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Exploring the Link between Mindful Eating, Instagram Engagement, and Eating Disorders: A Focus on Orthorexia Nervosa

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Abstract: Mindful eating is an increasingly popular dietary practice that may mediate the symptomatology of eating disorders. Orthorexia nervosa is a recently proposed eating disorder characterized by excessive concern for body image, healthy eating, and calorie control. The purpose of this study is to investigate the relationship between mindful eating, Instagram engagement, and eating disorders, with a focus on orthorexia nervosa. This cross-sectional study involving 407 adults explored the interplay between mindful eating, psychological distress, and eating disorders, notably orthorexia nervosa and their association with Instagram use. The data extraction and analysis were conducted employing SPSS v28 and R-Statistics. Utilizing Mindful Eating Scale (MES-16), Eating Disorder Examination Questionnaire Short (EDE-QS), Orthorexia Nervosa Questionnaire-Revised (ORTO-R), and Depression Anxiety Stress Scale (DASS-21) validated scales, alongside inquiries into Instagram usage, significant correlations emerged. MES-16 demonstrated a robust negative association with both EDE-QS ($r = -0.501, p < 0.001$) and ORTO-R ($r = -0.519, p < 0.001$), while EDE-QS and ORTO-R showed significant correlations with depression, anxiety, and stress ($p < 0.001$). Variations in ORTO-R mean scores were notably distinct across different mindful eating adherence categories ($p < 0.001$), emphasizing the negative relationship between mindful eating and orthorexia nervosa. Additionally, participants with extensive daily Instagram use displayed significantly higher ORTO-R scores compared to minimal users ($p < 0.05$). These findings suggest a negative link between mindful eating with eating disorders and orthorexia nervosa, highlighting mindful eating's potential role in reducing orthorexia nervosa tendencies. Furthermore, Instagram use seems associated with psychological distress and elevated orthorexia nervosa levels.

Keywords: mindful eating; orthorexia nervosa; eating disorders; Instagram; mental health; body image



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1. Introduction

In today's digital era, technology's fusion with social behavior has revolutionized how people engage with information, ideas, and self-perception [1]. Social media's surge has drastically reshaped self-image, eating habits, and mental well-being [2], often leading to significant impacts [3]. The omnipresence of digital platforms has fostered a culture of constant comparison, fueling unrealistic beauty ideals and wellness norms [4]. Platforms like Instagram, particularly visual and influential, significantly influence societal views on body image and dietary habits [5]. The relentless display of curated content, showcasing unattainable physical perfection and diets, correlates with increased dissatisfaction and promotes various eating disorders [6].

Eating disorders encompass a range of psychological conditions affecting eating behavior and body image perceptions [7]. They stem from a mix of genetic, environmental, societal, and psychological factors [8]. In addition to recognized disorders like anorexia and bulimia, emerging disorders like orthorexia nervosa gain attention [9]. Orthorexia revolves around an obsession with consuming only foods seen as healthy or “clean”. This fixation

leads to strict dietary rules, causing nutritional deficiencies and social isolation [10], driven by a desire for control, order, and distorted achievement [11]. Understanding the complex factors behind orthorexia is crucial [12].

Eating disorders, including orthorexia, cause profound psychological distress, often linked with depression, anxiety, and stress [13]. Individuals struggle with low self-worth due to distorted body image perceptions [14]. Orthorexia intensifies these feelings through rigid dietary rules and anxiety over deviating from self-imposed norms [15]. A holistic approach is vital to address both behavioral and emotional aspects [16].

Mindfulness and mindful eating blend psychology and nutrition [17]. Mindful eating promotes conscious nonjudgmental awareness of eating habits, focusing on savoring each bite and understanding bodily cues and needs [18]. It offers a way to tackle orthorexia's complexities, psychological distress, and Instagram's negative influence by promoting self-awareness and a non-reactive attitude towards food.

For orthorexia, mindful eating could shift toward a balanced flexible dietary approach. It lessens rigid rules and eases anxiety, fostering empowerment and autonomy [19], countering social media pressures and unrealistic beauty standards on platforms like Instagram [20].

