Bachelor Thesis

The Relationship Between Body Image Dissatisfaction, Orthorexic-Related Symptoms and Social Media Exposure

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Abstract

Background. Orthorexia nervosa (ON) is an unhealthy eating behavior with fixation and concern about healthy nutrition. Individuals displaying ON-related symptoms aim to live a healthy lifestyle and often follow strict dietary rules. It is not much known about possible factors predicting the onset and maintenance of ON are still unknown. Recent studies have investigated the impact of body image dissatisfaction (BID) on ON. BID describes the negative perception and attitude towards the individual's own body. Associated with mental health concerns, including eating disorders (ED), BID could be a predisposing factor of ON. Through the usage of social media BID can be triggered.This is often elicited by exposure to social network sites (SNS), which have shown to evoke a more negative body image among individuals. Moreover, SNS demonstrates and teaches users about healthy nutrition and a healthy lifestyle which leads to the question if social media exposure might influence orthorexic-related symptoms.
Method. A mediation analysis with 242 participants was conducted to examine the relationship between BID, ON, and social media exposure. Hereby, BID was the predictor variable, measured by BID subscale from the Eating Disorder Inventory-2 (EDI-2). ON was the outcome variable, assessed with the Düsseldorf Orthorexia Scale (DOS) and social media exposure was used as the mediator variable. **Results and discussion.** The results have shown a significant effect of BID on the outcome variable ON, explained by shared symptoms of weight concern among individuals displaying BID and ON and the similarity of ON shared with EDs, whereas BID is a predisposing factor for classified EDs. Next, a significant effect of BID on social media use was found, explained by social comparison. Moreover, social media use seems to decrease orthorexic-related symptoms, which can be explained by type and content of SNS consumed by the participants. No mediation effect of social media exposure on the BID-ON relationship was found. The results were explained by other predisposing factors contributing to ON with a greater link.

Keywords: Orthorexia nervosa, body image dissatisfaction, eating behavior, social media exposure, social network sites, university students

The Relationship Between Body Image Dissatisfaction and Orthorexic-Related Symptoms

Nowadays, the interest in proper nutrition and a healthy lifestyle is increasing, accompanied by easy and quick access to information about food consumption in general and how to follow a healthy lifestyle (Pauze et. al, 2021). Moreover, the perception and attitude toward one's own body can influence eating behavior (Brytek-Matera et al., 2018). A growing interest in body shape and nutrition can lead to an extreme concern of an individual with their physical health, supported by accessibility to information about healthy lifestyle and about people pursuing it on social media (Franchina & Lo Coco, 2018).

Orthorexia Nervosa

According to the World Health Organization (WHO, 2020), proper nutrition contains a sufficient consumption of fruits, vegetables, nuts, and whole grains per day, as well as limited consumption of sugars, less than 10% unsaturated fats, less than 30% and salt, less than 5% per day. Orthorexia Nervosa (ON) describes an individual´s psychopathological fixation with proper nutrition. Affected individuals are concerned with healthy food consumption, often dedicating several hours per day to food planning and preparation (Brytek-Matera et al., 2018). Most individuals aim to have a healthy lifestyle, nevertheless, a continuous preoccupation with living such a life may facilitate the development of unhealthy eating patterns (Brytek-Matera et al., 2018).

Individuals displaying orthorexic-related symptoms often adhere to strict dietary rules. These include the consumption of fruit and vegetables (Turner & Lefevre, 2017) and restriction of food intake that entails a significant amount of fat, sugar, or salt (He et al., 2020). Additionally, individuals with ON are often driven by a desire to control their food, regarding its ingredients and production.

This includes checking and analyzing the source of their food and whether the products were exposed to pesticides or additional hormones (Koven & Abry, 2015). Brytek-Matera et al. (2015) defined five specific criteria for identifying ON: (a) spending more than three hours per day preparing food, (b) following a diet, and (c) having feelings of superiority accompanied by, (d) having increased self-esteem based on individuals' diet, and (e) proper nutrition is the main aspect of their lifestyle.

Moreover, the psychological status of the individual experiencing ON may include frustration in case of food-related changes, disgust or guilt when being exposed to food viewed as unhealthy and chronic worry about imperfection (Koven & Abry, 2015).

Some studies highlighted the similarities between ON and obsessive-compulsive disorder (OCD), (Barnes & Caltabino, 2016). OCD and ON share symptoms of intrusive thoughts and ritualized behaviors, i.e., for food consumption (Turner & Lefevre, 2017). Parts of ritualized behaviors are cutting food in a particular way or using particular material for food preparation (Brytek-Matera et al., 2015).

