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## Orthorexic Tendency in Light of Eating Disorder Attitudes, Social Media Addiction and Regular Sporting Among Young Hungarian Women

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### ABSTRACT

This study examined a set of background psychological and other variables of orthorexic (ON) tendency in a sample of young women with special interest in healthy lifestyle. The sample consisted of female young adults ( $N=310$ ; aged 18–35 years; mean age = 24.3 years;  $SD = 4.97$  years) who were recruited through social media health sites. Besides Orthorexia Nervosa Questionnaire (ORTO-15), BMI, regular sporting activity, the following scales were used: Eating Disorder Inventory (EDI, drive for thinness, ineffectiveness and maturity fears); Bergen Social Media Addiction Scale (BSMAS); and The Proactive Coping Inventory. In this sample, 37.7% were at risk for ON. Eating disorder attitudes, regular sporting and social media addiction were the most relevant predictors of orthorexic tendency with drive for thinness being the strongest contributor ( $\beta=0.54$ ,  $p<0.001$ ). For young women with a special interest in healthy lifestyle, drive for thinness together with regular sporting, ON tendency may serve as a tool for achieving their goal. Social media addiction and other psychological problems (feeling of ineffectiveness or maturity fears) can also contribute to orthorexic tendency. It would be important to ask for support from qualified health professionals when changing nutritional practices.

### Introduction

Disordered eating patterns are common among young women, especially in Western countries, due to robust cultural pressures for a thin body as a symbol of female beauty (Saunders & Eaton, 2018). Beyond the most common eating disorders like anorexia, bulimia or binge eating disorder, orthorexia nervosa (ON) has come to the fore as an eating-related problem. First identified by Bratman and Knight (2000), the term derives from the Greek word 'orthos', meaning correct, and describes an eating style characterized by an obsession with 'proper' nutrition, e.g. 'clean eating' or 'pure foods' (Mac Evilly, 2001). While healthy eating is an important aspect of a health-promoting lifestyle, individuals with ON are so obsessive about healthy eating that their behavior becomes pathological.

Despite the pathological nature of ON, there are debates as to whether it is an eating disorder, a psychological condition, a mental disorder, or a subset of another disorder (Costa et al., 2017). It is not included in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition—Revised (DSM-5 TR), but it is still recognized by many experts and researchers as a disorder which can be part of Avoidant/Restrictive Food Intake Disorder (ARFID) (Ryman et al., 2019). Indeed, there are a number of features meeting the criteria for behavioral addictions, such as obsessional

preoccupation with and concerns about proper eating, feeling guilty when eating unhealthy food, and neglecting friends who do not follow similar eating patterns (Morozé et al., 2015). Several other negative consequences may also occur, for example, health problems due to unbalanced diet or malnutrition, and impairments in the fields of social, academic or occupational functioning (Morozé et al., 2015; Varga et al., 2013).

On the other hand, it has been argued that ON is only a medicalization of eating behaviors amplifying 'healthism' which can be called 'nutritionism' overemphasizing the moral categories of good and bad in terms of eating (Arguedas, 2020). Mac Evilly (2001) states that ON is more a risk factor for disordered eating. Recently, several researchers suggest to differentiate between Orthorexia Nervosa (ON) as a disordered eating behavior with clinical impairment and 'healthy orthorexia' as a non-pathological interest in healthy eating (Zickgraf & Barrada, 2022). Even in terms of ON, however, rather than describing ON symptoms as disordered, we should call the behaviors of concern 'orthorexic tendencies' or 'orthorexic behavior' without a valid clinical diagnosis (Missbach et al., 2015) to avoid the trap of pathologizing healthy eating (Heiss et al., 2019). Thus, in our analysis, we use the term 'orthorexic tendency' which shows a drive to follow a healthy diet to the extreme but not necessary a pathological behavior. Actually, these individuals may be at risk for pathological ON,

but their involvement in ON has not been justified without a clinical diagnosis.

