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Research Article

Self-Criticism and Critical Voices in Eating Disorder Patients and Healthy Controls

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Keywords

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- Self-criticism
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- BMI

Abstract

Objectives: The purpose of the current study was to assess whether eating disorder (ED) patients had higher self-criticism and more experiences with hearing a critical inner voice than healthy controls and whether the Body Mass Index (BMI) is related to hearing critical inner voices.

Method: Using a cross-sectional case-control design, 130 ED patients and 59 healthy controls completed a questionnaire with the Forms of Self-criticizing/Attacking and Self-reassuring Scale, the Psychotic Symptom Rating Scales and The Beliefs about Voices Questionnaire. Mann-Whitney U tests and correlations were used to test the hypothesis.

Results: ED patients had significant higher levels of self-criticism and heard more often inner critical voices compared to the healthy controls. The lower the BMI the more often critical inner voices were heard.

Discussion: To find out whether self-criticism and a low BMI are a risk factor for hearing inner critical voices prospective research is necessary.

INTRODUCTION

Patients suffering from eating disorders (ED) are highly perfectionistic whereby the relation between perfectionism and the eating disorder is mediated by self-criticism [1].

In addition, self-criticism is often found in eating disorder patients and is a strong predictor for high scores on the Eating Disorder Inventory-2 (EDI-2) [1,2]. Greater distress caused by recurring self-critical thinking may be a consequence of unhealthy perfectionism [3]. A non-clinical sample of 94 women showed a significant association between perfectionism and anorectic and bulimic automatic thoughts [4].

Although most ED patients start their restriction of food intake as a deliberate ego-syntonic decision, in the severe stage of their ED a change occurs, whereby they hear a commanding ego-dystonic voice in their head [5] which forces them to reduce their food intake and their weight [6,7]. In the severe stage anorectic thoughts dominate their life and identity [8,9].

In the first period of the ED, the inner voice is often experienced as positive, but when the severity of the ED increases the voice is experienced as very negative [10]. What first started as a source of comfort changes to a dominant voice who asks for unquestioning obedience [10]. In a study by Noordenbos et al. [6], 94.5% of the young female ED patients experienced critical inner voices in the severe stage of their ED, as measured by the Beliefs About Voices Questionnaire-Revised (BAVQ-R). In addition, critical inner voices become more negative when the weight of anorectic patient becomes very low [10]. Therefore a correlation might be found between critical thoughts and a low BMI of less than 17.5, which indicates underweight [11].

Aim of study and hypotheses

The aim of this study is to investigate differences between ED patients and a healthy control group (CG) with regard to self-criticism and experiences with hearing critical inner voices. In addition, this study will assess the relationship between BMI and hearing a critical inner voice.

Hypotheses

1. ED patients show significantly higher self-criticism compared to the healthy controls.
2. Compared to a healthy control group ED patients have significantly a) more experiences with hearing a critical inner voice b) a higher frequency of hearing critical inner voices, c) a longer duration of critical inner voices and d) a higher degree of suffering from hearing critical inner voices.
3. ED patients show significantly higher scores on the subscales a) omnipotence and b) malevolence of the BAVQ-R, compared to healthy controls.
4. Patients with a BMI of less than 17.5 mention significantly

a) a higher frequency of hearing critical inner voices, b) a longer duration of critical inner voices, c) and a higher degree of suffering from hearing critical inner voices.

Research design

This study had a cross-sectional case-control design to compare ED patients with a healthy, non-clinical CG.

Participants and procedure

Since patients with anorexia nervosa and bulimia nervosa have similar experiences with critical inner voices [12- 14], this study included anorexia nervosa and bulimia nervosa patients in the ED Group (EDG). Patients with Binge eating disorders are not included in this study because no research has found that patients with BED also hear critical inner voices.