One of the key research gaps this study addresses lies in the elucidation of the potential pathways through which mindful eating practices and Instagram use may influence the development and perpetuation of eating disorders, particularly orthorexia nervosa. By exploring these pathways, this research endeavors to shed light on the often unexplored role of psychological distress in the context of digital media consumption and dietary behaviors. Moreover, this study aims to highlight the significance of recognizing the nuanced connections between mindful eating, Instagram usage, and psychological factors such as depression, anxiety, and stress, underscoring the need for holistic intervention strategies that address both the behavioral and emotional dimensions of disordered eating. These efforts aim to foster a more resilient and mindful approach to well-being in the digital era, thereby addressing a critical gap in understanding and managing eating disorders within the context of modern lifestyles.

The hypothesis of this study proposes that, within a mindfulness-based approach, mindful eating potentially acts as a mediator in the relationship between triggers associated with disordered eating behaviors, including depression, anxiety, and stress. Furthermore, these triggers, influenced by contemporary societal norms as depicted on Instagram in the modern era, might be linked to the presence or likelihood of orthorexia.

2. Materials and Methods

2.1. Design and Procedure

This study employed a cross-sectional design and utilized an online survey conducted in both Greek and English languages through the Sogolytics online survey tool [21]. The first two survey questions were utilized as inclusion and exclusion criteria, ensuring participants' acknowledgment of the study's terms and conditions, and verifying their age within the range of 18 to 65 years. The survey was disseminated through direct messaging on various social media applications, with follow-up reminders to encourage participant engagement and provide a platform for addressing any inquiries or concerns related to this study. This hybrid method utilizes the advantages of both web and mailed questionnaires [22–24].

Before initiating the data collection process, this study's purpose and hypotheses were clearly specified, providing a comprehensive framework for the research analysis and interpretation. The final sample that met the inclusion-exclusion criteria consisted of 407 adults.

2.2. Scales

2.2.1. Mindful Eating Scale-16 (MES-16)

MES-16 represents a condensed version of the 28-item Mindful Eating Scale (MES-28), initially introduced by Hulbert-Williams et al. [25] to cater to the specific assessment

needs within the domain of food behavior [26]. Following the identification of certain deficient psychometric properties and sub-scale elements within the MES-28 by Hulbert-Williams et al. [27], subsequent revisions were implemented to enhance its robustness. The refined MES-16 now comprises 16 components categorized into five distinct sub-scales: self-acceptance, awareness, non-reactivity, routine, and conscious action.

Utilizing a Likert scale [28], the MES-16 prompts respondents to express their level of agreement with various statements related to mindful eating behaviors. A standard question within the MES-16 scale, for instance, involves assessing the degree of consciousness during eating habits, as indicated by the statement, "I eat something without really being aware of it". Respondents rate their agreement on a scale of 1 to 4, with the cumulative score ranging from 16 to 64. Higher scores on the MES-16 suggest a more pronounced tendency toward mindful eating practices [27].

This particular scale was chosen due to its alignment with the fundamental principles of mindfulness, specifically as they pertain to dietary habits [26]. The current study observed an acceptable internal consistency index (Cronbach's α) of 0.694 for the overall MES-16 scale.

2.2.2. Eating Disorder Examination Questionnaire Short (EDE-QS)

EDE-QS is a 12-item validated self-report instrument used for the assessment of eating disorder symptoms that derives from the 28-item Eating Disorder Examination (EDE-Q). The EDE-QS measures various facets of disordered eating behaviors such as dietary restraint, eating concerns, shape concerns, and weight concerns. Participants rate the frequency and severity of these behaviors over the preceding 7 days on a 4-point rating scale, with higher scores indicating a greater degree of pathology [29]. Example question: "How dissatisfied have you been with your weight or shape?".

Widely recognized and extensively utilized, the EDE-QS serves as a critical instrument for identifying individuals at risk of eating disorders, facilitating early intervention and tailored treatment strategies. Its standardized scoring methodology and multidimensional assessment approach contribute to a comprehensive understanding of eating disorder pathology, guiding clinicians and researchers in the effective management and study of these complex conditions [30]. In our study, this scale EDE-QS had a Cronbach's internal consistency index of $\alpha = 0.885$.