The estimated prevalence of orthorexic behavior varies greatly from 6.9% in the general population to 75.2% in certain groups, such as artists, athletes or health care professionals (Niedzielski & Kaźmierczak-Wojtaś, 2021). Social media users are particularly at risk, with for example, up to 49% of Instagram users exhibiting ON behaviors (Turner & Lefevre, 2017).

Media (and social media in particular) play an important role in forming our body-related attitudes, food preferences, and eating habits (Hawkins et al., 2020, Piko et al., 2022). Social media addiction was found to be related to body dissatisfaction and higher eating disorder risk (Cohen & Blaszczynski, 2015). In a study, orthorexic tendency was higher among social media addicts than non-addict individuals (Yilmazel, 2021). This is not surprising, given that via social comparison, social networking sites play important roles in the internalization of beauty ideals, body image formation, weight satisfaction, and even self-identity (Martinac Dorčić et al., 2023; Saunders & Eaton, 2018).

Although studies explored mixed results on gender differences in ON tendencies, there may be diverse motivation structure for men and women, e.g. body image concepts and psychological correlates (Anastasiades & Argyrides, 2023). Within student populations female students with ON showed not only a greater interest, but also a greater preoccupation with weight and body image concerns and appearance in general than those without ON in health orientation (Brytek-Matera et al., 2015). Among male students body image concerns were not related to preoccupation with healthy eating. Other researchers also reported a lack of gender difference (McComb & Mills, 2019), with some findings on different patterns of underlying motivations. For women, ideals of thinness and a consequent body dissatisfaction seem important, while for men these motivations are less relevant (Novara et al., 2022). For men, muscularity concerns and exercise dependence are more strongly associated with orthorexic behavior (White et al., 2020).

In a German study investigating health behavior and well-being, there were no differences in Body Mass Index (BMI) between ON and non-ON participants. In addition, in this study, gender, age, educational background or weight category did not play a role in distribution of ON tendencies in the general population (Strahler et al., 2018). In contrast, dieting concerns as well as overweight preoccupation were predictors of Polish university students' ON behavior (Brytek-Matera et al., 2015). Besides dieting, it is closely connected with physical activity: ON tendency is more common among athletes (Rudolph, 2018).

Exploring psychological correlates of ON tendency has a great priority since they provide a good base for both prevention and therapeutic interventions. Among the few studies investigating personality traits, narcissism and perfectionism were found to be positively correlated with ON symptomatology (Oberle et al., 2017). Besides perfectionism, impulsiveness was also found as a correlate (Parra-Fernández et al., 2018). Another study reported that ON was associated with negative affectivity, detachment, disinhibition, and psychoticism (Roncero et al., 2021). Other researchers, e.g. Kiss-Leizer and

Rigó (2019) revealed that high harm avoidance and low self-directedness were important factors in ON. These findings suggest that people with ON may have problems with emotion regulation and behavior control.

The role of self-esteem in ON is still an object of debate. Self-esteem as an overall sense of self-worth or personal value may serve as a protection against disordered eating (Voica et al., 2021). However, results about the role of self-worth in ON are controversial. Striving for a perfect diet can elevate feelings of self-worth (Musolino et al., 2015). Some studies did not find a relationship between low self-esteem and ON tendency (Brytek-Matera et al., 2022; McComb & Mills, 2019). Other studies found the opposite, namely, a feeling of ineffectiveness and low level of self-esteem could contribute to ON. For example, in a Hungarian study, lack of self-esteem predicted ON (Bóna et al., 2021). Similarly, a Turkish study found a relationship between anxiety, low self-esteem, and orthorexia (Yilmaz & Dundar, 2022).