In order to find participants with eating disorders, several Centers for Eating Disorders in the Netherlands were contacted: Amarum in Zutphen, Lentis in Groningen and Emergis in Goes. These Centers treat patients with Eating Disorders. Only patients who were diagnosed by this Center with Anorexia and Bulimia Nervosa were included in this research. At the moment of research the eating disorder patients were in different stages varying from severely ill to improved. For that reason their BMI's varied from 11, 49 to 35.08.

The Ethical Committees of these three institutions gave permission to conduct this study. After this permission was obtained, questionnaires were sent to the head of the department of eating disorders, who distributed the questionnaires to ED patients. All participants provided written informed consent before the start of the study. The questionnaires could be filled out in the centre of eating disorders. The respondents could participate anonymously. When patients were not willing to participate they could leave the questions unanswered.

After filling in the questionnaire the patients could put their questionnaires and signed informed consent form in an envelope. The therapists gathered all the closed envelopes and sent them to the researchers in Leiden.

Participants were included in the EDG if they were diagnosed with anorexia or bulimia nervosa. Patients with other eating disorders were excluded as well as patients with a diagnosis of schizophrenia, or psychotic symptoms; this was done to ensure that the inner voices heard by the participants were neither hallucinations nor part of a delusion.

In total 130 participants with an ED participated in this study: all of them were women between the ages of 18 and 48 years, with a mean age of 25.82 (SD=8.77). In total 92 participants were diagnosed with anorexia nervosa and 38 with bulimia nervosa.

Participants were included in the healthy control group (CG) if they met the following criteria: being female and between the ages of 18 and 48, and having no clinical diagnosis or history of an ED, schizophrenia, or a psychotic disorder. These inclusion criteria were chosen to match this group adequately with the group of ED patients. The participants in the CG were recruited through the network of students from the department of Clinical Psychology at Leiden University. In total 59 participants were included in the healthy CG, with a mean age of 24.42 (SD=3.76).

Instruments

Participants were asked to fill in a questionnaire concerning demographic information (gender, age, education, weight and height), their diagnosis, the onset and development of the ED, duration and treatment of the ED, and their experiences with hearing a critical inner voice. Furthermore the participants had to fill in the following four scales:

EDE-Q

First, severity of the participants' ED was measured using the Eating Disorder Examination-Questionnaire (EDE-Q); this is a self-report questionnaire designed to measure several specific psychopathological features of eating disorders [15]. This self-report scale measures the present state of eating behavior and attitude over the last 28 days [15]. The EDE-Q uses a Likert scale from 0 to 6 whereby 0=0 days, and 6=28 days. Higher scores indicate greater severity of ED psychopathology [15]. The EDE-Q has as good test-retest reliability [16]. Earlier research found for the global EDE-Q a Cronbach's Alpha of .96 [17]. In the current study the analysis of reliability showed a high internal consistency for the EDE-Q global scale of .95. This makes this instrument very usable and reliable for this study.

FSCRS

The Forms of Self-criticizing/Attacking and Self-reassuring Scale (FSCRS) assess self-criticism and self-reassurance [18]. This is a 22-item five-point Likert scale, ranging from 0 (not at all like me) to 4 (extremely like me). In a study by Gilbert, Clarke, Hemple, Miles and Irons [19], a principal-component analysis with direct oblimin rotation was implemented, resulting in a three-component solution, namely the Inadequate Self, the Hated Self and the Reassuring Self. In a study by Castilho et al. [18], the internal consistency was high for the Inadequate Self, Hated Self and Reassured Self subscales with a Cronbach's alpha of .95, .86 and .94, respectively. In our study the internal reliability for the total FSCRS was high with α= .96.