ON is not officially classified as an eating disorder (ED) yet, despite ongoing discussions among researchers about its psychopathology and classification (Barnes & Caltabino, 2016). Several studies indicated that ON may be a predisposing factor for EDs (anorexia nervosa, AN, and bulimia nervosa, BN). Regarding ON and AN, shared symptoms are anxiety, perfectionism, a lack of pleasure about food and its consumption. Often affected individuals displace a lack of control they have over their life to their diets and make it their main focus of achievements (Brytek-Matera et al., 2018). However, in contrast to classified EDs, the focus of individuals displaying orthorexic-related features is not on the quantity of food but on the quality of it (Koven & Abry, 2015). Based on this, researchers inferred that Body Image (Dis-)Satisfaction does not contribute to the onset and development of ON (Cena et al., 2018).

However, emerging research emphases that body image (dis-)satisfaction may be a significant factor in the development of ON (Pauze et al., 2021). ON is strongly associated with a low body image perception among students (Brytek-Matera, et al., 2017). Also,an internalization of a muscular body ideal among males and a thin body ideal among females which is perceived as healthy (Pauze et al., 2021).

Body Image Dissatisfaction

Body image is a multidimensional concept describing how an individual perceives their body. This incorporates perception and attitude towards one's body, including subjective evaluation and related beliefs, positive or negative, and emotional and behavioral effort in the evaluation of the body perception (Pauze et al., 2021). A negative perception of one's body is described as body image dissatisfaction (BID). According to Brytek-Matera et al. (2018), it consists of two components, body percept, and body concept. *Body percept* describes the internal visual image an individual has of their body shape and size, whereas the *body concept* defines

the level of satisfaction the individuals feel toward their body. The discrepancy between the body percept and body concept, meaning the difference between how the individual perceived their body and how they wish their ideal body would look, forms the level of body image (dis)satisfaction. Individuals experiencing BID often display the tendency to overestimate their body dimensions but also avoid observing parts of their body, and experience negative thoughts and emotions towards their body. Often, a continuous comparison between the actual body and the ideal body occurs. Hereby, individuals compare their actual body with a body shape they desire to have (Brytek-Matera et al., 2018).

One factor enhancing a negative attitude towards one's body is social comparison. It can enhance the gap between body percept and the actual body, especially among younger individuals, increasing their drive to be thin (female) or muscular (male) (Ho et al., 2016). With regard to social comparison, younger individuals are at higher risk to be affected, since they tend to identify themselves as social participants through their acceptance and valuation of their peers (Brytek-Matera et al., 2018).

BID is highly associated with mental health concerns, including low self-esteem, emotional distress, depression, social anxiety, and social difficulties such as isolation (Pauze et al., 2021). Moreover, BID has a fundamental role in the onset and maintenance of ED and unhealthy eating behavior (Brytek-Matera et al., 2018). With regard to ON, inconsistent results have been found. On the one hand, ON has shown to be associated with higher self-perceived muscularity and lower self-perceived body fat (Oberle & Lipschuetz, 2018). Whereas other research has shown a significant relationship between displaying orthorexic-related symptoms and a higher perceived weight (Pauze et al., 2021).

Social Media Exposure

Social comparison is greatly facilitated by access to social networking sites (SNS). Traditional media, such as television, films and magazines are losing popularity, whereas internet-based media which also includes the use of social media such as Instagram or Facebook are more frequently used in people's everyday life (Siddiqui & Singh, 2016). SNS are mostly used to connect with others and to follow the self-presentation of others but also to present oneself. With phones, laptops and tablets, social media is easily and quickly accessible for everyone which enhances the popularity and frequency of its use (Franchina & Lo Coco, 2018). Images people create of themself on SNS may not align with reality. With regard to life

satisfaction, daily routine, nutrition, or body shape, an unrealistic image can be created by editing pictures or using filters to create a more appealing look (Franchina & Lo Coco, 2018).

According to a study by Tiggemann and Slater (2013), a brief exposure to social media is sufficient to evoke a significantly lower body image perception among participants. Hereby, girls and young women are often exposed to images of thin female bodies, whereas boys and young men are more prone to images of muscular male bodies (Fardouly & Vartanian, 2016). Self comparison has been found to increase BID, as not only the exposure to pictures of other users but also the response other users have towards their own posts can evoke a negative change in body concert. Thus, social comparison has shown to be a key factor in the development and maintenance of BID (Turner & Lefevre, 2017). A study by Herbozo and Thompson (2016) showed a negative change in body concerns, not only for negative reactions but also for positive reactions and comments.

