The Influence Of Social Media And The Imaginary Audience On The Development Of Orthorexia Nervosa In A Predominantly White Sample Of Undergraduates

Dheer S Avashia

Psychology Department, University Of The South

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Eating disorders are becoming highly prevalent in college students, as several studies have reported a greater presence of eating disorders on college campuses as compared to the general population (Fitzsimmons-Craft et al., 2019). This increase is of great concern because these disorders are a threat to the mental and physical health of students (Golman et al., 2017).

One such eating disorder that is increasingly being studied in the context of college students is Orthorexia Nervosa (ON); (Fidan et al., 2010). ON is defined by an unhealthy obsession with healthy eating (Bratman & Knight, 2000) in which individuals extensively worry about and moderate their diet (Bağcı Bosi et al., 2007). In 2015, Bratman et al. developed the Bratman Orthorexia Scale, a 10-item questionnaire to assess food attitudes and ON tendencies in the United States (Bundros et al., 2016). Many studies suggest that ON has repercussions related to physical, psychological, and social aspects of an individual's life (Example: Bundros et al., 2016, Dunn & Bratman, 2016, Bağcı Bosi et al., 2007). ON behavior may lead to nutrient deficiencies and weight loss (Ramacciotti et al., 2011), increased stress and anxiety developed by the guilt of the inevitable failure to have perfect eating habits (Dunn & Bratman, 2016), and de-prioritization of personal relationships and social life in favor on the focus of healthy eating (Bağcı Bosi et al., 2007). Studies on the etiology of ON symptoms suggest that the high levels of social pressure and unrealistic body image expectations in young college students have often been associated with a greater risk of developing ON (Bundros et al., 2016).

Given that social pressure and unrealistic expectations about body image are associated with ON, delving deeper into factors that lead to increased social pressure and unrealistic body

image expectations might help better understand the reasons for the onset of ON in college students. One such factor is Imaginary Audience.

Imaginary Audience is a state in which individuals believe they are actively being judged by peers (Elkind & Bowen, 1979); it is one of the most frequent ideation states faced by adolescents (O'Connor, 1995). In 1979, Elkind et al. proposed a 12-item Imaginary audience scale that measures the presence of an Imaginary audience in individuals. The presence of an Imaginary Audience is associated with typical adolescent behaviors such as self-consciousness and feeling judged (Galanaki, 2012) and is used as an explanation in many studies for why eating disorders are more prevalent in adolescents (Verschueren et al., 2018). Considering all this existing research that suggests how Imaginary Audience instills insecurities in adolescents, the presence of an Imaginary audience could potentially be associated with the onset of ON.

Past studies have correlated high levels of the presence of an Imaginary audience to high levels of social media use (Zheng et al., 2018, Peters et al., 2021). Social media is used most by young adults (Anderson & Jiang, 2021) and has consistently been positively correlated with negative body image (Fardouly et al., 2016) and body shame in youth (Brown et al., 2018), therefore making it another possible factor influencing the onset of ON. In fact, a study by Turner & Lefevre (2017) found that higher Instagram usage was associated with more symptoms of ON, while another study found that increased internet usage causes unrealistic body image expectations that in turn lead to more eating disorder tendencies (Tiggemann & Miller, 2010; Tiggemann & Slater, 2010).

In this current study, social media use is expected to predict levels of ON in college students, with Imaginary Audience as a potential mediating variable. Current literature search reveals sparse research on the connection between these two variables. This study uses an online

survey to gather data about three constructs: the presence of an imaginary audience, social media use, and the prevalence of ON. The study predicts that a higher influence of social media and the prevalence of an imaginary audience will positively associate with higher levels of ON in college students.

Method

Participants

A total of 71 undergraduate participants were recruited from a small, private liberal arts college in the Southeastern U.S. Additional demographics are provided in Table 1.

Measures

Orthorexia

Bratman et al.'s (2000) 10-item Bratman Orthorexia Test (BOT) scale was used to measure the prevalence of Orthorexia Nervosa in participants. A six-point Likert scale was used for each question, ranging from 1 = *strongly disagree* to 6 = *strongly agree*. In one question, participants are asked "Do you spend more than 3 hours a day thinking about your diet?". A higher score on the BOT was attributed to a greater presence of ON. The BOT demonstrated good internal consistency in our sample ($\alpha = 0.82$).

