

Master Thesis

Positive Clinical Psychology and Technology

University of Twente

*Exploring the Relationship between Social Media Use, Orthorexia Nervosa, Body Image
Dissatisfaction and Gender*

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19.02.2023

Abstract

Background. Orthorexia Nervosa (ON) is characterised as an obsession concerning nutrition and high-quality food. Generally, healthy lifestyle choices have gained more importance over the past decade, which can also be seen on social media. Since prior research found that social media use can be linked to a negative perception of one's body, as well as to eating disorders, the aim of this research is to gain a better understanding of the association between social media use and ON. Furthermore, the current study investigates the role of gender differences in the severity of ON and the use of social media since there are differential findings in research. Additionally, a moderating role of gender and body image dissatisfaction (BID) on the relationship between social media use and ON is assumed, which is tested in the current study.

Method. This cross-sectional research is based on a convenience sample of 242 university students. The research consists of an online questionnaire, including the Düsseldorf Orthorexia Scale (DOS), the Body Dissatisfaction subscale of the Eating Disorder Inventory 2 (EDI-2) and a questionnaire regarding social media use. To test the relationship between social media use and ON, a Linear Regression Analysis is done. Additionally, Moderation Analyses are conducted to test the moderating effect of BID and gender on the relationship between social media use and ON. Moreover, social media use and ON severity are compared between genders using an independent samples t-test.

Results and discussion. The current results revealed that the ON severity is significantly higher in females than in male individuals. Furthermore, no significant relationships were found between social media use and ON and for the moderating effect of gender and BID. Lastly, the study did not reveal any significant results on gender differences in social media use.

Conclusion. The present study revealed interesting results regarding gender differences in ON prevalence. Since counter-exceptional results were obtained for the remaining research questions, the current findings demonstrate the need for further research on the predisposing factors of ON.

Keywords: social media use, orthorexia nervosa, body image dissatisfaction, gender differences, university students, cross-sectional study

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Exploring the Relationship between Social Media Use, Orthorexia Nervosa, Body Image and Gender

A solid body of literature indicates that healthy nutrition is related to a high quality of life (Barr & Schumacher, 2003). Nevertheless, a prolonged and constant preoccupation with having a healthy lifestyle may facilitate the development of mental health conditions such as Orthorexia Nervosa (ON), explained as an obsession with consuming healthy foods (Costa et al., 2017; Koven & Abry, 2015).

In the past decade, more emphasis has been placed on healthy lifestyles and eating choices, which can also be observed on different media channels. Social media is one of the resources on which nutrition, fitness and a healthy lifestyle are emphasised (Turner & Lefevre, 2017). Research showed that social media exposure and its excessive use might precipitate the development of eating disorders, body dysmorphia, and body image dissatisfaction (Ryding & Kuss, 2020). Considering the growing interest in ON, the aim of this study is to examine the relationship between social media use and ON and to understand how this is influenced by body image dissatisfaction, as well as by gender. Additionally, this study aims at gaining a better understanding of gender differences in the use of social media and the severity of ON.

Orthorexia Nervosa

The term Orthorexia Nervosa, stems from Greek, meaning “correct appetite” and it has first been used by Steven Bratman in 1997 (Dunn & Bratman, 2016). There are no clear-cut diagnostic criteria for ON, as it is not yet classified as a psychiatric disorder (Ryman et al., 2019) according to the Fifth Edition of the Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 2013). However, ON is commonly defined as an obsession with the consumption of healthy and high-quality food, as well as the experience of anxiety about the possible effects of certain foods on health and the avoidance of food groups due to health reasons (Turner & Lefevre, 2017).

Also, ON is characterised by spending an excessive amount of time on planning and preparing meals that are classified as being health-promoting (Costa et al., 2017). Additionally, to consider that individuals are affected by ON, the above-mentioned criteria must negatively affect the individual and their overall well-being (Cheshire et al., 2020). There are differential findings regarding the prevalence rates of ON. Dunn et al. (2016) found that less than 1% of a

sample consisting of US college students were affected by ON. Contrary, Gubiec et al. (2015) found that in a sample of Polish Dietary students, nearly 60% of the participants were suffering from ON.

Since individuals with ON show high levels of anxiety regarding the consumption of foods that are believed to have detrimental health effects and are deemed unhealthy, they avoid certain food groups (Donini et al., 2004). Individuals with ON usually refrain from consuming processed foods or artificial ingredients, as well as meals containing sugar or fats (Koven & Abry, 2015). Therefore, their diet is often based on whole foods considered 'clean', with some individuals even limiting their diet to raw foods (Dell'Osso et al., 2016). Unlike eating disorders, where the focus lies on the amount of food consumed, individuals affected by ON obsess over the consumption of high-quality foods (Moroze et al., 2015). As a result of these dietary rules, individuals commonly avoid eating meals prepared by others due to a lack of knowledge about the ingredients and the food preparation (Sánchez & Rial, 2005).