Social media is frequently used as a tool and source of information to improve bodily appearance and to live a healthy lifestyle (Fardouly & Vartanian, 2016). Social media users increase their popularity with related hashtags (#) and tags (@) by displaying their lifestyle on SNS (Turner & Lefevre, 2017). A study by Sharma and De Choudhury (2015) showed that health-related posts receive more user support than posts concerning an unhealthy lifestyle. Exposure to health-lifestyle-related posts can influence users of social media to focus more on proper nutrition but can also trigger negative behavior and disordered eating habits (Holland & Tiggemann, 2016).

According to previous studies, an individual´s high exposure to social media platforms is associated with mental health concerns, including depression, social comparison, anxiety, sleep disturbance, and symptoms of OCD. Frequent social media use has been proven to play a significant role in the development of ED and unhealthy eating behavior (Holland & Tiggemann, 2016). A study by Turner and Lefevre (2017) showed a positive association between prolonged use of Instagram and the development of ON. According to these results, image-focused posts concerning a healthy lifestyle are more influential than word focused posts. Image focused posts are pictures of healthy food or showing people claiming to live a healthy lifestyle. Moreover, SNS encourages selective exposure. Users choose the type of content they are interested in and get selectively exposed to similarly minded people and their posts, sensing their point of view as more common than it is (Fardouly & Vartanian, 2016). This can increase pressure on individuals

to align with such behaviors, supported by the presentation of a healthy lifestyle by perceived authorities, and social media users with a large number of followers (Turner & Lefevre, 2017).

Objective of this Study

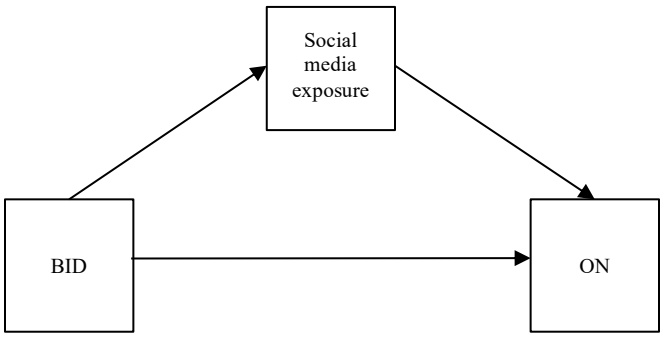
Previous studies have shown inconsistent data regarding the causal relationship between BID and ON. Hereby, the role of social media exposure in the BID-ON relationship is unclear. Therefore, the objective of the current study is to examine the mediating role of social media exposure between BID and ON in university students (Figure 1). To address this aim, the following research question (RQ) was formulated:

Research Question

To what extent does social media exposure mediate the relationship between body image dissatisfaction and orthorexia nervosa in university students?

Figure 1

The simple mediation model



Methods

Design

A quantitative cross-sectional online survey study was conducted, using the independent variable BDI, the dependent variable ON and social media exposure as mediation variable. To collect data, a convenience sampling method was used.

Participants

For this study 334 participants were recruited, within an age range of 18 to 34 years (M = 21.45, SD = 2.55). Criteria for participation were the occupation of a student, independently of

the educational level and sufficient knowledge of English. Participants who did not complete the survey were excluded from the dataset (n = 84). Other exclusion criteria were not accepting the informed consent (n = 4), unrealistic answers regarding weight and height, being 3m tall (n = 1) or time spent on SNS, 86 hours per day (n = 1) or not having an active account on SNS (n = 2). The final data set consisted of 242 participants, from which 22% of the participants were male, 76% female and 2% non-binary or third gender. Participants were mostly from Germany (59%), the Netherlands (12%) or Latvia (9%). Most participants were currently in their Bachelor's studies (60%).

The link of the survey was distributed through social media platforms (i.e., Instagram and Whatsapp) and via the Sona system, a test subject pool offered and used by the University of Twente.

Materials

Socio-demographic data

The survey collected data regarding the participants' age, gender, educational level, nationality, weight, and height to calculate their Body-Mass Index (BMI), possible mental health diagnosis and treatment and their time spent on social media. Participants were asked if they have an account on social media and if yes, they should indicate how many hours are spent on social media daily. The full set of socio-demographic data is included in Appendix A.