Imaginary Audience

Elkind et al.'s (1979) 12-item Imaginary Audience Scale (IAS) was used to measure participant concerns about being evaluated by an imaginary audience. Participants were asked to read a series of short embarrassing scenarios like, "You got a bad haircut and want to go to a basketball game" and were asked to choose from three reactions to each situation. The situations increasingly reflected discomfort with staying in public in the imagined scenario. A reverse-coded Likert scale was used, ranging from, 2 = *complete lack of willingness to*

participate to 0 = *willingness to participate without concern*. The scale was used to generate a score that indicated the level of sensitivity to an imaginary audience. A greater score on the IAS was linked to higher levels of the presence of an imaginary audience. The IAS demonstrated a questionable but acceptable internal consistency in our sample ($\alpha = 0.64$). The IAS has two sub-scales:

Abiding Self (IAS-AS); This subscale explains self-consciousness's link to permanent characteristics of the self (Elkind et al.; 1979). Items 1,3,5,7,9, and 10 on the IAS are items for the IAS-A scale. An example of a scenario in the IAS-A is, "you worry about how much people like you". IAS-AS demonstrated an unacceptable internal consistency in the current sample, $\alpha = .43$

Transient Self (IAS-TS); This subscale explains the self-consciousnesses link to temporary aspects of self. Items 2,4,6,8,11, and 12 on the IAS are items for the IAS-T scale. An example scenario is "you notice a spot on your pants at a party". The IAS-TS demonstrated an acceptable but questionable internal consistency in the current sample, $\alpha = .65$

Exposure to Social Media and Influencers

A six-item Influencer Scale was developed by the researchers of the current study to measure exposure to influencers and time spent on social media. The first three items on the influencer scale ask participants to select all the categories of influencers they encounter on different social media platforms. An example of the aforementioned type of question would be, "Please select all the categories of influencers that you come across on Snapchat" and participants are asked to select from categories; 1 = *Health*, 2 = *Fitness*, 3 = *Fashion*, 4 = *Gaming*, 5 = *Beauty*, 6 = *Music*, 7 = *Food*, 8 = *Celebrity*, 9 = *Animals/Pets*, 10 = *Lifestyle*, 11 = *Acting*, 12 = *Vlogger*, 13 = *Sports*, 14 = *Art*, 15 = *Photography*, 16 = *Other (Fill in)*, 17 = *I don't*

use Snapchat. The fourth item in the IS asks participants, "How many hours did you use any social media last week?" expecting a numerical value of the number of hours. The scores from these first three items were averaged, added, and then multiplied by the fourth item to create an index of social media use (SMUI). The fifth measures TikTok use percentage (TTP) by asking, "What percentage of your social media use is Tik Tok?" expecting a response as a percentage value between 0 and 100. Lastly, the sixth item was a Likert scale, that measured envy by asking participants to "Indicate how much you agree with the following statement: I find myself envying the influencers I encounter on social media" ranging from 1 = *strongly disagree* to 6 = *strongly agree*. Under the Influencer Scale, the six items demonstrated good internal consistency in our sample ($\alpha = 0.87$).

Careless Responding

Three questions were used to identify careless responding. Each of the three questions was inserted randomly within each of the three measures administered in the study. The questions asked the participant to choose a particular response category. Choosing an incorrect response was taken as a sign of a careless response.

Additional Questions

Additional questions focused on participant characteristics. Participants were asked about Greek Life Membership (GLM) using the question "Are you a part of the Greek System?", with responses coded as 1 = *yes* and 2 = *no*. Participants were also asked, "Do you play a varsity sport at Sewanee?", with responses coded as 1 = *yes* and 2 = *no*. Frequencies and percentages for these questions are included in Table 1.

Procedure

Participants accessed the survey, online, through a research participant portal at their university. Participants completed informed consent, followed by a request asking them "make sure you are in a distraction-free environment and that you give the study your full attention" before proceeding. Upon proceeding, participants completed the BOT, followed by the IAS, the IS, and then the additional questions, and demographics. Participants were then presented with the following question: "At the beginning of the study you were asked to give the study your full attention. Is there any reason we should not use your data?" Participants were given the option to select, "My data are fine to use" or "Do not use my data.". Finally, participants were debriefed and thanked.

Results

The dataset that emerged from the online survey comprised 85 cases. The following criteria were applied to remove unusable data from the dataset: if the participant had instructed us not to use their data, if the participant was missing more than one response (only for variables that applied to all participants), or if the participant incorrectly answered one of the three careless responding items. The resulting dataset comprised 71 cases. Additionally, four instances of variables were imputed with the mean of the corresponding variable for three participants.

Two variables that are of interest in terms of descriptive characteristics are the BOT (M = 3.32, SD = .79) and the envy question from the IS (M = 3.5, SD = 1.49). For the BOT, the mean scores fell below the midpoint of 3.5 on the Likert scale toward disagreement. For the envy item from the IS, the mean scores fell at the neutral point.

To assess the predictive power of demographic variables and social media use variables for orthorexia, a hierarchical regression analysis was calculated with standardized variables in the following blocks: In the first model, the demographic variables of GLM, varsity sport

participation, and gender, where 1 = *female* and 2 = *male*. In the second model, the variables of SMUI, the envy item, and TTP. In the third model, IAS scores were added. Finally, in the fourth model, two interaction terms were added, the interaction of the envy item and SMUI, and the interaction of TTP and SMUI. The first model did not significantly explain variance in BOT scores. The second model significantly explained 26.4% of the variance, change in $F(3, 64) = 5.69$, $p < .01$. Both SMUI ($\beta = .23$, $p < .05$) and the envy item ($\beta = .40$, $p < .001$). Neither the third model nor the fourth model was significant improvements to the second.