2.2.3. Depression Anxiety Stress Scale (DASS-21)

DASS-21 is a well-established self-report measure used to assess the severity of symptoms related to depression, anxiety, and stress. Comprising 21 items, the scale is divided into three sub-scales, each focusing on specific psychological constructs: depression, anxiety, and stress. Participants rate the frequency and intensity of their experiences over the past week on a 4-point Likert scale, with higher scores indicating a greater degree of symptom severity [31].

The DASS-21 employs a standardized scoring system that allows for the computation of individual sub-scale scores as well as a combined total score, providing a comprehensive evaluation of the participant's emotional well-being. It is widely recognized for its reliable and valid psychometric properties, making it an invaluable tool for both clinical and research purposes in the assessment and monitoring of mental health conditions [32]. Example question: "Over the past week, how often have you felt downhearted and blue?". Participants select a response on the 4-point scale, ranging from 0 (did not apply to me at all) to 3 (applied to me very much or most of the time).

Due to its robust assessment framework and sensitivity to changes in symptom severity, the DASS-21 serves as a critical instrument for identifying and evaluating individuals experiencing symptoms of depression, anxiety, and stress. Its systematic approach and comprehensive measurement contribute to a better understanding of psychological distress, facilitating targeted interventions and improved mental health outcomes [33]. The DASS-21 had an excellent internal consistency index (Cronbach's α) of $\alpha = 0.953$.

2.2.4. Orthorexia Nervosa Questionnaire-Revised (ORTO-R)

ORTO-R represents a revised version of the original ORTO-15 questionnaire tailored to assess orthorexia nervosa tendencies. Initially, the ORTO-15 consisted of 15 questions, each providing respondents with four Likert-scale response options (always, often, sometimes, and never), corresponding to scores ranging from 1 to 4. The original research publication introduced a diagnostic threshold of 35, obtained by summing individual item scores, to identify orthorexia nervosa [34].

In its updated format, ORTO-R retains six questions from the original version, now offering respondents five response options (never, rarely, sometimes, frequently, and always) for each question. Scoring for the ORTO-R questionnaire ranges from 1 to 30, with individual question scores varying between 1 and 5, based on the selected response. Unlike the earlier iteration, ORTO-R does not propose a specific threshold for diagnosing ON. Instead, the cumulative score is interpreted on a scale, indicating different degrees of inclination towards orthorexia nervosa tendencies [35]. The Cronbach's α of ORTO-R in the current study was $\alpha = 0.673$.

2.2.5. Demographics, Somatometrics, and Instagram Use

Demographic questions regarding participants' age group (e.g., 18–29 years), gender (female, male, non-binary), and highest education level acquired (e.g., Bachelor's degree), were included in the survey. To mitigate potential survey dropout rates [36], somatometric inquiries were strategically positioned at the conclusion of the survey. Participants were prompted to furnish their height and weight, enabling the calculation of their Body Mass Index (BMI). While acknowledging the limitations of relying on self-reported data for height and weight, this approach remains accepted for BMI computations in adult populations, particularly across diverse socio-demographic cohorts [37]. Following established protocols [38], individuals' BMI values were classified into distinct subcategories, such as underweight, normal weight, overweight, and obesity.

Instagram use was evaluated through two specific questions in this study. The first question was employed to establish the presence of an active Instagram account among participants. The second question focused on quantifying the average daily time dedicated to the platform. The inclusion of these questions was intended to offer valuable insights into participants' Instagram usage patterns and their potential influence on psychological well-being and dietary behaviors [39].

2.3. Empirical Results

A comprehensive examination of the data was undertaken to detect potential omissions. Instances where participants abruptly discontinued the questionnaire (Missing Completely at Random) led to the exclusion of the corresponding data from the analysis [40]. In cases of inadvertent oversights (Missing at Random), missing data points were substituted with the mean value derived from all respondents' answers.

The data were exported in a format compatible with import and processing in SPSS v28 and R-Statistics. R-Statistics was primarily utilized for data management, regularity checks, and the creation of boxplot figures. On the other hand, SPSS v28 served as the primary tool for conducting all other statistical tests performed during the analysis. This division allowed for comprehensive data management and specific graphical representation in R-Statistics, while SPSS v28 facilitated a wide array of statistical analyses. Established literature recommends conducting the regularity test before engaging in statistical analyses. To ensure the most accurate and reliable assessment of regularity, a combination of visual examination and the Shapiro-Wilk test was employed [41]. Thorough regularity testing was applied to the primary research variables. The results in multinomial logistic regression analysis were adjusted for possible confounders such as age and gender. The statistical significance level was set at $p < 0.05$.