ON is usually associated with a high need for control regarding eating schedules and food options. Individuals affected by it have specific rules and internalised guidelines by which they judge certain foods (Cheshire et al., 2020). Individuals with ON usually follow a strict diet consisting of unprocessed foods like fruits and vegetables, and therefore they can experience malnutrition and weight loss (Koven & Abry, 2015). However, weight loss is not considered a goal that leads individuals to develop these eating habits, but this diet's initial aim is to feel healthy (McComb & Mills, 2019). Another common component in the development of ON is the desire to prevent physical diseases or to gain a higher sense of control over life (Costa et al., 2017). Costa et al. (2017) suggested that the development of ON can also be caused by the wish to belong to a group of individuals with the same dietary habits and beliefs.

Adherence to their strict diet can feel like an achievement for individuals affected by ON (Dunn & Bratman, 2016). However, they often experience negative feelings like remorse after indulging in foods that are not considered as healthy (Hayes et al., 2017). Common risks associated with these dietary habits are isolation from social relations and an unhealthy focus on eating, leading to the neglect of other areas of life and low overall quality of life (Oberle et al., 2017).

There has been an ongoing discussion on the categorisation of ON as a psychiatric disorder, due to its similarities with several other mental health conditions (Bartel et al., 2020). There are various overlaps between ON and Anorexia Nervosa (AN), namely the experience of anxiety, as well as the desire to have a high level of control (Koven & Senbonmatsu, 2013). Similarly to individuals with AN, individuals affected by ON commonly experience feelings of accomplishment when adhering to their eating rules and attribute this to their high levels of self-discipline (Varga et al., 2013). Furthermore, there are several similarities between the symptoms of ON and those of Obsessive-Compulsive Disorder (OCD), namely the experience of obsessive-compulsive thoughts and behaviours (Bartel et al., 2020). These usually evolve around food planning, preparation and measurement of ingredients in ON, and the time spent on these activities inhibits individuals in their daily activities (Koven & Senbonmatsu, 2013).

Regarding the prevalence rates of ON, there are also inconsistent results concerning gender differences (Oberle et al., 2017). Research by Strahler (2019) showed that ON is slightly more common in women. However, she also states that differences in the ON prevalence between men and women vary strongly based on the questionnaire used to assess ON (Strahler, 2019). These large differences regarding gender rates in ON indicate the need for further research. Hence, this study aims at investigating the role of gender in ON to gain a better understanding of its relationship.

Body image dissatisfaction

Slade (1988) defined body image as “the picture we have in our minds of the size, shape and form of our bodies; and to our feelings concerning these characteristics and our constituent body parts” (p. 497). Individuals who are dissatisfied with their body image have a negative attitude towards their body, especially regarding their size, physique and skin colour (Purton et al., 2019). Body image dissatisfaction (BID) is a multidimensional construct with a perceptual component, which describes how we perceive our physical appearance, weight and physique. Secondly, the evaluative component of our body image defines how we experience these features and how these emotions in turn impact behaviour (Mills et al., 2017).

A high BID was found to be a major determinant for developing eating and weight-related concerns, as well as eating disorders (Bucchianeri et al., 2013). BID also implies a disparity between how their body looks and how individuals want their idealised body to look

(Purton et al., 2019). Another component in developing BID may be the constant exposure to the thin beauty ideal prevalent in society (Hawkins et al., 2004). This can lead to the belief that individuals must fulfil these unrealistic beauty standards to be considered beautiful (Mills et al., 2017). Additionally, studies have indicated that BID may precipitate psychological distress, including low self-esteem and depressive symptoms (Purton et al., 2019).

Research regarding gender differences in BID found that it can be frequently observed in women but is also becoming increasingly prevalent in men (Pater et al., 2019). The current body of literature on body image focuses predominately on female individuals, and there are many differential findings regarding men's body image (Grogan & Richards, 2002). According to Muth and Cash (1997), women generally aim to have a thin body, compared to men, who often want a stronger and more athletic body. This is in line with the ideal beauty standard of men, which views a strong upper body with wide shoulders as the ideal body type (Furnham et al., 2002). Furthermore, research found that BID in women is usually associated with the perception of being overweight (Brennan et al., 2010). Compared to that, BID in men often arises from lacking muscularity (Brennan et al., 2010).

Social media use

A strong focus on body image is often found in social media, which has become increasingly common over the past years (Boulianne, 2015). Hence, it is essential to understand how social media exposure affects individuals' body image. Since social media may be identified as one of the facilitators of the development of eating disorders (Morris & Katzman, 2003), it is also essential to investigate how social media use is related to ON.

Media sources like television, movies and newspapers significantly impact the development of beauty standards (Mills et al., 2017). Nowadays, social media is the primary media source used by young people (Shehata, 2016). On social media channels like Instagram, TikTok and Facebook, the content is mainly presented in the form of images and videos focused on beauty and body image (Tiggemann & Zaccardo, 2015). Consistent exposure to image-based content based on beauty and health may predict dissatisfaction with physical appearance (Turner & Lefevre, 2017). Moreover, it can lead to developing a body image based on the idealised beauty standard promoted on social media (Franchina & Lo Coco, 2018). Additionally, using platforms like Instagram, to a great extent, can result in an unhealthy comparison to peers and

influencers, as people on social media platforms often show flawless and unrealistic pictures of themselves (Tiggemann & Zaccardo, 2015).