A systematic review of the literature identified the following main risk factors for ON: perfectionism, obsessive-compulsive traits, psychopathology, disordered eating, history of an eating disorder, dieting, poor body image, and drive for thinness (McComb & Mills, 2019). Gender and self-esteem were found to be unrelated to ON, and the reviewed studies reported contradicting findings for age, socioeconomic status, BMI, belonging to a health-related field, exercise engagement, vegetarianism/veganism, body dissatisfaction, and alcohol, tobacco, and drug use.

In addition to these personality factors and attitudes, there are potential contributors about which we know little. For example, ON can be serving as a way of coping to enhance autonomy and competence (Barthels et al., 2017). Positive cognitive coping, such as proactive coping, seems to contribute to avoidance of disordered eating (Kelly et al., 2012). Proactive coping (a future-oriented self-regulatory skill using coping resources as goal management) was found to be associated with eating behavior through intention and planning (Zhou et al., 2013). In contrast, difficulties of coping with becoming an adult, i.e. maturity fears can act as a risk factor for disordered eating (Astudillo & Meza, 2013; Fitzgerald et al., 2021). As a previous study pointed out, female university students' greater disturbed eating might also be attributed to their aging anxiety (Mahoney, 2018). These fears and anxieties are not all about changes in appearance but also psychological challenges.

The reviewed literature suggests that we should further investigate whether there are other psychological variables contributing to orthorexic tendency, and clarify predictors whose role has been unclear. Therefore, besides BMI, in this study we included the following psychological variables: social media addiction, coping (namely, proactive coping), and three subscales of the Eating Disorder Inventory (EDI): drive for thinness, ineffectiveness (i.e. lack of self-esteem) and maturity fears. In a study of university students a positive correlation was found between the prevalence of ON and drive for thinness, ineffectiveness and maturity fears, each of which is measured by the EDI (Parra-Fernández et al., 2018).

Although there are ample controversies and criticism about its psychological/medical significance, orthorexia is

the focus of more recent scientific interest. However, we still do not know with any certainty its contributors, risk or protective factors. Due to different ON motivations between genders (Novara et al., 2022), we decided to include only a female sample. Therefore, the aim of this paper is to report on orthorexic tendency in a sample of Hungarian female young adults. More specifically, we focused on young women with special interest in a healthy lifestyle, in the hope of accessing a relatively high prevalence of orthorexic tendency. This study will provide further information about some background variables a) which are not yet or scarcely studied and b) that need further evidence, namely, drive for thinness, ineffectiveness (i.e. lack of self-esteem) and maturity fears, BMI, social media addiction, and proactive coping.

## Method

### Participants and procedure

Survey participants were recruited via an online questionnaire between May and July 2022. The public link was shared on special Internet communication platforms (i.e. Facebook groups dedicated to healthy lifestyle, more precisely, 8 groups). The purpose of this sharing was to disseminate the questionnaire among those who are especially interested in healthy lifestyle, such as healthy eating. In addition, only female members were invited in the survey. We focused on young women with special interest in a healthy lifestyle, in the hope of accessing those with a relatively high motivation to engage in healthy food choice. Since being Hungarian was part of the inclusion criteria (besides being a female), only Hungarian online platforms were chosen. Participation was voluntary and confidential, and participant's informed consent was obtained. The study plan was approved by the Institutional Review Board of the Doctoral School of Education, University of Szeged (No. 6/2021), in accordance with the Helsinki Declaration. The convenience sample that was obtained, consisted of female young adults ( $N=310$ ; aged 18–35 years; mean age = 24.3 years;  $SD = 4.97$  years). Since our sample is not a representative but a convenience sample, the number of total population is unknown. During the two-month-period, altogether 310 voluntary participants filled in the online questionnaire. We applied the sample size calculator computing the minimum sample size to meet the desired statistical constraints, and our sample size proved acceptable with 95% CI and 5.5% margin of error. Most participants lived in urban areas (32.6% in the capital, Budapest and 54.2% in other town, 13.2% in villages); 41.6% reported having a college or university degree, 53.9% had a General Certificate of Education, i.e. high school level, and only 4.5% less; most of them considered themselves middle class (64.2%) or upper-middle class (22.6%).