3. Results

3.1. Subjects

The survey involved the participation of 548 individuals. Following the exclusion of 122 respondents who did not meet the survey's inclusion criteria and 19 cases with incomplete (answering less than 50% of the total questions) or random responses (questions answered in less than 3 min), the final sample comprised 407 adults, including 68.3% women, 31% men, and 0.7% non-binary. A predominant percentage of the participants (61.6%) fell within the age range of 18 to 29 years old. Women had statistically significant ($p < 0.05$) lower scores of MES-16 and higher scores of DASS-21, EDE-QS, and ORTO-R.

3.2. Correlations between MES-16, DASS-21, EDE-QS, and ORTO-R

To assess the correlation among MES-16, DASS-21, EDE-QS, and ORTO-R, Pearson's correlation coefficients were computed. Statistical analysis revealed a significant negative correlation of MES-16 with DASS-21, EDE-QS, and ORTO-R scores, as well as a significant positive inter-correlation between DASS-21, EDE-QS, and ORTO-R scores (Table 1).

Table 1. Pearson's correlations (r) between MES-16 (mindful eating), DASS-21 (depression, anxiety, stress), EDE-QS (eating disorders), and ORTO-R (orthorexia nervosa).

	MES-16	DASS-21	EDE-QS	ORTO-R
MES-16	1	−0.297 **	−0.513 **	−0.467 **
DASS-21	−0.297 **	1	0.459 **	0.422 **
EDE-QS	−0.513 **	0.459 **	1	0.620 **
ORTO-R	−0.467 **	0.422 **	0.620 **	1

** Correlation is significant at the $p < 0.001$ level.

3.3. The Association of Depression, Anxiety, and Stress with Mindful Eating and Eating Disorders

Pearson's correlation coefficients were used to further investigate the relationship between mindful eating, eating disorders, and the various elements of the DASS-21 scale as reflected through its subcategories of depression, anxiety, and stress. MES-16 had a statistically significant negative correlation with depression, anxiety, and stress scores (Table 2).

Table 2. Pearson's correlations between mindful eating, depression, anxiety, and stress.

	MES-16	Depression	Anxiety	Stress
MES-16	1	−0.292 **	−0.226 **	−0.300 **
Depression	−0.292 **	1	0.757 **	0.826 **
Anxiety	−0.226 **	0.757 **	1	0.779 **
Stress	−0.300 **	0.826 **	0.779 **	1

** Correlation is significant at the $p < 0.001$ level.

Eating disorders were significantly associated with depression, anxiety, and stress (Table 3). Among DASS-21 sub scales, stress had the strongest negative correlation with MES-16, and the strongest positive correlation with EDE-QS, followed by depression.

Table 3. Pearson's correlations between eating disorders, depression, anxiety, and stress.

	EDE-QS	Depression	Anxiety	Stress
EDE-QS	1	0.431 **	0.390 **	0.451 **
Depression	0.431 **	1	0.757 **	0.826 **
Anxiety	0.390 **	0.757 **	1	0.779 **
Stress	0.451 **	0.826 **	0.779 **	1

** Correlation is significant at the $p < 0.001$ level.

3.4. Mindful Eating, Eating Disorders, and Orthorexia Nervosa

One-way ANOVA testing indicated a statistically significant difference ($p < 0.05$) in the means of EDE-QS across different MES-16 categories (Figure 1).