Many social media platforms promote content on fitness and healthy eating habits that are believed to have health benefits and promote well-being. These accounts often share images of flawless bodies and exercises and diets that are promoted as the pathway to reaching these idealised body images (Marks et al., 2020). Studies found that social media exposure leads to concerns about the own body, as well as to developing an unhealthy perception of one's physical appearance and to mental distress (Marks et al., 2020). Moreover, it was found that 49% of individuals who followed social media pages that promoted healthy food showed symptoms of ON (Turner & Lefevre, 2017).

Research showed that men underestimate the impact social media has on their body image to a great extent and that media does impact the way men perceive their own appearance (Green & Pritchard, 2003). Moreover, higher exposure to image-based content was found to be related to poor body satisfaction in men (Lonergan et al., 2020). However, Twenge & Martin (2020) found that high social media usage was more frequently related to low mental well-being in females than in males.

Objective of this study

Although ON has been extensively researched in the past, the causes of ON are still not completely understood. Especially exposure to social media has been linked to ON in previous research, indicating that social media use is associated with ON (Turner & Lefevre, 2017). Considering the increasing use of social media, which is especially prevalent in the age range of the participants of this research (Atske, 2022), this study could provide important insights into how social media exposure is related to ON. Therefore, the aim of this study is to test these findings, assuming that high social media use is associated with higher ON severity.

Since prior research indicated that differences between male and female social media use can be observed, this study is investigating gender disparities in the use of social media platforms. Research by Chae (2017) indicated that overall, women spend more time on social media than men. Because prior research found a relationship between social media use and ON (Turner & Lefevre, 2017), it is expected that women are also at higher risk of being affected by ON.

Since there are inconsistent findings regarding gender differences in ON in previous research, this study aims at gaining a better understanding of how gender impacts ON. There are differential findings indicating that there are either no differences in ON prevalence between genders (Depa et al., 2016) or that there are higher prevalence rates in women (Sanlier et al., 2016). Additionally, since there is a generally higher prevalence of eating disorders in women compared to men (Striegel-Moore et al., 2009), this study aims at testing the hypothesis that women have higher ON severity compared to men.

Prior research indicated that gender differences could be observed in the use of social media (Alnjadat et al., 2019) and in the severity of ON (Strahler, 2019). Hence, it is assumed that gender moderates the relationship between social media and ON. Moreover, body image dissatisfaction has not been investigated in previous research in the context of ON and social media use. Research by Pater et al. (2019) found that women show higher levels of body image dissatisfaction compared to men and women are more commonly affected by eating disorders (Spettigue & Henderson, 2004). Since high BID was found to be associated with social media use and ON, a moderating role of BID on the relationship between social media use and ON was assumed.

Based on the previously mentioned aspects, the following research questions have been proposed:

RQ1: Is there a relationship between social media use and orthorexia nervosa?

RQ2: Are there significant differences in social media use between genders?

RQ3: Are there significant differences in the severity of ON between genders?

RQ4: Does gender moderate the relationship between social media use and orthorexia nervosa?

RQ5: Does body image dissatisfaction moderate the relationship between social media use and orthorexia nervosa?

Based on these research questions, the following hypotheses have been proposed:

H1: There is a positive relationship between social media use and orthorexia nervosa.

H2: Female individuals have a significantly higher social media use than males.

H3: The severity of ON is significantly higher in female individuals than in males.

H4: Gender moderates the relationship between social media use and orthorexia nervosa.

H5: Body image dissatisfaction moderates the relationship between social media use and orthorexia nervosa.

Figure 1

Moderation model RQ1

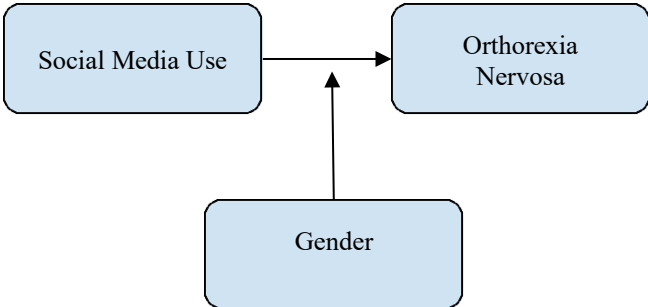
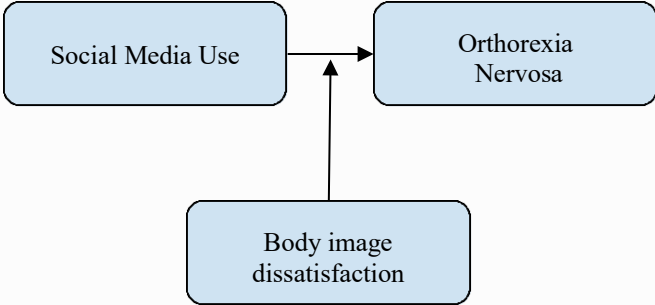


Figure 2

Moderation model RQ2



Methods

Study Design & Procedure

This study was based on a quantitative cross-sectional study design, and it was part of a larger research project, which was conducted by several researchers at the University of Twente in 2021. For the data analysis of this research, the already existing data from the study in 2021 has been used, which was collected by using an online survey. A convenience sampling method

was employed, and participants were recruited through the personal contacts of the researchers, as well as through social media and SONA systems, which is an online experiment management system for participant recruitment. The online survey study was conducted with the use of the software Qualtrics.