PSYRATS

The participants were asked to fill in the Psychotic Symptom Rating Scales (PSYRATS) [20]. This instrument measures characteristics of the inner voice. Participants were asked to complete this questionnaire with respect to the most severe episode of hearing a voice. As shown in a study by Drake, Haddock, Tarrier, Bentall and Lewis [21], the internal consistency for the auditory hallucinations had a Cronbach's Alpha of α= .76. For the current study, only items from the Auditory Hallucinations subscale of the PSYRATS were used which measures the frequency and duration of hearing inner voices in the last week. The frequency of hearing inner critical voices could vary from 0= never; 1 = once a week, 3= once a day, 4 = once each hour to 5 = nearly continuously; the duration of hearing an inner critical voice could vary from 1= a few seconds; 2= a few minutes; 3: at least one hour; 4- several hours. The degree of suffering could vary from 0= not to 5 = very much.

This subscale had a high internal consistency with a Cronbach's alpha of α= .96. The answers on the question about the degree of suffering from hearing inner a critical voice were used to test the second and fourth hypothesis.

BAVQ-R

The Beliefs about Voices Questionnaire (BAVQ-R) was used to assess not only the participants' beliefs about auditory hallucinations, but also their emotional and behavioral reactions to auditory hallucinations [22]. The BAVQ-R uses a 35-item Likert scale, ranging from 1 (disagree) to 4 (strongly agree). The BAVQ-R has three subscales considering beliefs about the nature of the inner voice: Malevolence (six items), Benevolence (nine items), and Omnipotence (six items). Resistance (nine items) and Engagement (eight items) are two other subscales that measure the behavioral and emotional relationship to the inner voice [22]. The Cronbach's alpha for the total score of the BAVQ−R was α= 0.86 [22].

For current study, the internal consistency for the total score of the BAVQ-R was very high, with a Cronbach's alpha of .98. In this study only the subscales Omnipotence (about the voice as powerful and dominant) and Malevolence (about punishing thoughts) are used. In a study by Chadwick et al. [22], the internal consistencies of the different subscales were strong, with a Cronbach's alpha ranging from .74 for the Omnipotence subscale and. 85 for the Malevolence subscale. In our study, the subscales Omnipotence and Malevolence both had a high internal consistency with a Cronbach's alpha of α= .95.

Statistical analysis

Data analysis was performed using SPSS statistics 22. Before executing the statistical analyses, data were checked on assumptions according to the specific test and to determine whether the data were normally distributed. Differences in demographic characteristics between the EDG and the CG (such as age, current weight, and BMI) were calculated using independent-sample t-tests followed by Bonferroni corrections which led to a new significant level of α (0.5/4)=0.125.

To examine differences between the EDG and the healthy CG in self-criticism and experiences of hearing a critical inner voice (first, second and third hypothesis) one-way Analyses of Variances (ANOVA) were used.

For the fourth hypothesis independent-samples t-tests were used followed by Bonferroni corrections which means that the critical *p* value of .05 was divided by the three comparisons which led to a new critical p value of .05/3= 0.167.

In order to analyses the fourth hypothesis the BMIs were calculated for the EDG and CG. This was done by dividing weight in kilos by the square of height in meters.

RESULTS

Participant characteristics

In total 130 female eating disorders patients completed the questionnaire: 92 (70,8%) participants were diagnosed with anorexia nervosa (AN) and 38 (29,3%) with bulimia nervosa (BN) No patients had received a diagnosis of schizophrenia or any other psychotic disorder.

The 130 female ED patients were referred to as the EDG. Their scores were compared with a control group (CG) of 59 healthy women. In table 1 the age, current weight and current BMI are presented.

Table (1) shows that the mean age of the participants in the EDG was 25.82 which was significant older than the participants in the CG who had a mean age of 24.42, (t (189) = 1.526, p = <.001, d=0.22). In addition an independent-sample t-tests indicated that the mean current weight and mean BMI of the EDG (respectively 54.13 and 18.75) were significantly lower than that of the CG (respectively 65.44 and 22.43), t (186) = -7.261, p<.001, d= 0.54 and t (186) = -7.093, p <.001, d= 0.52. The AN group had a significantly lower mean BMI than the CG, (t(150)= -10.672, p<.001, d=1.75), but the mean BMI of the BN group did not differ significantly from the CG, t(95)=-1.118, p=.266, d=0.23. Lastly, the mean BMI of the AN group (17.57) was significantly lower than the mean BMI of the BN group (21.73) (t(127)=-5.963, p<.001, d=1.74).