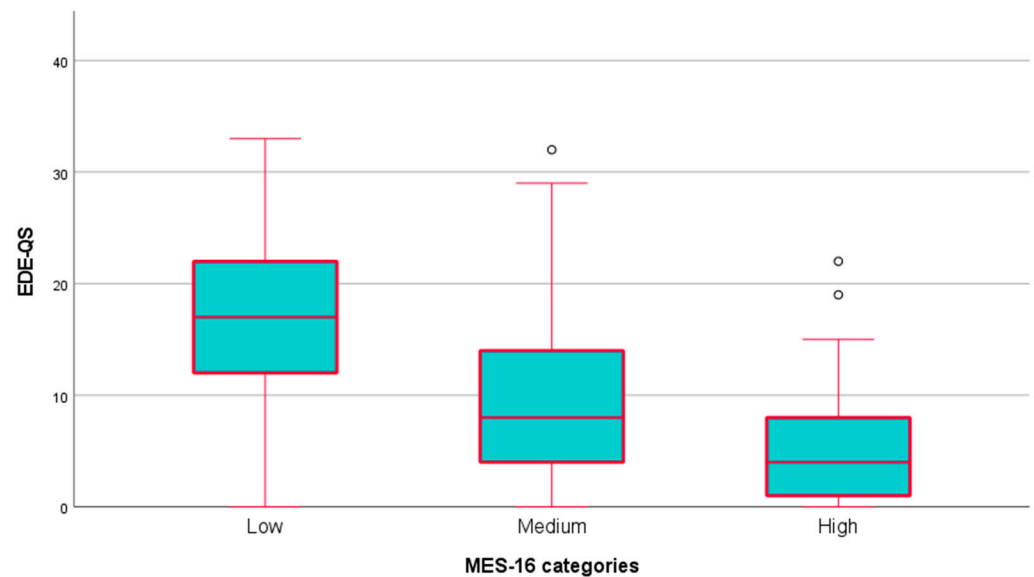


Figure 1. Boxplots displaying the difference in EDE-QS (eating disorders) scores across MES-16 (mindful eating) categories.

The same statistical test demonstrated a significant difference ($p < 0.05$) in the means of ORTO-R (orthorexia nervosa) across various MES-16 (mindful eating) categories (Figure 2).

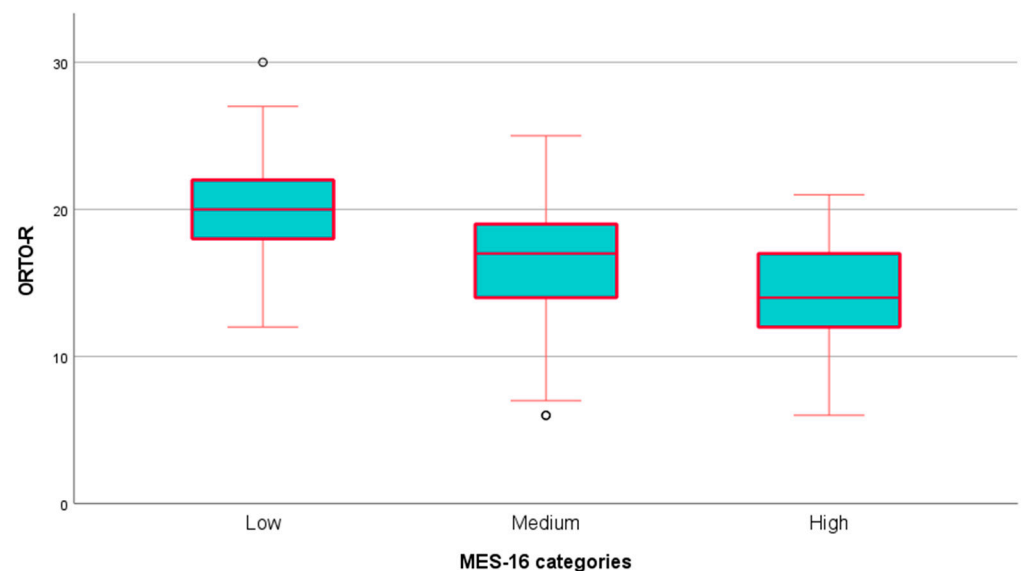


Figure 2. Boxplots displaying the difference in ORTO-R (orthorexia nervosa) scores across MES-16 (mindful eating) categories.

Multinomial logistic regression analysis identified MES-16 as a prognostic factor for having a low EDE-QS score (OR: 1.364, 95% CI: 1.263, 1.474, $p < 0.001$, compared to a high EDE-QS score) and having a low ORTO-R score (OR: 1.301, 95% CI: 1.208, 1.401, $p < 0.001$, compared to a high ORTO-R score).