Prior to the start of the data collection, Ethical Approval was granted by the Ethical Committee of the Behavioural, Management and Social Sciences of the University of Twente. At the beginning of the online survey, participants were informed about the purpose of the study, and informed consent was obtained (Appendix A). Additionally, they were informed about the possibility of withdrawing from the study at any time, as well as the anonymous nature of the research and the duration of the study (10-20 minutes). Then, the participants were asked to answer the demographic questions, as well as the questions about their social media use and their mental health history (Appendix B). This was followed by the questionnaires regarding BID and ON. At the end of the survey, the participants were thanked for their participation, and the mail contact of one researcher was shown for any further questions or remarks.

Participants

Inclusion criteria consisted of being enrolled in a university program, being between the age of 18-34 years old, and English proficiency was necessary to fill out the questionnaire. Another criterion for participation was having at least one active social media account. In total, 334 participants took part in the online survey. Several participants had to be left out of the data analysis due to missing data in the questionnaires/not completing it (n=84) and giving unrealistic answers (e.g. using SNS for 86 hours daily) (n=2). Another exclusion criterion was not giving informed consent (n=4) and not having an active SNS account (n=2).

In the final data analysis, 242 participants were included, and 76% identified as female, 22% as male and 2% as non-binary/third gender (see Table 1). Regarding nationality, 59% of the participants were German, 12% were Dutch, and 9% were Latvian. The majority of the participants (60%) indicated that they are currently Bachelor students, 32.6% were hogeschool students, 6.2% were Master students, and 0.8% of the participants were in a PhD programme. Regarding their mental health history, 25.2% of the participants indicated that they had received psychological/pharmacological treatment in the past, and 14.9% of the participants had been

diagnosed with a mental health condition before. The most common diagnoses were depression (n=16), eating disorders (n=7) and anxiety (n=8).

Materials

Socio-Demographic Data

A socio-demographic questionnaire with nine questions was included in the survey to gain insights into the age, gender identity, nationality, educational level, weight and height (BMI) of the participants. The Body Mass Index (BMI) was then calculated based on the following formula, $BMI = \text{weight (kg)} / \text{height (m)}^2$ (World Health Organization, WHO, 2022). To assess the mental health history of the participants, they were asked to indicate whether they received any psychological/pharmacological treatment in the past and whether they have been diagnosed with a mental health condition in the past. These questions were “Yes/No questions”, and afterwards, the participants were given the opportunity to specify which treatment/diagnoses they received.

Time spent on Social Media

To assess the daily social media use of the participants, the participants were asked whether they have at least one active social media account. Furthermore, they were asked to indicate how much time they spent daily on one of the following social media channels, namely Instagram, Facebook, Twitter, Snapchat, YouTube, and TikTok.

Orthorexia-Related Concerns

To assess orthorexia-related concerns in the study population, the English version of the Düsseldorf Orthorexia Scale (DOS) was used in the survey (Chard et al., 2018). The questionnaire consists of 10 items (e.g. “I feel upset after eating unhealthy foods”), which are measured on a four-point Likert scale ranging from (1) “this does not apply to me” to (4) “this applies to me” (Appendix D). There are two versions of the DOS, namely a 10-item short version and a 21-item version. However, in the current study, the short form of the questionnaire was used.

A higher score on the DOS indicates that individuals show a higher tendency towards experiencing orthorexia-related concerns. The maximum score on this scale is 40, with a cut-off point of ≥ 30 , which indicates that individuals are affected by ON (Barthels & Pietrowsky, 2012). Furthermore, scores between 25-29 suggest that individuals are at risk of experiencing

ON-related concerns. The questionnaire was found to have high internal consistency, with a Cronbach's alpha of .88 for the English version and a high test-retest reliability ($r=.67-.79$, $p=.001$) (Chard et al., 2018). In the current study, internal consistency was good, with a Cronbach's alpha of .84.

Body Image Dissatisfaction

To draw inferences about the level of body image (dis-)satisfaction of the target population, the Body Dissatisfaction (BD) subscale of the questionnaire Eating Disorder Inventory 2 (EDI-2) was included in the survey (Thiel, 1997). The questionnaire consists of nine items that are measured on a six-point Likert scale ranging from (1) "never" to (6) "always". Example items of the scale are "I think that my stomach is too big" and "I feel satisfied with the shape of my body". An overview of all items is provided in Appendix C. The negatively framed items, namely items 3, 4, 5, 7 and 9, are reversed coded before analysing the data. To calculate the questionnaire score, a sum score was calculated, and the maximum score that can be reached is 54 (Clausen et al., 2012). Scores that are ≥ 15 indicate that individuals experience BID. This subscale of the EDI-2 has a good internal consistency ($\alpha = .83$) (Clausen et al., 2012), which was validated in the current study ($\alpha = .90$).