### Measures

The ORTO-15 scale was developed by Donini et al. (2005) to detect obsession with and intention to healthy eating. The scale consists of 15 questions on eating behaviors like “Do you think your mood affects your eating behavior?” or “When eating, do

you pay attention to the calories of the food?”. It has been validated in a number of languages, among others, Hungarian (Varga et al., 2014). The measurement was based on Bratman's ON model (Bratman & Knight, 2000). The response format was based on frequency of behaviors (always, often, sometimes and never), and converted to scores of 1 to 4 respectively. Total scores could vary between 15 and 60, with lower scores indicating higher risk of ON. Since there are debates about the valid cutoff scores (Atchison & Zickgraf, 2022; Heiss et al., 2019; Niedzielski & Kaźmierczak-Wojtaś, 2021), two cutoff scores may be applied. Originally, a high risk of ON is based on a cutoff score below or equal to 40 scores (Rogoza & Donini, 2021). However, a cutoff at  $< 35$  has been found to provide a more accurate estimate of ON tendency (Abdullah et al., 2020; Ramacciotti et al., 2011). The reliability index (Cronbach alpha) was 0.80 with this sample.

Three subscales of the Eating Disorder Inventory (EDI: Garner et al., 1983) were chosen to measure drive for thinness (7 items with 1 reversed, e.g. “I am terrified of gaining weight”), ineffectiveness (10 items with 4 reversed, e.g. “I wish I were someone else”) and maturity fears (8 items with 3 reversed, e.g. “The demands of adulthood are too great”). We included these subscales to map the role of these factors in orthorexic tendency. The original inventory, consisting of 64 items and eight subscales, was adapted and validated to the Hungarian populations (Túry et al., 1997). A 6-point response scale ranges from 1 (always) to 6 (never). Our subscales had good internal reliability with the following Cronbach's alphas: 0.93 (drive for thinness), 0.89 (ineffectiveness), and 0.81 (maturity fears).

The Hungarian validated form of the 6-item Bergen Social Media Addiction Scale (BSMAS) was applied to measure problematic social media use (Bányai et al., 2017). This scale assesses the use of social media over the past 12 months (e.g. “You spend a lot of time thinking about social media or planning how to use it”). Participants responded on a 5-point scale (from never = 1 to always = 5). Higher total scores reflect higher levels of social media addiction. The Cronbach's alpha coefficient was 0.83 in our sample.

The Proactive Coping Inventory includes 14 items (with three reversed items) characterizing a coping skill which prepares for potential stressors to manage them successfully (Greenglass, 1998). We used the Hungarian validated and adapted version (Almássy et al., 2014). Participants indicated how strongly they agreed with each statement (e.g. “I try to pinpoint what I need to do to succeed”) from 1 (= not at all true) to 4 (completely true). The total scores, after reverse scoring the three items mentioned above, indicate higher skill levels of proactive coping. The inventory was reliable with a Cronbach value = 0.87.

Finally, we asked the participants about their sporting behavior during the past several months (0=no or only occasionally, 1=yes, regularly). Based on their self-reported height and weight we also calculated Body Mass Index (BMI).

### Statistical analysis

SPSS for MS Windows Release 22.0 was used to analyze the data, with a maximum significance level set at 0.05. The



analysis started with calculating prevalence of ON risk and descriptive statistics for study variables by group categorization based on their ON risk status. Bivariate relationships between the study variables were examined using Pearson correlation coefficients. Finally, multiple linear regression analysis was applied to detect associations between dependent variables (BMI, eating disorder attitudes, social media addiction, proactive coping and sporting) and the independent variable (ON score).

## Results

### Mean score for and prevalence of ON tendency

The participants' ORTO-15 test mean score was  $37.81 \pm 6.74$  (with a range of 23-57). Applying the cutoff score 40: 64.8% of the sample would be allocated to the ON risk group, however, the prevalence was reasonable lower and more accurate when the cutoff score 35 was applied: 37.7%.