3.5. Instagram Engagement, Depression, Anxiety, and Stress

Instagram emerged as a widely favored social media platform among the study participants. Specifically, 46.5% of the participants dedicated more than 3 h daily to Instagram, 35.2% allocated 1–3 h daily, and a mere 15.5% spent less than 1 h daily on the platform or were non-users of Instagram. There was a statistically significant difference between the means of depression ($p = 0.002$), anxiety ($p = 0.016$), and stress ($p = 0.002$) scores in various Instagram engagement categories (Figure 3).

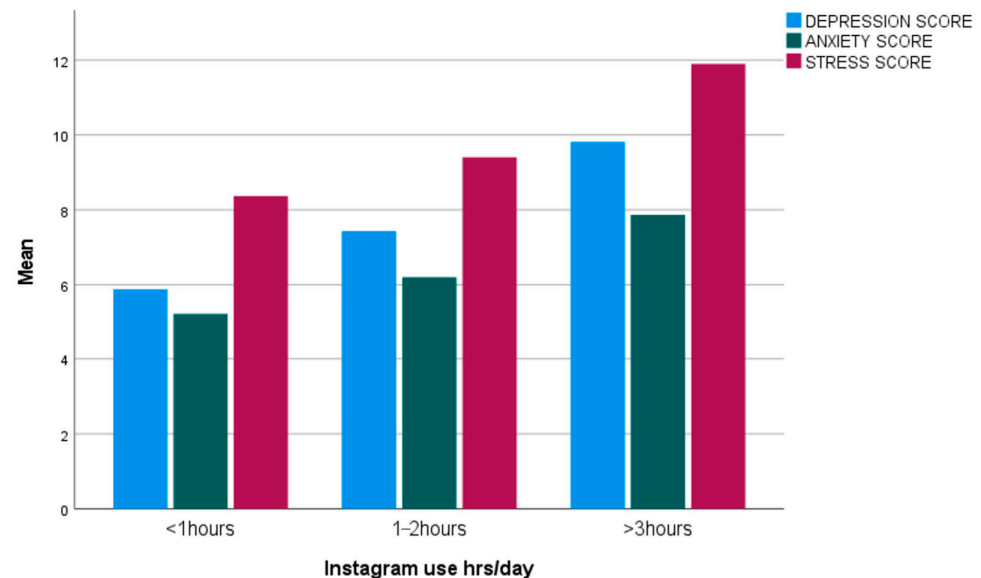


Figure 3. A clustered bar count graphic showing the difference in means of depression, anxiety, and stress scores based on daily Instagram engagement.

3.6. Instagram Engagement, Eating Disorders, and Anorexia Nervosa

The daily utilization of this social media platform did not have any statistical significance in relation to EDE-QS scores. On the contrary, there was a significant difference ($p < 0.05$) in the means of ORTO-R scores in different daily utilizations of Instagram (Figure 4).

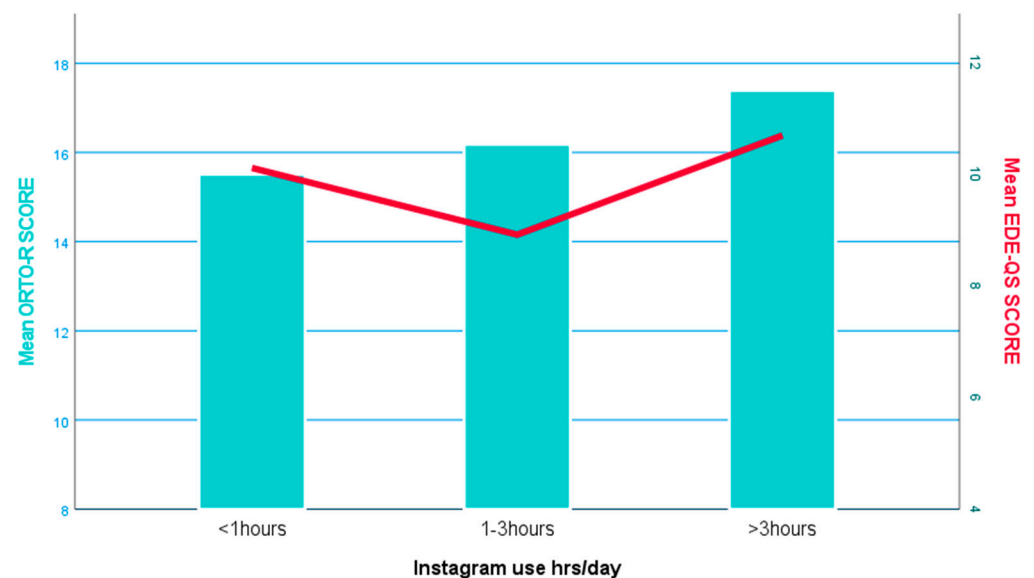


Figure 4. A dual Y-axis graphic showing the difference in means of ORTO-R (orthorexia nervosa) and EDE-QS (eating disorders) scores based on daily Instagram engagement.