Body Dissatisfaction

Body Dissatisfaction (BD) is a subscale of the self-reported questionnaire Eating Disorder Inventory 2 (EDI-2), which was designed to explore the self-perception of one's body (Garner et al., 1983). The subscale consists of 9 items, scored on a 6-point Likert scale, ranging from *never* (1), *rarely* (2), *sometimes* (3), *often* (4), *usually* (5), to *always* (6). All items are provided in Appendix B. A total score of 54 can be reached after summing all items (Clausen et al., 2012). The subscale has shown to have a good internal consistency ($\alpha = 0.83$, $k = 9$). Participants scoring ≥ 15 are assigned to display BDI (Clausen et al., 2011). Example items are "I feel satisfied with my body", "I think my buttocks are too large" and "I think my stomach is too large". The items 3, 4, 5, 7 and 9 are negatively formulated and will be reversed for the analysis (Tasca et al., 2003). The internal validity calculated for this study is considered excellent ($\alpha = 0.9$, $k = 9$).

Düsseldorf Orthorexie Scale

DOS is a self-reported questionnaire, developed to assess orthorexic-related eating behavior among individuals (Chard, et al.. 2019). It consists of 10 items and is scored on a 4-point Likert scale, ranging from *This does not apply to me* (1), *This does not really apply to me* (2)*, This somewhat applies to me* (3) to *This applies to me* (4). In Appendix C a complete set of items can be found. A total score of 40 can be reached after summing all items. A score of 30 or above indicates presence of ON, a score between 25 and 29 indicates a risk of ON (Chard, et al., 2018). Example items are “Eating healthy food is more important to me than indulgence/ enjoying the food”, “I like that I pay more attention to healthy nutrition than other people'" and “My thoughts constantly revolve around eating healthy nutrition and I organize my day around it”. DOS was originally developed in German but was adapted in other languages as well. The English version of DOS, used for this study, has shown to have a good internal consistency ($\alpha = 0.88$, $k = 10$) (Chard et al., 2018). Internal consistency calculated for this study is considered to be good ($\alpha = 0.84$, $k = 10$).

Procedure

Prior to publication, the study was approved by the Ethics Committee from the University of Twente (Requestnumber: 220321). Afterwards, the survey was published and open for participation. The data collection took place from the 30th of March 2022 to the 23th of April 2022. The link to the survey was distributed through social media platforms (i.e., Instagram and Whatsapp) and via the Sona system, a test subject pool offered and used by the University of Twente. Participants recruited via SONA were offered 0.25 SONA-points as a reward.

At the beginning of the survey, participants were introduced to the study by presenting a description of the survey, followed by potential risks and benefits and protection of confidentiality as well as a confirmation of voluntary participation (see Appendix D). Moreover, the participants were informed that if there were any questions, they had the opportunity to contact one of the researchers or the supervisor. Afterwards, the participants were asked to agree to the informed consent (see Appendix D).

The survey started with demographic questions regarding age, occupation, nationality, gender as well as weight and height (to calculate BMI). Next, participants were asked if they own active accounts on social media platforms and how much time they spend daily on those, followed by questions if the participants are diagnosed with a mental health condition and if they followed any treatment methods. Since the survey was part of a larger research, the questionnaire

included items regarding mental health diagnosis and treatment. However, those items were not relevant for this study. To avoid bias, the order of the blocks presented to participants was randomized. At the end of the survey, the participants were reminded to contact one of the researchers or the supervisor in case of any questions.

Data Analysis

The data analysis aimed to investigate the link between BID and ON, mediated by social media exposure. First, the data was imported from Qualtrics to IBM SPSS Statistics version 25 (IBM Corp., 2017) and cleared. Unfinished or unrealistic data, i.e., 86 hours on social media or 3m tall, got deleted. Each participant's BMI got calculated, based on their weight and height.

Categorical variables were created for ON, BMI, BID and social media exposure. Based on the cut-off scores, ON data got categorized into *no ON* = 1 (10 - 24), *at-risk of ON* = 2 (25 - 29) and *ON* = 3 (30 - 40) (Charles et al., 2019). For BMI, data was categorized into *Underweight* = 1 (< 18.5), *Healthy Weight* = 2 (18.5 - < 25), *Overweight* = 3 (25 - < 30) and *Obesity* = 4 (> 30) (WHO, n.d.). Social media exposure was categorized into *moderate social media duration* = 1 (< 3 hours) and *high social media duration* = 2 (> 3 hours) considering previous research (Karmila et al.,2020). BID got categorized into *no BID* (0 - 14) and *BID* tendency (15 - 54) (Clausen et al., 2011).