### Group differences based on ON risk

Table 1 presents descriptive statistics (Mean, SD) for study variables by group categorization (ON risk group,  $n=117$ ; Non-risk group,  $n=193$ ). ON risk was defined on the base of the cutoff score above 35 and controls below. Student's *t*-tests were used for detecting statistically significant differences between these groups. Significant group differences were found for all variables. Those from the ON risk group scored significantly higher on the following scales: EDI drive for thinness subscale [ $t(310) = 14.18, p < 0.001$ ], EDI ineffectiveness subscale [ $t(310) = 7.24, p < 0.001$ ] and EDI maturity fears subscale [ $t(310) = 5.64, p < 0.001$ ]. In addition, they reported significantly higher levels of BMI [ $t(310) = 3.45, p < 0.01$ ] and social media addiction scale [ $t(310) = 4.03, p < 0.001$ ]. Even though more of them were engaged in regular sports [ $\chi^2(3, N=310) = 19.70, p < 0.001$ ], they reported lower levels of self-esteem [ $t(310) = -4.78, p < 0.001$ ] and proactive coping skill [ $t(310) = -3.67, p < 0.001$ ] than the group not at risk for ON. Based on Cohen's *d* values, the

effect sizes ranged from small ( $d=0.40$ ) to large ( $d=1.82$ ) in one case.

### Zero-order correlation for study variables

Table 2 presents correlation matrix for study variables. ON scores were positively correlated with BMI [ $r(310) = 0.18, p < 0.01$ ], EDI\_drive for thinness [ $r(310) = 0.71, p < 0.001$ ], EDI\_ineffectiveness [ $r(310) = 0.53, p < 0.001$ ], EDI\_maturity fears [ $r(310) = 0.41, p < 0.001$ ], social media addiction [ $r(310) = 0.30, p < 0.001$ ] and regular sporting [ $r(310) = 0.22, p < 0.001$ ]. They were negatively correlated with proactive coping [ $r(310) = -0.27, p < 0.001$ ]. Social media addiction was also significantly correlated with the included subscales of EDI, but these coefficients were smaller than those with the ORTO scale. The correlation between social media addiction and proactive coping [ $r(310) = -0.30, p < 0.01$ ] was negative. It is also worth mentioning that regular sporting behavior was positively associated with EDI\_drive for thinness [ $r(310) = 0.17, p < 0.01$ ] and proactive coping as well [ $r(310) = 0.15, p < 0.01$ ].

### Predictors of on tendency using multiple linear regression analysis

Table 3 displays results for multiple linear regression estimates of the ORTO-15 score (ON tendency). Among eating disorder attitudes, drive for thinness showed the strongest contribution to ON tendency ( $\beta=0.54, p < 0.001$ ). In addition, feeling of ineffectiveness ( $\beta=0.11, p < 0.05$ ) and maturity fears ( $\beta=0.09, p < 0.05$ ) were also positively associated with the ORTO-15 score. Besides, social media addiction ( $\beta=0.13, p < 0.05$ ) and regular sporting ( $\beta=0.13, p < 0.01$ ) were significant predictors. Finally, proactive coping and BMI did not prove to be significant contributors. All these variables explained approximately 57% of the total variation in ORTO-15 score. The reliability of the models was further examined with VIF (Variance Inflation Factor) indices and tolerance values. The VIF values were all within acceptable range (below 2).