Multinomial logistic regression analysis demonstrated that a one-unit increment in the ORTO-R score was associated with a 10% elevation in the odds of participants spending more than 3 h per day on Instagram (OR: 1.100, 95% CI: 1.023, 1.183, $p < 0.01$) in comparison to individuals spending less than an hour per day on the platform. Moreover, women exhibited nearly three times higher odds than men of engaging in Instagram usage for more than 3 h daily, after a one-point increase in the ORTO-R score (OR: 2.988, 95% CI: 1.628, 5.484, $p < 0.001$).

4. Discussion

This study represents the first known exploration of the intricate connections among mindful eating, Instagram usage, and eating disorders, with a specific focus on orthorexia nervosa, in the context of the Greek population. The significance of this research lies in its contribution to unraveling the complex web of psychological distress and disordered eating behaviors within the digital era, where the influence of social media, particularly Instagram, plays a pivotal role.

This study, involving 407 adults who met the study's inclusion and exclusion criteria, sheds light on the intricate relationships between mindful eating, psychological well-being, disordered eating, and orthorexia nervosa tendencies. Utilizing Pearson's correlation coefficients, this research quantitatively explores these connections.

Significantly, a negative correlation emerges between mindful eating and eating disorders suggesting a potential therapeutic role of mindful eating in mitigating disordered eating behaviors. Consistent with previous research [42], this finding implies that mindful eating is associated with a lower likelihood of engaging in problematic eating behaviors linked to various eating disorders.

The negative correlation between mindful eating and orthorexia nervosa is also notable, indicating that individuals practicing mindful eating are less likely to exhibit high orthorexia nervosa tendencies. This aligns with the conceptualization of mindful eating as fostering a nonrestrictive and compassionate approach to food, potentially mitigating the rigid dietary restrictions associated with orthorexia nervosa [43].

Moreover, this study reveals a significant positive inter-correlation among psychological distress, disordered eating, and orthorexia nervosa, emphasizing the complex connections between emotional turmoil, disordered eating, and orthorexia nervosa tendencies. This aligns with existing literature highlighting the multifaceted nature of eating disorders and their co-occurrence with psychological challenges [44]. The stringent dietary regulations seen in orthorexia nervosa contribute to heightened levels of depression, anxiety, and stress [45].

Pearson's correlation coefficients demonstrated a statistically significant negative association between mindful eating and depression, anxiety, and stress scores after categorizing DASS-21 [46]. Notably, eating disorders are strongly linked to depression, anxiety, and stress [47]. Stress emerges as a critical element, with a negative correlation with mindful eating and a positive correlation with eating disorders [48].

These findings emphasize the crucial role of stress and depression in the manifestation of eating disorders [49]. The strong negative correlation between stress and mindful eating suggests that mindful eating could serve as a potential mechanism to mitigate eating disorder symptoms [50]. Mindful eating practices may address stress and depression, fostering a more balanced and attuned relationship with food [51], and thereby contributing to the amelioration of disordered eating behaviors [52]. This underscores the importance of incorporating mindfulness-based interventions in comprehensive strategies targeting eating disorders [53].

The study participants overwhelmingly favored Instagram usage, with 46.5% spending more than 3 h daily on the platform. This extensive engagement with Instagram was associated with depression, anxiety, and stress. These findings underscore the impact of Instagram on psychological well-being, aligning with existing literature that highlights the platform's role in influencing mental health outcomes [54].

This study's focus on the relationship between Instagram engagement and eating disorders revealed intriguing results. While daily Instagram use did not show statistical significance concerning disordered eating, it did exhibit a noteworthy association with orthorexia nervosa tendencies, as indicated by the significant difference in means of ORTO-R scores based on daily Instagram engagement. This finding supports the growing body of research that links social media use, particularly on visually oriented platforms like Instagram, to the development of orthorexia nervosa [55].