Statistical Analysis

The obtained data was downloaded from Qualtrics and analysed with the statistical software IBM SPSS (Version 27). Firstly, the BMI was calculated from the "height" and "weight" of the participants and the categories "underweight", "healthy weight", "overweight", and "obese" were created for this variable based on the suggestions by the WHO (World Health Organization, WHO, 2022). The variable categories that have been created for ON are "no ON" (10-24), "at risk of ON" (25-29) and "ON" (30-40), based on the cut-off scores (Chard et al., 2018). Additionally, the variable BID was categorised into "no BID" (0-14) and "BID tendency" (15-54). Lastly, another categorical variable was created for the time spent on SNS, namely "low to medium" and "high", based on a cut-off score of 3 hours. This cut-off score is derived from previous research by Hunt et al. (2021), which determined low SNS usage as 0.5-2 hours daily.

Additionally, descriptive statistics were used to compute the socio-demographic data of the sample. For this, the mean item scores, as well as the minimum and maximum scores and the standard deviations, were computed for the continuous variables. Moreover, the frequencies of

the variables mental health treatment and diagnoses have been calculated. Furthermore, the total scores for ON, BID, social media use and BMI have been calculated. The normal distribution of the obtained data was tested using Normality graphs in SPSS.

Then, the Pearson correlation coefficient was computed for all variables to assess the correlations between them. To answer the first RQ, a Linear Regression Analysis has been performed to assess the relationship between social media use and orthorexia nervosa. To answer the second RQ, an independent samples t-test was conducted, which compared social media use between genders. Additionally, another independent samples t-test has been used to compare the ON scores between genders to answer the third RQ.

Furthermore, to draw inferences about the moderation effect of gender on the relationship between social media use and ON, a Moderation Analysis was carried out. For this, the statistical program PROCESS macro was used (Hayes, 2017). To answer this fourth research question, a Moderation Analysis was conducted with social media use as the independent variable, ON as the dependent and gender as the moderating variable. Additionally, to answer the last research question, another Moderation Analysis was conducted to investigate the moderating effect of BID on the relationship between social media use and ON, with social media use as the independent variable, ON as the dependent and BID as the moderating variable.

Results

Description of the study group

Table 1

Sociodemographic data (N=242)

Variable	<i>n</i>	Percentage	<i>M</i>	<i>SD</i>	Min.	Max.
Gender Identity						
Female	185	76.4				
Male	53	21.9				
Non-binary/third gender	4	1.7				
Nationality						
Dutch	30	12.4				
German	142	58.7				
Other	70	28.9				
BMI Category						
Healthy Weight	185	76.4				
Overweight	32	13.2				
Obese	6	2.5				
Psychological or Pharmacological treatment in the past						

Yes	61	25.2				
No	181	74.8				
Mental health diagnosis in the past						
Yes	36	14.9				
No	206	85.1				
Age (years)			21.4	2.5	18	34

Table 2

Means and Standard deviations of the Düsseldorf Orthorexia Scale, Body Dissatisfaction Subscale of the Questionnaire EDI-2 and the Questionnaire measuring Social Media Use (N= 242)

	<i>n</i>	Min.	Max.	<i>M</i>	<i>SD</i>
Orthorexia nervosa Total	242	10	34	18,8	5,65
ON	13	5.4			
At risk	27	11.2			
No ON	202	83.5			
Female				19.43	5.85
Male				16.92	4.37

Social media use Total	242	0.16	10	3.12	1.48
Low social media duration	98	40.5			
High social media duration	144	59.5			
Female				3.17	1.44
Male				2.8	1.29
Body image dissatisfaction	242	9	54	27.57	9.94

Correlations between the main variables

In Table 3 below, the correlations between the main variables are presented. Pearson's Correlation Coefficient was used to assess whether social media use and ON correlate, indicating no significant correlation between the two variables ($r(240) = -.087, p = .177$). A low significant positive correlation was found between social media use and gender ($r(240) = .152, p = .018$) and between ON and gender ($r(240) = .141, p = .029$). Additionally, a low positive correlation was found between BID and social media use ($r(240) = .13, p = .04$) and between BID and gender ($r(240) = .29, p < .001$). Furthermore, a positive relationship was found between BID and ON ($r(240) = .31, p < .001$).

Table 3
Correlation Matrix

Variables	1	2	3	4	5	6	7	8	9
1 Age	1								
2 Gender	-,25**	1							
3 Education	,29**	,02	1						
4 BMI	,04	-,10	,02	1					
5 Social media use	-,25**	,15*	-,06	,01	1				
6 Psychological/ Pharmacological treatment	-,01	-,18**	,03	-,22**	-,10	1			
7 Mental health diagnosis	,02	-,08	,02	-,27**	-,16*	,66**	1		
8 ON	-,00	,14*	,07	-,04	-,08	-,07	-,06	1	
9 BID	-,05	,29**	,04	,40**	,13*	-,25**	-,22**	,31**	1

*. Correlation is significant at the 0.05 level (2-tailed) **. Correlation is significant at the 0.01 level (2-tailed)

Main findings

Association between social media use and ON

The Linear Regression Analysis showed no significant relationship between social media use and ON, $F(1,240) = 1.83, p = .177$, which indicates that social media use does not have a significant impact on ON. Moreover, the $R^2 = .008$ depicts that the model explains 0.8% of the variance in ON.