**Table 1.** Descriptive statistics (Mean, SD) for study variables by group categorization ( $N=310$ ).

Variables	Groups	Mean $\pm$ SD	<sup>a</sup> t-value <sup>a</sup> (Cohen's <i>d</i> )
Body Mass Index (range: 12.7-44.6)	ON risk group	23.12 $\pm$ 4.57	$t=3.45$ (0.41)
	Non-risk group	21.45 $\pm$ 3.57	$p < 0.01$
EDI_drive for thinness (range: 7-42)	ON risk group	28.53 $\pm$ 9.12	$t=14.18$ (1.82)
	Non-risk group	14.69 $\pm$ 5.65	$p < 0.001$
EDI_ineffectiveness (range: 8-46)	ON risk group	26.03 $\pm$ 8.68	$t=7.24$ (0.71)
	Non-risk group	20.34 $\pm$ 7.26	$p < 0.001$
EDI_maturity fears (range: 8-48)	ON risk group	27.15 $\pm$ 8.13	$t=5.64$ (0.47)
	Non-risk group	23.58 $\pm$ 6.89	$p < 0.001$
Social media addiction (range: 6- 30)	ON risk group	14.35 $\pm$ 5.45	$t=4.03$ (0.40)
	Non-risk group	12.88 $\pm$ 5.07	$p < 0.001$
Proactive coping (range: 16-56)	ON risk group	40.85 $\pm$ 7.48	$t=-3.67$ (0.42)
	Non-risk group	43.71 $\pm$ 6.20	$p < 0.001$
	Groups	%	Pearson $\chi^2$
Regular sporting (45.2%)	ON risk group	57.3	<sup>b</sup> $\chi^2 = 11.12$
	Non-risk group	37.8	$p < 0.001$

Note.

<sup>a</sup>Student *t*-test.

<sup>b</sup>Chi-square test. Group categorization was based on a cut-off score  $< 35$  (ON risk group,  $n=117$ ; Non-risk group,  $n=193$ ).

**Table 2.** Pearson correlations for association between the study variables ( $N=310$ ).

	1	2	3	4	5	6	7	8
1. Orthorexic (ON) tendency	–	0.18*	0.71**	0.53**	0.41**	0.30**	–0.27**	0.22**
2. Body Mass Index (BMI)	–	–	0.21**	0.16*	0.04	0.05	–0.04	–0.10
3. EDI_drive for thinness	–	–	–	0.60**	0.39**	0.22**	–0.25**	0.17*
4. EDI_ineffectiveness	–	–	–	–	0.55**	0.17*	–0.33**	0.07
5. EDI_maturity fears	–	–	–	–	–	0.17*	–0.29**	0.08
6. Social media addiction	–	–	–	–	–	–	–0.30**	0.01
7. Proactive coping	–	–	–	–	–	–	–	0.15*
8. Regular sporting	–	–	–	–	–	–	–	–

Note. Correlation coefficients ( $r$ ).

\* $p < 0.01$ .

\*\* $p < 0.001$ .

**Table 3.** Multiple linear regression results with enter method for ON tendency among female young adults ( $N=310$ ).

Variables	B	SE	$\beta$	<sup>a</sup> Tolerance	<sup>a</sup> VIF
Body Mass Index	0.08	0.06	0.05	0.93	1.08
Eating disorder attitudes					
EDI_drive for thinness	0.42	0.04	0.54***	0.59	1.68
EDI_ineffectiveness	0.12	0.06	0.11*	0.51	1.94
EDI_maturity fears	0.11	0.06	0.09*	0.68	1.48
Psychological variables					
Social media addiction	0.16	0.05	0.13*	0.89	1.13
Proactive coping	–0.05	0.04	–0.05	0.78	1.28
Regular sporting	1.77	0.54	0.13**	0.91	1.10
Constant	16.44***				
$R^2$	0.57***				
F value	56.96***				

\* $p < 0.05$ .

\*\* $p < 0.01$ .

\*\*\* $p < 0.001$ ; one-tailed t-test.

Note. B=Unstandardized regression coefficient, SE=Standard Error,  $\beta$  = standardized regression coefficients.

<sup>a</sup>Collinearity statistics (VIF=Variance Inflation Factor).