Multinomial logistic regression analysis further elucidated the connection between Instagram usage and orthorexia nervosa tendencies. A one-unit increment in the ORTO-R score was associated with a 10% increase in the odds of spending more than 3 h per day on Instagram. Additionally, women showed nearly three times higher odds than men of engaging in extensive Instagram use if their ORTO-R score increased by one point. These results suggest a gender-specific association between orthorexia nervosa tendencies and increased Instagram usage, aligning with studies that emphasize the platform's role in shaping body image ideals and dietary norms, particularly for women [56].

The presented findings underscore the need for awareness campaigns and educational initiatives addressing the impact of specific social media platforms, like Instagram, on mental health and dietary behaviors. The association between Instagram use and orthorexia nervosa tendencies highlights the platform's potential role in perpetuating unrealistic body image paradigms and promoting disordered eating behaviors. Recognizing these associations is crucial for developing targeted interventions that address the nuanced connections between online engagement, mental well-being, and the development of eating disorders.

In the context of exploring the links between mindful eating, Instagram engagement, and eating disorders, particularly within the paradigm of orthorexia nervosa, practical recommendations for the general population, especially young individuals, are crucial. Encourage a balanced approach to nutrition, emphasizing the importance of varied whole foods while discouraging extreme dietary restrictions often associated with orthorexia nervosa. Stress the intricate relationship between nutrition and mental well-being, highlighting how a balanced diet can positively impact mental health. When it comes to Instagram engagement, promote awareness of the content being consumed, advising individuals to follow accounts promoting a healthy relationship with food and body image and to avoid those that may trigger disordered eating behaviors. Educate about the potential causes of nutritional problems, emphasizing societal pressures and the impact of misleading information on social media. Encourage seeking professional help for nutritional guidance and mental well-being, fostering a supportive environment for individuals grappling with the challenges associated with orthorexia nervosa.

Limitations

This study, while providing valuable insights, is not without limitations. The cross-sectional design limits the establishment of causality, and the reliance on self-reported data introduces potential biases. Future longitudinal studies and objective measures could enhance the robustness of the findings. Additionally, this study's sample predominantly comprised young adults, potentially limiting the generalizability of the results to other age groups.

Using an online questionnaire for data collection introduces challenges related to non-probability sampling. In response to these challenges, this survey implemented various strategies such as incorporating open-ended questions (e.g., for height and weight), conducting timing checks (excluding surveys lasting less than 4 min), and utilizing consistency checks with follow-up questions. Non-probability sampling tends to limit the ability to generalize findings to the broader population. To mitigate this limitation, purposive and quota sampling methods were employed, involving carefully defined criteria for inclusion and exclusion. Participants who met specific prerequisites were included in this study, while those who did not meet these predetermined conditions were excluded. This ap-

proach was suggested to standardize the sample and address the limitations associated with non-probability sampling [57].

5. Conclusions

This study's findings strongly support the suggested links between mindful eating, Instagram activity, and orthorexia nervosa. We have observed that mindful eating has a notable correlation with lower levels of depression, anxiety, stress, and disordered eating behaviors. It seems to act as a predictor for reduced tendencies towards both eating disorders and orthorexia nervosa. As mindful eating levels increase, instances of disordered eating and orthorexia nervosa tendencies decrease.

Furthermore, our study uncovered that in Greece, the widespread usage of Instagram, especially high engagement rates, is linked to heightened levels of depression, anxiety, and stress. Additionally, increased involvement with Instagram corresponds to higher tendencies toward orthorexia nervosa, especially among women.

To further solidify and expand upon these discoveries, future research might consider delving into randomized control trials. This approach could build upon the current cross-sectional design, providing deeper insights into the causal relationships between mindful eating, Instagram usage patterns, and mental health outcomes. Additionally, exploring these associations across diverse cultural contexts could offer valuable insights into the universality or cultural specificity of these relationships.

Moreover, investigating the long-term effects of interventions promoting mindful eating or targeted interventions aiming to modify Instagram usage habits might be a promising avenue for future research. Understanding the potential effectiveness of such interventions could provide valuable guidance for mental health and eating disorder interventions in today's digitally interconnected society.

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