Scores on the EDE-Q

Differences between the EDG and CG with regard to ED pathology were analysed by performing independent-samples t-tests. Data were normally distributed. Participants in the EDG showed significantly higher scores on the EDE-Q total score compared to the CG, with a mean of 4.53 (SD=0.79) for the EDG and a mean of 1.18 (SD =1.00) for the CG (d =4.75, t= 22.561 and p<.001).

The means of the subscales of the EDE-Q were also significantly different. For the subscale Eating Concern (EC) the mean scores were 3.97 for the EDG and 0.60 for the CG d=5.03, t= 28.188. For the subscale Shape Concern (SC) the means were respectively 5.30 and 1.53 (d= 3.95, t= 17.750; for the Weight Concern (WC) the means were respectively 5.08 and 1.30 (d= 3.97, t= 18.683). For the subscale Restraint Concern (RC) the means were respectively 4.76 and 1.16 (d= 2.92, t= 19.985).

Differences in self-criticism

A one-way ANOVA was conducted to investigate the differences between both groups on the scores on the FSCRS about self-criticism. The total score of the EDG was 55.11 (SD=13.56) and the total score of the Control Group was 25.21(SD= 10.13). Inspection of the skewness, kurtosis and Shapiro-Wilk statistics indicated that the assumption of normality was supported for both conditions. The results of the one-way ANOVA for the scores on self-criticism were statistically significant, indicating that the EDG had a significant higher score on the FSCRS than the CG, F (1, 150)= 209.553, p<.001, η^2= .583.

High self-criticism however, is not unique for eating disorder patients, but is also found in patients with depression, as is described in the studies of Franche and Dobson [24] and Zuroff, Igreja and Mongrain [25]. Depression is often found as co-morbidity in Eating Disorder patients [26].

Experiences with hearing a critical inner voice

In total 96.2% of the EDG reported having heard critical inner voices and 3.8 % had very critical thoughts. Participants of the CG also reported having heard critical inner voices but at a lower frequency of 39%.

A one-way ANOVA was conducted to measure the differences between the groups. Inspection of the skewness, kurtosis and Shapiro-Wilk statistics indicated that the assumption of normality was supported for both conditions.

Table 1: Demographic characteristics and Mean Scores, SDs, t values and p values for total scale and sub-scales of the EDE-Q for the EDG (N=130) and the CG (N=59).

	EDG (n=130) Mean (SD)	CG (n=59) Mean (SD)	D	t	p
Age	25.82 (8.77)	24.42 (3.76)	0.21	1.526	<.001
Current weight	53.13 (10.01)	65.44 (9.63)	-1.25	-7.261	<.001
BMI (EDG)	18.75 (4.39)	22.43 (3.16)	-0.96	-7.093	<.001
BMI AN	17.57 (2.51)	22.43 (3.16)	-1.70	-10.672	<.001
BMI BN	21.73 (3.87)	22.43 (3.16)	-0.99	-1.118	.266
EDE-Q total	4. 53 (0.79)	1.18 (1.00)	4.75	22.561	<.001
Eating Concerns (EC)	3.97 (0.86)	0.60 (0.69)	5.03	28.188	<.001
Shape Concerns (SC)	5.30 (0.99)	1.53 (1.48)	3.95	17.750	<.001
Weight Concerns (WC)	5.08 (1.05)	1.30 (1.37)	3.97	18.683	<.001
Restraint Concerns (RC)	4.76 (1.17)	1.16 (1.08)	2.92	19.895	<.001

Table 2: Independent-samples t-tests of the frequency, the duration and the degree of suffering of hearing critical inner voices on group 1 (N = 49) and group 2 (N = 78).