An analysis of the descriptive statistics of the participants' demographic data, BMI total score, ON total score, BDI total score and social media exposure total score was conducted. Afterwards, the frequencies of categorical variables and the variables mental health treatment and mental health diagnosis were analyzed.

Next, a Shapiro Wilkson test was conducted to test the normality of the data, indicating a deviation from normality for the total scores of DOS, the BID subscale of EDI-2 and time spent on social media. However, according to Kwak and Kim (2017), the central limit theorem does suggest that the higher the sample size, the more normally distributed the data, independently from a skewed distribution. This applies to sample sizes larger than 30.

To investigate a possible mediation effect the statistical program PROCESS was used to investigate the impact of SNS on the relationship between BID and ON in university students.

Results

Sociodemographic Data

All results of the sociodemographic data of the participants are displayed in Table 1. The participants spent on average 3.12 hours per day on social media (*SD* = 1.5). 25% (*n* = 61) of the participants indicated a past or current mental health treatment and 15% (*n* =36) stated that they have a mental health diagnosis. Examples of mental health treatment and diagnosis displayed by participants were depression, anxiety, eating disorder and panic disorder. Most participants scored with a BMI indicating a healthy weight (77%). Next, 218 participants (90%) scored above the cut-off point on the EDI-2 subscale, indicating BID. The majority of the participants did not display ON (83.5%).

Table 1

Sociodemographic Data of Participants

Characteristics	*n*	Percentage	*M*	*SD*	Min	Max
Total	243					
Age			21.45	2.55	18	34
Gender						
Female	185	76.4				
Male	53	21.9				
Non binary/ Other	4	1.7				
Education						
Hogeschool	79	32.6				
Bachelor	146	60.3				
Master	15	6.2				
PhD	2	0.8				
Nationality						
German	142	58.7				
Dutch	30	12.4				
Latvian	23	9.5				
Other	47	19.4				
BMI						

Total score			22.29	4.26	14.69	56.43
Underweight	19	7.8				
Healthy Weight	186	76.5				
Overweight	32	13.2				
Obese	6	2.5				
Mental Health Treatment						
Yes	61	25.2				
No	181	74.8				
Mental Health Diagnosis						
Yes	36	14.9				
No	206	85.1				
Time spent on social media						
Total Score			3.12	1.49	0.16	10.00
Moderate duration	99	40.7				
High duration	144	59.3				
ON						
Total Score			18.81	5.65	10.00	34.00
No ON	202	83.5				
At-risk	27	11.2				
ON	13	5.4				
Body Image Dissatisfaction						
Total Score			27.58	9.95	9.00	54.00
No BID	24	9.9				
BID	218	90.1				

Note. BMI = Body Mass Index, ON = Orthorexia Nervosa, BID = Body Image Dissatisfaction

Mediation Analysis

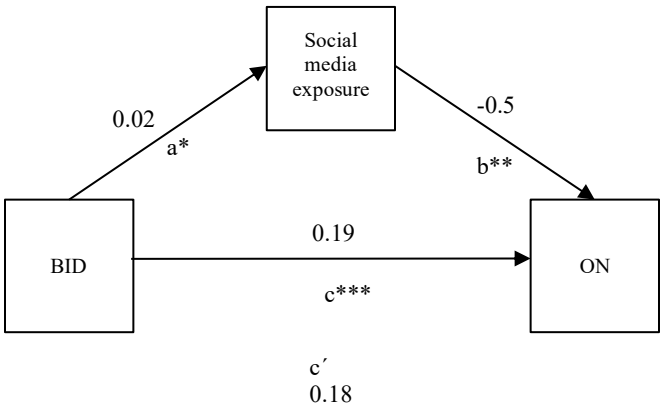
A simple mediation analysis was performed to investigate the relationship between BID, ON and social media exposure among university students. BID was the predictor variable, ON the outcome variable and social media exposure the mediator.

The results indicated a positive significant total effect of BID on ON [B = .18, SE = .03, t(240) = 5.12, p < .001] (path 'c`' on Figure 2). Next, a positive significant direct effect of the predictor variable on the outcome variable was revealed [B = 0.19, SE = 0.03, t(240) = 5.40, p < 0.001] (path 'c' on Figure 2).