Comparison of social media use between genders

An independent samples t-test was conducted to compare social media use in female and male participants. There was no significant difference found in social media use for female ($M=3.17, SD=1.44$) and male ($M=2.80, SD=1.29$) participants; $t(236) = -1.70, p = .09$.

Comparison of the ON severity between genders

An independent samples t-test was conducted to compare ON severity between female and male participants. There was a significant difference found between the ON severity of female ($M=19.43, SD=5.85$) and male participants ($M=16.92, SD=4.37$); $t(236) = -2.89, p = .004$.

Moderation effect of gender on the relationship between social media use and ON

To answer the fourth RQ, a PROCESS macro analysis by Andrew Hayes was conducted to test the moderation effect of gender on the relationship between social media use and ON. The results reveal no significant moderating impact of gender on the relationship between social media use and ON ($b = -0.778, t = -1.65, p = 0.09$) (Table 4).

Moderation effect of BID on the relationship between social media use and ON

To answer the first fifth RQ, a PROCESS macro analysis by Andrew Hayes was run to test whether BID moderates the relationship between social media use and ON. The results reveal no significant moderating impact of BID on the relationship between social media use and ON ($b = -0.020, t = -0.825, p = .410$) (Table 5).

Table 4
Results of the Moderation Analysis between Social Media Use, Gender & ON

	Coefficient	Std. Err.	<i>t</i>	<i>p</i>	Lower Bound	Upper Bound
Constant	12.00	3.15	3.80	.00	5.78	18.22
SNS	1.07	.93	1.14	.25	-.77	2.92
Gender	4.38	1.65	2.65	.00	1.13	7.64
Intercept	-.77	.47	-1.65	.09	-1.70	.14

Table 5
Results of the Moderation Analysis between Social Media Use, BID & ON

	Coefficient	Std. Err.	<i>t</i>	<i>p</i>	Lower Bound	Upper Bound
Constant	13.62	2.21	6.14	.00	9.25	17.99
SNS	.00	.65	.01	.99	-1.28	1.29
BID	.25	.08	2.96	.00	.08	.41
Intercept	-.02	.02	-.82	.41	-.06	.02

Discussion

The purpose of this study was to gain a better understanding of the relationship between social media use and ON. Additionally, the study assessed gender differences in social media use and the severity of ON. Lastly, the research aimed at gaining a better understanding of the moderating effect of gender and body image dissatisfaction on the relationship between social media use and ON, which was tested using a Moderation Analysis.

General Discussion

There are five key findings of this research. Firstly, a positive relationship between social media use and ON was assumed, which was tested in the current study. The results of the research do not support the hypothesis that social media use is positively related to ON. Hence, the first hypothesis cannot be accepted. Whereas past research has found that social media use may be related to ON (Cheshire et al., 2020), the present study did not confirm these results. A

possible explanation for the results of the current research may be the lack of differentiation between the social media platforms that were used. Whereas other studies merely focused on Instagram or Facebook use (Turner & Lefevre, 2017), this study did not distinguish between the different platforms that have been used, as there were no questions concerning this included in the questionnaire. This could be especially important since research by Turner & Lefevre (2017) showed that only one social media platform was related to ON, namely Instagram.

Furthermore, other underlying factors might influence the relationship between social media use and ON. For example, the presence of psychological concerns in the past might explain the results of the present study. Since 25% of the participants indicated that they received psychological or pharmacological treatment in the past and 15% have been diagnosed with a mental health condition, this might have impacted the current research findings. According to research, those who have previously struggled with psychological issues are more likely to develop eating disorders. (Sanlier et al., 2016). Additionally, Velden (2019) found that exposure to social media could not be identified as a predisposing factor for low mental well-being anymore after ruling out underlying factors, including the mental health history of the participants (van der Velden et al., 2019).

Another interpretation of these results could be that the effect of social media use on ON might depend to a greater extent on the sort of content viewed than on the amount of time spent online (Marino, 2018). Marks et al. (2020) also mentioned this aspect in their research, explaining this with different interaction styles on social media. They found that social media use is more detrimental to mental health for individuals who mainly consume content from influencers rather than engaging with friends on social media, leading to unhealthy comparisons (Marks et al., 2020). According to the current research findings this may imply that the study participants interacted with friends more frequently on social media, which might lead to fewer negative effects on mental health. Additionally, as mentioned in the introduction, nearly half of the individuals who actively follow social media channels related to nutrition experience ON (Turner & Lefevre, 2017). These findings indicate a need for further research, which focuses on the content viewed by social media users.

Regarding the second hypothesis, which states that females use social media to a greater extent than males, no supporting evidence was found in the given study. Therefore, the second

hypothesis needs to be rejected. Past research, which aligns with this finding, found that addiction to social media platforms occurred more frequently in males than in females (Alnjadat et al., 2019). Additionally, Krasnova et al. (2017) found that women use social media to connect to their social environment, whereas men use social networking sites mainly for informational purposes.