	Group 1	BMI<17.5 Mean (SD)	Group 2	BMI>17.5 Mean (SD)	D	t	p
Frequencies		4.19(1.47)		2.94 (2.14)	0.83	4.359	<.001
Duration		2.22 (1.11)		1.61 (1.43)	0.59	2.943	.002
Suffering		4.57(1.41)		3.27 (2.25)	0.88	4.921	<.001

a) The comparison of the outcomes showed that the EDG had a significantly higher score on the subscale of the PSYRATS than the CG, F (1, 186) =173,651, p<.001, η^2= .483.

b) The frequency of hearing critical voices was significant higher for the EDG than the CG, F (1, 92) = 200,235, p <.001, η^2= .575.

c) The EDG also had a significant higher score on the duration of the critical inner voices compared to the CG, F (1,175) = 107,569, p=<.001, η^2= .381.

d) Moreover, the EDG had a significant higher score on the degree of suffering from hearing critical inner voices than the CG, F= (1, 89) =211, 663, p=<.001, η^2= .576.

Differences between groups with regard to the BAVQ-R

Because both the EDG (group 1) and the CG (group 2) had experiences with hearing critical inner voices a one-way ANOVA was conducted to measure differences between both groups on the malevolence and omnipotence scale of the BAVQ-R. For the malevolence scale the result was F (1, 173) = 189,571 p <.001 and for the omnipotence scale F (1, 176) = 229,420, p <.001. For both scales group 1 had a significant higher score than group 2.

Relationship between BMI an hearing critical inner voices

The EDG was divided in a group with a BMI of less than 17.5 and a group with a BMI over 17.5. A BMI less than 17.5 is an indication of low weight. First, frequencies were been calculated for group 1 (BMI<17.5) and group 2 (BMI>17.5) to investigate group differences. In total 49 participants were included in group 1 and 78 participants in group 2.

The frequency of hearing inner critical voices could vary from 0= never to 5; the duration of hearing an inner critical voice could vary from 1= once a week to nearly continuously; and from 1= a few seconds to 4 several hours.

The results of the independent-samples t-tests are presented in Table (2). These results show that the frequencies of all items were significantly higher in group 1 than in group 2.

a. Table (2) shows that group 1 mentioned a significantly higher frequency of hearing critical inner voices than group 2. The independent-sample t-test showed that group 1 had a significant higher mean score on frequency of the critical inner voice, t(174)= 4.359, p<.001, d= 0.83.

b. In order to test the hypothesis that group 1 would show a higher score on duration of critical inner voices compared to group 2, mean scores were compared by computing an independent-samples t-test, t(174)= 2.943, p= .004, d= 0.59. Group 1 showed a significantly higher score on duration of critical inner voices compared to group 2.

c. Answers on the PSYRATS were used to determine whether group 1 had higher scores on suffering from critical inner voices compared to group 2. Mean scores were compared by computing an independent-samples t-test, t (177) = 4.921, p <.001, d= 0.88. Group 1 had higher scores on the items concerning suffering from critical inner voices compared to group 2.

DISCUSSION

The results of this study support the first hypothesis that ED patients show significantly higher self-criticism according to the FSCRS compared to healthy controls. This hypothesis was tested using items from the FSCRS. This result is comparable to the findings of Kannan and Levitt [2], who found that self-criticism, is often present in patients who are dealing with psychological

difficulties such as eating disorders. Moreover, Fennig et al. [1], found that self-criticism has been found to be a strong predictor of ED severity. Our result is also comparable with the findings of Shafran et al. [23], who found that the patients have a pervasive negative view of themselves that becomes a part of their identity. They also found that patients with BN also have a negative self-evaluation.