BID has a significant positive effect on the mediator variable [B = 0.02, SE = 0.01, t(240) = 2.06, p = .04] (path 'a' on Figure 2). Social media exposure has a significant negative effect on the outcome variable [B = -0.5, SE = 0.23, t(240) = -2.12, p = .03] (path 'b' on Figure 2). The indirect effect of BID on ON, mediated by social media exposure was found to be statistically insignificant (B = -.01, SE = .01, 95% CI [-.0250;-.0005]).

Figure 2

Simple mediation model with BID, ON and social media exposure



Note. *p = .04, **p = .03, ***p = < .001

Discussion

The aim of this study was to examine the relationship between BID and ON and to investigate the mediating effect of social media exposure on BID-ON relationship. Previous research found a correlation between ON and BID (Brytek-Matera et al., 2018) and the use and exposure of SNS has shown to evoke negative changes in eating behavior (Brytek-Matera &

Donini, 2018). However, the effect of social media exposure on BID-ON relationships has not been examined yet.

Mediation Model

Indirect effect

This study revealed a significant positive link of BID and social media exposure, meaning that individuals scoring higher on BID spend more time on SNS. In previous research, the focus was mainly on the impact social media exposure can have on BID among individuals. It was found that use of and exposure to SNS elicit a significantly lower perception of body image (Tiggemann & Slater, 2013; Franchina & Lo Coco, 2018). The link between BID and social media use has not been examined yet. Nevertheless, results can potentially be explained by (social) comparison, one component of BID (Brytek-Matera et al., 2018). Individuals experiencing BID tend to compare their actual or perceived body shape and their desired ideal body shape which often increases a negative attitude towards their own body shape (Brytek-Matera et al., 2018; Ho et al., 2016). Besides connecting with other people online, SNS are used to present oneself and to follow the self-presentation of other users, including their body shape (Franchina & Lo Coco, 2018). Pictures of presenting thin or muscular bodies are shown on SNS (Fardouly & Vartanian, 2016). Therefore, SNS can be used as a tool to compare one's actual body or perceived body image with ideal body image, presented by other users on social media. This could explain the significant link between BID and social media exposure.

Furthermore, findings of this study suggested a negative impact of social media exposure on ON. According to this, the more an individual is exposed to social media, the less orthorexic-related symptoms they display. Those findings are contradictory to previous research, showing a relationship between high social media use and exposure and higher display of orthorexic-related symptoms (Brytek-Matera & Donini, 2018; Holland & Tiggeman, 2016). However, previous studies have also shown that the type of social media used and content being exposed to plays a role in a possible effect on the individual (Turner & Lefevre, 2017). Being exposed to picture-based content, i.e., Instagram, with posts related to a healthy lifestyle and nutrition can evoke negative changes in eating behavior (Turner & Lefevre, 2017). In contrast to that, SNS can also be used as a tool to increase awareness about risk factors of healthy eating and to decrease orthorexic-related symptoms (Valente et al., 2022). Social media content related to ON, aiming to raise awareness about possible side effects of obsession with healthy nutrition and to offer

support, has shown to decrease the chance of displaying orthorexic-related symptoms among users (Valente et al., 2022). In the course of this study, participants were asked only if they own an active account on any SNS platform, not which type of SNS they use or which type of content they are exposed to. It could be that participants of this study did use SNS for connecting purposes only, not aiming to gather information about healthy lifestyle and proper nutrition. Or the contradictory, that participants of this study use SNS to gain more knowledge about possible side effects of obsession about healthy nutrition.

Despite the statistically significant effects of BID on social media exposure and of social media exposure on ON, no significant mediational effect of social media exposure on BID-ON relationship was found. No prior studies conducted a similar study yet. However, it can be assumed that social media does not have a significant impact on the effect of BID on ON, due to the relatively small coefficient of BID-social media relationship. Another possible explanation could be social media exposure is a small factor contributing to onset and maintenance of ON, however, not significant enough, and other, unknown, predisposing factors have a bigger influence on ON. The mediational effect was assumed due to studies reporting an influence of social media exposure on ON. However, the questions asked regarding social media use in this study were nonspecific, not focusing on specific type or content of SNS. The un-specificity of questions asked could be another explanation for the insignificant mediation effect of social media exposure on BID-ON relationship.