Discussion

This study finds associations between the use of social media and Imaginary Audience on Orthorexia in a sample of predominantly white undergraduates. The alternative hypothesis suggests that social media use is expected to predict levels of ON in college students, with Imaginary Audience as a potential mediating variable. Objective quantitative data about the variables: imaginary audience, social media use, demographic information, and their influence on ON were gathered and used for statistical analyses.

Data from the study reveals that a part of the alternative hypothesis, which suggests, higher levels of social media use predict higher levels of Orthorexia in college students is accepted at the 95% confidence level. However, no significant relationship between the potential medial variable, Imaginary Audience, and Orthorexia in college students is found. Constructs in this study are operationalized using; the IAS, IS, and BOT. All the measures yield acceptable to good internal reliability with Cronbach's alpha values ranging from $\alpha = 0.64$ to $\alpha = 0.88$. While data analysis suggests that scores on the IAS and TTP (in the IS) cannot be used to explain variance in BOT scores, it does find that scores on the envy question of the IS and SMUI are

significant predictors of scores on the BOT. The additional descriptive analysis finds that levels of envy towards influencers are most strongly correlated with orthorexia in the current sample.

This study's findings of social media use predicting Orthorexia tendencies align with results from existing literature that have found that higher internet and social media usage was positively associated with eating disorders (Turner & Lefevre, 2017; Tiggemann & Miller, 2010; Tiggemann & Slater, 2010). A possible explanation for why this relationship is significant might be that social media exposes students to influencers that become subconscious role models and in turn create unrealistic expectations about eating habits and body image (Fardouly et al., 2016). This explanation also might be used to justify why participants who demonstrate high levels of envy towards influencers generally score higher on Orthorexia. Greater levels of envy might mean there is a strong desire to be like the influencer, therefore leading individuals to mirror an influencer's lifestyle and moderate eating habits to look like them.

The medial hypothesis of this study predicted that Imaginary Audience would also positively associate with Orthorexia, however, that wasn't the case. The researchers predict this can be explained using three major reasons. First, there was not enough prevalence of an imaginary audience in the current sample. The mean score on the IAS ($M = 11.11$) was lower than the mean score ($M = 11.83$) typically found for adolescents (Adams and Jones; 1981), this, in conjunction with the low sample size ($n = 71$), may have compromised variability and, therefore, the power of the statistics and led to insignificant results. Additionally, given that O'Connor (1995) found that Imaginary Audience is most prevalent in adolescents (typically 19-20 years of age), it is important to consider that in our convenience sample, a little over half of the participants were juniors or seniors. This might suggest that Imaginary Audience might be of greater significance in participants of younger ages as compared to an older undergraduate

sample. The second reason for the insignificance might be the questionable internal reliability of the IAS in this sample ($\alpha = 0.64$). Researchers predict that extraneous variables such as individual differences, demand characteristics, and the social desirability bias affected the way participants interpreted questions on the IAS Likert scale and therefore led to low internal reliability of the measure. Finally, the low levels of Orthorexia in the sample might be the third reason why the medial hypothesis was not significant. The researchers expected to see higher levels of orthorexia in the sample than there really were. The researchers of this study predict that a broader construct such as body dissatisfaction might be better explained by Imaginary Audience as compared to something less common like Orthorexia.

Moving on from the discussion about the prevalence of Imaginary Audience and Orthorexia in this sample, a review of the sample characteristics of this study suggests that social media could be used to predict Orthorexia in a mainly straight female undergraduate sample (Table 1). Frequency analysis revealed, about three-quarters of this sample was predominantly white females, therefore, decreasing the generalizability and external validity when applying results to non-undergraduate males. Additionally, about 85% of the sample's sexual orientation was straight/ heterosexual, again, limiting the generalization of findings to individuals of sexual orientations other than this.

Researchers of this study find the strong significant association between envying influencers on social media, and Orthorexia tendencies especially fascinating. In the future, this study could be tweaked and used to find relationships between social media use and body dissatisfaction with an individual's jealousy as the medial predictor. Researchers predict that if data from a large sample is gathered, high levels of body dissatisfaction can be explained by high levels of social media use and high levels of envy. Data from such a study can have major

implications in various cases such as parenting techniques (restriction on social media use), treatments for individuals with body dissatisfaction, and awareness about body dissatisfaction in the context of an undergraduate college setting.

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Table 1

Sample Demographics and Participant Characteristics

Characteristic	n	%
Gender		
Female		52 73.2
Male	17	23.9
Non-Binary	2	2.8
Class		
Freshman	16	22.5
Sophomore	18	25.4
Junior	19	26.8
Senior	18	25.3
Sexual Orientation		
Asexual	1	1.4
Bisexual	5	7.0
Gay	1	1.4
Heterosexual or straight	60	84.5
Pansexual	2	2.8
Queer	1	1.4
Greek Organization Member		
Yes (Member)	37	52.1

No (Non-member)	34	47.9
Varsity Athlete		
Yes	24	33.8
No	47	66.2