The second hypothesis that ED patients have significantly a) more experiences with hearing a critical inner voice, b) a higher frequency of hearing a critical inner voice, c) a longer duration of critical inner voices and d) a higher degree of suffering from hearing critical inner voices than healthy controls was also confirmed. Hearing critical inner voices was significantly more common among the EDG (96.2%) than the CG (39%). These results are confirmed by the findings of the studies of Tierney and Fox [10], Noordenbos, et al. [6], and Pugh and Waller [7].

Hypothesis 3 which suggested that ED patients had significantly higher scores on the negative subscales malevolence and omnipotence of the BAVQ-R than the healthy controls was also confirmed: participants with an ED suffered more from hearing a critical inner voice than the CG and they experienced the inner voice as significant more powerful, demanding, frightening, anxious, dominant, and evil. These findings are confirmed by other studies [10,7,9], who also found that the inner voice becomes more negative as the AN becomes more severe.

Also the fourth hypothesis was confirmed whereby participants with a BMI <17.5 were compared with participants with a BMI >17.5. A BMI of 17.5 was used because this is evaluated as underweight. Because the participants in EDG were selected in different Centers for Eating Disorders where they were treated for their eating disorder some anorectic patients no longer had a very low weight at the time of the research. Only 23 participants had a BMI <17.5 (all of them had Anorexia Nervosa) and 94 participants had a BMI >17.5 (Anorectic and Bulimic patients).

We found that participants with a BMI of less than 17.5 mentioned) a higher frequency of hearing critical inner voices; b) a longer duration of critical inner voices; c) and a higher degree of suffering from hearing critical inner voices.

All these differences were significantly different. Our results are confirmed in the studies of Tierney and Fox [10] and Pugh and Waller [7] who also found that the anorectic voice becomes more negative when the weight reduced.

A point of discussion is when a person has underweight. The World Health Organization (WHO) [27] mentions a BMI between 18.50 and 24.99 as ''normal weight". When persons have a BMI between 18.00 and 18.50 they might be evaluated as having underweight, but the difference with a BMI of 18.50 is very small. For that reason we used a BMI 17.50 which is clearly underweight. However, more research is necessary to find out at which BMI the hearing of inner critical voices becomes more severe.

Strengths

Most studies focusing on hearing clinical inner voices had a small number of participants, such as the studies of Broussard [12] with 13 participants; Rawal, et al. [8], with 10 participants; Tierney and Fox [10], with 21 participants, and Pugh and Waller [7], with 49 participants. Our study had a total number of 130 ED participants (N= 130) with 92 Anorectic patients and 38 Bulimic patients.

This study used validated quantitative scales, whereas the studies of Broussard [2] and Tierney and Fox [10] used qualitative methods of gathering data. In our study a comparison was made between a large group of 130 ED patients and 59 healthy controls. Moreover, in the current study a comparison was made with a group of a BMI less than17.5 and a group with a BMI more than 17.5.This study found an association between a low BMI and the frequency, duration and suffering from hearing critical inner voices. Furthermore, the effect sizes in this study were relatively high.

LIMITATIONS

A weak point in our study was that we were not able to investigate the development of the critical inner voices over time, as was done by Tierney and Fox [10]. They found that the content of the critical voices changed from positive and supporting into negative and denigrating. Another limitation of our study is the use of self-report questionnaires. Moreover, the number of participants in this study was skewed with 130 ED patients and 59 persons in the CG. Also the distribution of different forms of eating disorders in the EDG was skewed, with 70.8% patients diagnosed with AN and only 29.2% patients diagnosed with BN.

The participants of Eating Disorder Group were selected during the period that they received a treatment in a Center of Eating Disorders. Some patients were still in a severe stage of their eating disorder, while others were in the stage of improvement or recovery. For this reason several anorectic patients no longer had underweight.

RECOMMENDATIONS

Increasing the number of participants in the control group might improve the power and reliability of the results. A more equal division could be taken into account for future research. Also a prospective long-term design is desirable to explore the development of the critical inner voices over time. An important question for further research is how treatment can decrease severe self-criticism and the hearing of critical inner voices in eating disorder patients.

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