Direct effect

A significant direct effect of BID on ON was found. This result does partially align with previous studies. Some researchers assumed an inexistent correlation between BID and ON, since ON related symptoms are more focused on the quality of the food than on the quantity of it (Cena et al., 2018; Barnes & Caltabino, 2016). Hence, weight changes were seen as an indirect result in individuals displaying orthorexic-related symptoms, rather than their primary goal (Cena et al., 2018). Nevertheless, previous research is inconsistent in that regard. Results of several studies indicated a correlation between BID and ON. Brytek-Matera et al. (2017) found a significant relationship between dissatisfied body image and orthorexic-related symptoms among students. However, they did not provide an explanation for their findings but suggested further research to investigate more in BID-ON relationship. In a study by Brytek-Matera et al. (2018), similar results were found, indicating BID as a predisposing factor for ON. The results were

explained by the similarity of ON and classified EDs, i.e., AN. Both, AN and ON share symptoms of perfectionism, accompanied by feelings of guilt with regard to food and nutrition. Those symptoms may enhance adherence to dietary rules and can have a negative impact on the individuals' perception and attitude towards their body shape. Therefore, body image does have an impact on the onset and maintenance of EDs. Here, according to Brytek-Matera et al. (2018), it can be argued that due to shared symptoms of ON and other EDs, body image does also have an impact on the onset and maintenance of ON.

Another argument to explain the predisposing effect of BID on ON was brought by Pauze et al. (2021). In their study, the relationship between ON symptomatology and body image attitudes and distortion was investigated and a significant effect of body image concerns on ON was found. According to Pauze et al. (2021) BID and ON share symptoms of weight concerns and overweight preoccupation. Individuals experiencing BID are unsatisfied with their perceived body image and concerned about possible weight gain. Individuals experiencing orthorexic-related symptoms are fixated on a healthy lifestyle and appearance of such towards their social environment. Herby, the perceived health is measured by perceived body fat (mostly among females) and muscularity (mostly among males) (Pauze et al., 2021; Featherstone, 1991). Additionally, dissatisfaction with perceived body image and fear of gaining weight can be motivational factors behind healthy lifestyle and orthorexic-related symptoms, since a thin or muscular body is associated with a healthy lifestyle (Barnes & Caltabino, 2019). Concluding, BID and ON share symptoms of weight concerns and overweight preoccupations. Next, weight concerns as a component of BID might enhance orthorexic-related symptoms.

Moreover, the difference between perceived body shape and ideal body among individuals displaying BID can result in orthorexic-related symptoms (Brytek-Matera et al., 2018). Since a thin or muscular body can be seen as proof for a healthy lifestyle (Featherstone, 1991), a failure in achieving a thin or muscular body could result in appearance-related anxiety. In order to overcome their appearance-related anxiety, individuals might strive for more control over their nutrition and lifestyle (Brytek-Matera et al., 2018). This is accompanied by a possible desire to appear healthier and resulting as more attractive (Brytek-Matera et al., 2018; Featherstone, 1991).

Concludingly, the direct effect of BID on ON found in this study can be supported by previous research. One possible explanation might be shared symptoms of ON with classified

EDs accompanied by BID as a predisposing factor in classified EDs. Another explanation are the shared symptoms of weight concerns among BID and ON, paired with fear of gaining weight and appearing as unhealthy or unattractive.

Strengths and Limitations

One strength of this study were the good psychometric values of EDI-2 and DOS. The subscale Body Image Dissatisfaction of EDI-2 has shown an excellent Cronbach's Alpha in this study. DOS showed a good Cronbach's Alpha in the course of this study and in previous studies (Chard et al., 2018). Next, the DOS has shown to measure ON symptoms more accurately than other scales assessing possible symptoms of ON, i.e., ORTO-15. According to Chard et al. (2018), the prevalence rate of ON measured with DOS is lower than measured with ORTO-15.

Next, the final sample size of 242 participants in this study was relatively high, including students with a wide age range and from different nationalities. Even though the majority of the participants were from Germany or the Netherlands, participants from Eastern Europe were also recruited. In total, people from 24 different nationalities participated in this study. This increases the representativeness of the results found.

Even though the high representativeness of the sample was found to be a strength of the study, several limitations can be identified. One limitation was the sampling method as participant were recruited by sharing the link for the survey via social media but mostly by using the software “SONA-System” of the University of Twente. Hence, students from the Behavioral Science Management department only had the chance to participate in the study. Therefore, the variety within the participants decreased regarding their educational background. This could have influenced the results. People studying in a field of social science might be more aware of possible impacts of SNS and might be more reflective of their feelings and emotions evoked by social media exposure.