Furthermore, the results of the present study support the hypothesis that the severity of ON is significantly higher in females than in males. Based on this, the third hypothesis can be accepted. This finding is in line with the common body of literature, which indicates that an unhealthy fixation on healthy eating is more severe in female individuals (Strahler, 2019). Interestingly, Strahler (2019) also found that men and women generally put equal emphasis on healthy nutrition, even though gender differences in the severity of ON exist. According to Oberle et al. (2017), mixed results regarding gender differences in ON can be found across research, indicating only slight differences in the severity between genders. Even though eating disorders are still more prevalent in women, research has shown that the prevalence of eating disorders in men is steadily increasing (Agliata & Tantleff-Dunn, 2004).

Moreover, the study did not find supporting evidence for the hypothesis that gender moderates the relationship between social media use and ON. Hence, the fourth hypothesis needs to be rejected. A possible explanation for this finding may be differences in how women and men are affected by the content consumed on social media. Svensson et al. (2022) found that social media use was more commonly related to poor mental well-being in female individuals than in males. Moreover, female and male individuals who excessively use social media were found to be twice as likely to experience psychological problems compared to individuals who spend less time on social media (Twenge & Martin, 2020). Another explanation might be differences in how individuals are affected by the content on social media, which could be attributed to individual differences rather than gender differences.

Lastly, the results of this research do not support the hypothesis that BID moderates the relationship between social media use and ON, leading to a rejection of the fifth hypothesis. This is not in line with the common body of literature, as BID was found to be related to social media use (Marks et al., 2020) and the development of eating disorders (Derenne & Beresin, 2006). Especially, since a negative body image was found to be associated with the development of ON

symptoms (Messer et al., 2022), a moderating effect of BID was expected. According to research by Fardouly, Willburger, & Vartanian (2017), low body image satisfaction is related to the use of social media channels based on images. However, in the current study, we did not classify which social media channel was used. Since several social media sites do not rely on image-based content but rather use text-based content, this might be a potential explanation for the current findings.

Study Strengths & Limitations

Several strengths of the current study can be identified, namely the good psychometric properties of the DOS (Chard et al., 2018) and the EDI-2 (Clausen et al., 2012), which were also confirmed in the current study. Additionally, the present study had a high sample size ($n=242$) and included participants from a broad range of countries. There are several potential limitations concerning the results of this study. Firstly, one limitation of the current study may be the unequal gender division among the sample since there were significantly more female than male participants. Therefore, the sample may not be representative of the aim of the research, as it was interested in gender differences. Additionally, the current study involved individuals between the age of 18-34, which is a relatively broad age range. Also, the younger participants of the sample may use different social media channels compared to the participants who belong to the older age group. A report on social media use in 2021 showed that Snapchat, Instagram and TikTok are used significantly more by individuals between the age of 18-24, than by older individuals (Atske, 2022).

Another limitation of the current research may be the questionnaire, which was included to assess the social media use of the participants. Since the questions have been created by the researchers, the validity and reliability have not been tested before, which may account for the current results. Furthermore, a possible study limitation could be the study population of this research. As the study was based solely on university students, other populations were not considered. Especially, since unhealthy eating patterns were commonly observed in research on university students (Tao et al., 2022), it could be essential to use a larger and more representative sample to draw inferences about ON severity.

Future Research Recommendations

Several limitations of this study could be addressed in future research. For example, it may be interesting to conduct further research which differentiates between the social media platforms used by the participants. This could lead to a better understanding of how social media use differs between certain platforms like Instagram, Tiktok and Facebook and how this relates to BID and ON. In terms of future research, it would be useful to extend the current results by examining the different social media content consumed by individuals to gain a better understanding of how fitness or health content impacts individuals compared to content unrelated to beauty or health ideals. Additionally, further research, which compares “body positivity content” and “fitspiration” content, could be conducted to test the effect of this on the severity of ON.

Moreover, it could be of interest to test possible age differences in the use of social media. Especially since there was a significant Pearson’s correlation between age and social media use, this might be interesting to further investigate. Another recommendation for future research may be the inclusion of third-gender identities in the comparison of gender differences. As the current study employed binary gender measurement and only focused on the difference between male and female individuals, other gender identities were not considered in RQ2 and RQ3. Especially, since individuals who belong to a gender minority are more commonly affected by eating disorders than cisgender individuals, this could be of interest (Nagata et al., 2020).

This study was used to assess gender differences in ON severity, as there are many inconsistent findings in previous research. The current findings regarding the significant relationship between gender and ON have led to new insights that could be extended in future research. Based on the present study, the reasons for the gender differences should be further investigated. This might entail looking for content that predominately women are exposed to on different media channels, as this might account for the higher ON severity among women. Additionally, it could be interesting to investigate whether age differences impact the relationship between gender and ON, to gain a better understanding of the underlying factors that influence the development of ON. Furthermore, future research using the experience sampling method could be insightful to gain a better understanding of how different social media content is impacting the individual. This method could be employed to ask which social media platforms

have been used in the past hours, leading to a more concrete understanding of how specific content is impacting the body image of the participants. Also, it might be interesting to see how body image dissatisfaction is changing throughout the day on an individual level.