## Discussion

The present study examined the role of drive for thinness, ineffectiveness, maturity fears (as eating disorder attitudes), social media addiction, proactive coping, regular sporting activity and BMI in ON tendency, among a sample of Hungarian young women who were especially interested in healthy lifestyle. Using an online survey, we put special emphasis on investigating correlates of orthorexic tendency without pathologizing it. The novelty of our paper is the inclusion of psychological factors that have been scarcely or not yet explored, or have shown contradictory results (McComb & Mills, 2019). To the best of our knowledge, this is the first study investigating these associations in the Hungarian population. In the final model of multiple regression analysis, we found that all the included eating disorder attitudes (drive for thinness, ineffectiveness and maturity fears), regular sporting activity and social media addiction proved to be relevant predictors of these women's ON tendency, with drive for thinness being the strongest contributor. While BMI (positively) and proactive coping (negatively) were correlated with the ORTO-15 score, these became non-significant in the multivariate analysis.

The participants' ORTO-15 test average ( $37.81 \pm 6.74$ ) was slightly lower and the SD higher than those in a sample of healthy dietitian nutritionists ( $42.1 \pm 1.9$ ) in the United States (Tremmel et al. 2017), and the average score of Turkish university faculty members ( $41.0 \pm 2.6$ ) (Yilmaz & Dunder, 2022). The prevalence of ON risk was approximately 38%

which seems plausible due to the participants' interest in healthy diet and healthy lifestyle in general.

Our findings suggest that drive for thinness may serve as a strong motivation to follow a healthy diet. This result is similar to previous findings (Brytek-Matera et al., 2015; Parra-Fernández et al., 2018). Ideals of thinness and consequent body dissatisfaction are in particular focus of females' self-concept (Brytek-Matera et al., 2015; Novara et al., 2022; Saunders & Eaton, 2018).

Our results also show that BMI was positively correlated with ON tendency. In other studies, however, it has not been so evident (Strahler et al., 2018). In multivariate analysis, BMI became nonsignificant in our study. This finding underlines that not necessarily the objective value of BMI but its subjective evaluation may contribute to body dissatisfaction and decisions about eating practices. Our finding on the positive association of BMI with drive for thinness and ineffectiveness suggests that evaluation of BMI can lead to dissatisfaction which may provide an effort to reach thinness (Piko et al., 2022). In addition, those who were more passionately engaged in eating healthy food were also more prone to take physical activity regularly. Previous studies also reported that there was a close association between being physically active and ON tendencies, for example, among female athletes (Rudolph, 2018). Overall, different aspects of health behavior often overlap, such as diet control, sport and avoidance of harmful habits and form a concept of healthy lifestyle in which drive for thinness can play a decisive role.

By way of definition, ON is based on obsession rather than a controlling behavior (Bratman & Knight, 2000; Moroze et al., 2015; Ryman et al., 2019). Not surprisingly, in our study there was a relationship between ON tendency and social media addiction. Other studies also found a higher occurrence of ON among those who overused social media compared to the average population (Turner & Lefevre, 2017). Social networking sites can strengthen attitudes toward healthy lifestyle, showing pictures of healthy and ideal (thin) bodies or giving advice on slimming and health practices (Saunders & Eaton, 2018). Social media addiction also contains the element of obsession, e.g. feeling an urge to use social media more and more, or trying to cut down on the use of social media without success (Bányai et al., 2017; Piko et al., 2022). All these findings suggest that ON tendency can be viewed as a type of behavioral addiction.

These findings suggest that orthorexic tendencies may often go together with other psychological or social

problems; in this case, psychological help could be necessary. The negative correlation with proactive coping or the positive association with maturity fears and ineffectiveness support the presence of psychological problems behind the orthorexic symptoms. Previous studies reported ambiguous results regarding self-concept: while in several studies lower self-esteem predicted ON (Bóna et al., 2021; Yilmaz & Dundar, 2022), in another study ON was not related to self-esteem (Brytek-Matera et al., 2022). Feeling control over our body, either in sports or diet, can enhance self-worth and self-esteem (Musolino et al., 2015); however, only longitudinal studies can justify this cause-and-effect relationship. Therefore, in a cross-sectional study it seemed more plausible that instead of self-esteem we applied a measurement of ineffectiveness as an eating disorder attitude (Garner et al., 1983).