Another limitation of this study is the specificity of the questions asked regarding use and exposure of social media. As described before, the content of social media one is expected to plays a role in the effect of SNS can have on ON. Picture-based SNS, i.e., Instagram have a greater impact on orthorexic-related symptoms than word-based SNS, i.e., Twitter. Participants in this study were asked to indicate if they have an account on social media in general, and if they do, how many hours they spend on it per day. It was not asked for which type of SNS, i.e., Instagram, Snapchat, Facebook or Twitter, they use or are exposed to the most. Next,

participants were not asked which content they consume, i.e., content about healthy nutrition or another specific lifestyle. This could have influenced the effect of social media exposure on BID-ON relationship.

Additionally, the cut-off score of 9 for BID on the subscale of EDI-2 was low. 90% of the participants scored 15 or higher on this scale, indicating a tendency towards BID. As a comparison, anxiety disorder, one of the most common mental health conditions, scores with a prevalence of 30% (Merikangas et al., 2010). Therefore, the amount of participants displaying BID could be overestimated, due to the low cut-off score.

Future Research

Despite previous research supporting an increasing effect of social media exposure on ON (Holland & Tiggemann, 2016; Turner & Lefevre, 2017), the current study did reveal a decreasing effect of social media exposure on orthorexic-related symptoms. Therefore, one suggestion for further research would be to investigate the impact different types of SNS and different content can have on onset and maintenance of ON. Hereby, focus could lie on the effect of picture-based SNS, i.e, Instagram or Snapchat on ON, based on the results of Turner and Lefevre (2017). For example, a study investigating the effect of daily Instagram use on orthorexic-related symptoms could be conducted. Moreover, also differences between types of SNS content being consumed and orthorexic-related symptoms could be investigated further.

Another suggestion for further research could be to investigate the relationship between BID and social media exposure, to verify the significant results found in the current study. This could be important, since previous studies found a link between high exposure to social media and increasing BID and did not investigate the link between high BID on social media exposure. Therefore a study similar to the current one could be conducted to verify the results found in this study.

Conclusion

ON is a topic under increasing awareness and discussion. However, not much is known about factors influencing the development and maintenance of this unhealthy eating behavior. Additionally, due to a high number of people being exposed to social media, it is useful to gain more knowledge about the possible impact social media exposure can have on ON. The current study revealed a link between BID and social media exposure. This could be explained by one component of BID, namely, social comparison, increased through social media exposure. Next,

despite previous research, social media exposure has been shown to reduce orthorexic-related symptoms. These results can be explained by the non-specificity of questions asked regarding type and content of social media in this study. BID might be seen as a predisposing factor of ON, possibly due to shared symptoms of weight concerns of BID and ON and a failure in matching the ideal body among individuals displaying BID. However, social media use does not mediate the effect of BID on ON.

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Appendix A

Demographic Information

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)

Appendix B

Body Dissatisfaction (BD)

	Never (1)	Rarely (2)	Sometimes (3)	Often (4)	Usually (5)	Always (6)
I think that my stomach is too big.	○	○	○	○	○	○
think that my thighs are too large.	○	○	○	○	○	○
I think that my stomach is just the right size.	○	○	○	○	○	○
I feel satisfied with the shape of my body.	○	○	○	○	○	○
I like the shape of my buttock.	○	○	○	○	○	○
I think my hips are too big.	○	○	○	○	○	○
[think my thighs are just the right size.	○	○	○	○	○	○
I think my buttocks are too large.	○	○	○	○	○	○
I think that my hips ıre just the right size.	○	○	○	○	○	○

Appendix C

The Düsseldorf Orthorexia Scale (DOS)

	This does not apply to me (1)	This does not really apply to me (2)	This somewhat applies to me (3)	This applies to me (4)
Eating healthy food is more important to me than indulgence/ enjoying the food.	○	○	○	○
I have certain nutrition rules that I adhere to.	○	○	○	○
I can only enjoy eating foods considered healthy.	○	○	○	○
I try to avoid getting invited over to friends for dinner if I know they do not pay attention to healthy nutrition.	○	○	○	○
I like that I pay more attention to healthy nutrition than other people.	○	○	○	○
If I eat something I consider unhealthy, I feel really bad.	○	○	○	○
I have the feeling of being excluded by my	○	○	○	○

friends and colleagues due to my strict nutrition rules.				
My thoughts constantly revolve around eating healthy nutrition and I organize my day around it.	○	○	○	○
I find it difficult to go against my personal dietry rules.	○	○	○	○
I feel upset after eating unhealty foods.	○	○	○	○

Appendix D

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)