scale among osteoporosis sample from Pakistan. International Journal of Human Rights in Healthcare, 14(1), 42-57. https://doi.org/10.1108/IJHRH-07-2020-0057

- Married Madrassa and Non-Madrassa Women: A Shuja, K. H., Shahidullah, Aqeel, M., Khan, E. A., & Abbas, J. (2020). Letter to highlight the effects of isolation on elderly during COVID-19 outbreak. In International Journal of Geriatric Psychiatry (Vol. 35, Issue 12, pp. 1477–1478). https://doi.org/10.1002/gps.5423
 - Hardman, C. A. (2019). From Socioeconomic Disadvantage to Obesity: The Mediating Role of Psychological Distress and Emotional Eating. Obesity, 27(4), 559–564. https://doi.org/10.1002/oby.22402
 - Stice, E. (2002). Risk and maintenance factors for eating pathology: A meta-analytic review. Psychological Bulletin, 128(5), 825-848. https://doi.org/10.1037/0033-2909.128.5.825
 - Stunkard, A. J., & Messick, S. (1985). The three-factor eating questionnaire to measure dietary restraint, disinhibition and hunger. Journal of Psychosomatic Research, 29(1), 71-83. https://doi.org/10.1016/0022-3999(85)90010-8
 - Usubini, A. G., Cattivelli, R., Scarpa, A., Musetti, A., Varallo, G., Franceschini, C., & Castelnuovo, G. (2023). The interplay between emotion dysregulation, psychological distress, emotional eating, and weight status: a path model. International Journal of Clinical and Health Psychology, 23(1), 81–90.
 - Vainik, U., García-García, I., & Dagher, A. (2019). Uncontrolled eating: a unifying heritable trait linked with obesity, overeating, personality and the brain. European Journal of Neuroscience, *50*(3), https://doi.org/10.1111/ejn.14352
 - van Strien, T., Frijters, J. E. R., Bergers, G. P. A., & Defares, P. B. (1986). The Dutch Eating Behavior Questionnaire (DEBQ) for assessment of restrained, emotional, and external eating behavior. International Journal of Eating Disorders, 5(2), 295-315. https://doi.org/10.1002/1098-108X(198602)5:2<295::AID-EAT2260050209>3.0.CO;2-T
 - Vandekerckhove, M., & Wang, Y. L. (2018). Emotion, emotion regulation and sleep: An intimate relationship. AIMS Neuroscience. 5(1). https://doi.org/10.3934/Neuroscience.2018.1.1
 - Wu, T., Tan, X., Li, Y., Liang, Y., & Fan, J. (2024). The Relationship between Occupational Fatigue and Well-Being: The Moderating Effect of Unhealthy Eating Behaviour. Behavioral Sciences, 14(1), 32.
 - Wu, X. Y., Zhuang, L. H., Li, W., Guo, H. W., Zhang, J. H., Zhao, Y. K., Hu, J. W., Gao, Q. Q., Luo, S., Ohinmaa, A., & Veugelers, P. J. (2019). The influence of diet quality and dietary behavior on health-related quality of life in the general population of children and adolescents: a systematic review and meta-analysis. Quality of Life Research. 28(8), 1989–2015. https://doi.org/10.1007/s11136-019-02162-4

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