Another study found a relationship between anxiety and orthorexia (Barthels et al., 2017). This suggests that psychological health problems, such as dissatisfaction, anxiety or depression, can contribute to ON that needs to be explored to get a real picture. Our findings support that maturity fears, a special type of anxiety, may also contribute to the development of orthorexic tendencies. Previous studies indicated that maturity fears predicted anorexia (Astudillo & Meza, 2013) and bulimia (Fitzgerald et al., 2021), suggesting that this type of anxiety might provide a novel approach to disordered eating. Maturity fears represent a lower engagement in adult roles and responsibility; regarding diet control and drive for thinness it may also reflect an attempt to maintain a youthful appearance (Fitzgerald et al., 2021). This variable has received little attention in the field of eating disorders; this finding suggests that it should receive more.

The negative correlation between proactive coping and ON tendency also supports the assumption of a connection of orthorexic tendency and psychological problems. We chose proactive coping (a future-oriented self-regulatory skill using coping resources as goal management, see Greenglass, 1998), since it was found to be associated with eating behavior through intention and planning (Zhou et al., 2013). Thus, we anticipated that it would play a role in ON tendency. In multivariate analysis proactive coping did not remain significant, that is, its role was less important than social media addiction, regular sporting and drive for thinness.

The strength of this study was the inclusion of psychological variables which have been scarcely or not entirely explored in relation to ON tendencies. Although studies on ON are increasing, there are several controversies and criticism around this concept and its measurements. This is particularly true in Hungary where research on ON is still a novelty. A second strength was that we analyzed the relationship of ON tendency with psychological background variables without pathologizing ON symptoms which can be useful in prevention of eating disorders. However, we should also note some limitations here. The cross-sectional study design does not allow us to infer cause-and effect relationships. Further, due to the specific cultural context, the generalizability of our findings may be limited across cultures. Norms and beliefs among women regarding desired body habitus and body image differ across cultures, and we should take this into account when interpreting research results on

disordered eating. Finally, we have applied a scale for measuring social media addiction in general and not addiction to a given social media platform (e.g. Instagram or TikTok); a more specific addiction scale would be a better choice to explore its role in ON. In future studies more psychological variables could be included, e.g. coping strategies, anxiety or depression. While we included only females in our sample, future studies could include males as well in order to map sex differences in predictors of ON tendencies. Future studies should also be focused on coping strategies of those with elevated orthorexic tendency (e.g. stress management, social support, adaptive vs. inadaptive coping). We should also include other psychological variables, such as mental health (anxiety, depression, life satisfaction).

## Conclusion

Overall, our findings suggest that for young women with a special interest in healthy lifestyle, drive for thinness together with regular sporting, ON tendency may be serving as a behavior for achieving their goal. In addition, they are more prone to social media addiction which together with other psychological health problems (such as a feeling of ineffectiveness or maturity fears) may also contribute to ON tendency. We really think that orthorexic tendency cannot be diagnosed as a medical disorder without using diagnostic criteria from the Diagnostic and Statistical Manual 5-TR. However, identification of ON tendencies may be used to identify those individuals predisposed to develop eating disorders in certain cases. Namely, ON behavior can act as a risk factor for disordered eating and eating disorders, together with other psychological problems. As a practical implication, it would be really useful to provide more information on social media platform to the public audience on the risks of ON in relation to healthy lifestyle to avoid eating disorders. Finally, it would be also important to ask for support from nutritionists or diet specialists as well as health psychologists or mental health nurses in order to follow a healthy diet with setting realistic goals when adjusting nutritional practices focusing on weight reduction.

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