Conclusion

Despite the above-mentioned limitations of the study, this research has enhanced our understanding of gender differences in the severity of ON. This research did not show the expected results regarding the relationship between social media and ON and the difference in social media use between genders. Additionally, the expected moderation effect of gender and BID on the relationship between social media use and ON was not found. However, this research can be seen as a first step towards understanding the relationship between social media use, orthorexia nervosa, body image dissatisfaction and gender, which, to my knowledge, has not directly been tested before. Moreover, this study demonstrated that much further research is needed to gain a broader understanding of the factors that might precipitate the development of ON.

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Appendix A

Information sheet and Consent form

Information sheet for Participation in a Survey - The University of Twente -

Description of the survey and your participation

You are invited to participate in a survey conducted by Monique Höber, Anastasija Minina, Janna-Marie Esser, Julia Fleischmann and Mia Wiesmann supervised by Alexandra Ghita.

The purpose of this survey is to gain further insights into your personal experiences with the use of social media in relation to your physical and mental health. We would like to investigate the relationship between eating behaviour, social media use and health in the life of university students.

The survey will last approximately 15 minutes. The survey will be anonymous so no information can be traced back to your person.

Risks and discomforts

There are no known risks associated with this survey.

Potential benefits

There are no known benefits to you that would result from your participation in this survey. This survey may help us to gain adequate knowledge to have more insight into today's lifestyle of university students.

Protection of confidentiality

Your identity will not be revealed in any publication resulting from this survey. We will interpret your data and use it to analyze overall results, but your answers are completely anonymous. The data will not be used for any other purpose than for our study.

Voluntary participation

Your participation in this survey is voluntary. You may withdraw at any moment.

Consent Form for Survey

I have read and understood the study information, or it has been read to me. I consent voluntarily to be a participant in this survey and understand that I can refuse to answer questions and I can withdraw from the questionnaire at any time, without having to give a reason. Furthermore, I understand that taking part in the study involves interpreting my data anonymously.

Risks associated with participating in the study

I understand that taking part in the study involves no risks.

Use of the information in the study

I understand that information I provide will be used for the study and to gain adequate knowledge by interpreting my results and data. I understand that personal information collected about me that can identify me, such as [e.g. my age], will not be shared beyond the study team. I agree that my information can be quoted in research outputs.

Contact information

If you have questions or concerns about your participation in this survey, please contact Alexandra Ghita (alexandra.ghita@utwente.nl) or Mia Wiesmann (m.wiesmann@student.utwente.nl)

Q3 I have accurately read out the information sheet and agree to participate voluntarily in this survey.

Yes (1) No (2)

Appendix B

Demographic questions Q4 Please indicate your age in numbers.

Q5 Please indicate your nationality.

Q6 Please indicate your gender.

Male (1)

Female (2)

Non-binary / third gender (3)

Prefer not to say (4)

Q7 Please indicate your current level of education.

Hoogeschool (1)

Bachelor (2)

Master (3)

PhD (4)

Q8 Please indicate the following measures:

Weight (in kg) (1) _____

Height (in cm) (2) _____

Q10 Please indicate whether you have at least one active account on the following social media platforms: Instagram, Facebook, Twitter, Snapchat, YouTube, TikTok.

Yes (1)

No (2)

Q11 Please indicate in hours how much time you spend daily on social media platforms (e.g., 3 hours). _____

Q12 Have you ever sought psychological or pharmacological treatment for any mental health concerns (e.g., anxiety, depression, eating disorders)? If yes, please mention.

Yes (1)

No (2)

Q13 Have you ever been diagnosed with a mental health condition? If yes, please mention.

Yes (1)

No (2)

<p><i>think my thighs are just the right size.</i></p>	<p><input type="radio"/></p>	<p><input type="radio"/></p>	<p><input type="radio"/></p>	<p><input type="radio"/></p>	<p><input type="radio"/></p>	<p><input type="radio"/></p>
<p><i>think my buttocks are too large.</i></p>	<p><input type="radio"/></p>	<p><input type="radio"/></p>	<p><input type="radio"/></p>	<p><input type="radio"/></p>	<p><input type="radio"/></p>	<p><input type="radio"/></p>
<p><i>think that my hips are just the right size.</i></p>	<p><input type="radio"/></p>	<p><input type="radio"/></p>	<p><input type="radio"/></p>	<p><input type="radio"/></p>	<p><input type="radio"/></p>	<p><input type="radio"/></p>

Appendix D

Düsseldorf Orthorexia Scale

	<i>This does not apply to me (1)</i>	<i>This does not really apply to me (2)</i>	<i>This somewhat applies to me (3)</i>	<i>This applies to me (4)</i>
<i>Eating healthy food is more important to me than indulgence/ enjoying the food.</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>I have certain nutrition rules that I adhere to.</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>I can only enjoy eating foods considered healthy.</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>I try to avoid getting invited over to friends for dinner if I know they do not pay attention to healthy nutrition.</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>I like that I pay more attention to healthy nutrition than other people.</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

<i>If I eat something I consider unhealthy, I feel really bad.</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>I have the feeling of being excluded by my friends and colleagues due to my strict nutrition rules.</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>My thoughts constantly revolve around eating healthy nutrition and I organize my day around it.</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>I find it difficult to go against my personal dietary rules.</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>I feel upset after eating unhealthy foods.</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>