Obsessive-compulsive symptoms in young women affected with anorexia nervosa and their relationship with personality, psychopathology and attachment style

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Research Article

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Abstract

Purpose

Obsessive-compulsive symptoms (OC) are associated with greater morbidity and worse prognosis in anorexia nervosa (AN). We assessed the presence of non-eating OC in participants with AN and related them with their psychopathology, personality, and attachment style features.

Methods

Young women with AN (N = 41, 30 restricter and 11 binge-purging type) were assessed on the Yale-Brown Obsessive-Compulsive Scale (Y-BOCS). Participants with AN and 82 healthy controls (HC) completed the Temperament and Character Inventory (TCI), Eating Disorder Inventory-2 (EDI-2), Symptom Checklist-90 (SCL- 90), Toronto Alexithymia Scale (TAS-20), and Attachment Style Questionnaire (ASQ), and were compared to underscore the AN features. Y-BOCS scores were correlated to psychopathology, personality, and attachment features in AN participants.

Results

AN had significantly higher scores than HC on EDI-2, SCL-90, TAS-20, ASQ-Need for Approval, and TCI-Harm Avoidance and Self-directedness. The Y-BOCS scores were significantly correlated with ASQ-Need for Approval, TAS-20-Difficulty in Describing Feelings, SCL-90-Phobic Anxiety, and Anxiety, EDI-2-Drive to Thinness and Asceticism. Need for Approval displayed the strongest and broadest correlation pattern with OC symptoms. Difficulty in describing feelings displayed the strongest correlation with compulsive OC symptoms.

Conclusions

OC traits in participants with AN are primarily associated with measures of insecure attachment rather than to their eating and general psychopathology. Therapeutic approaches to correcting insecure attachment may be considered a possible choice to treat OC symptoms in AN. The study suggests a new psychopathological perspective to understand the meaning of obsessive-compulsive symptoms in AN.

Introduction

An association between obsessive-compulsive features (OC) and eating disorders (EDs), in particular anorexia nervosa (AN), has long been reported [1–5]. Some authors raised the question about the possible psychogenetic connection between the two disorders due to the involvement of the serotonergic system [6–8]. Moreover, the inclusion of AN into a broad OCD spectrum has been proposed [9, 10].

There are indeed analogies in the symptomatic manifestations of both AN and OCD, with the presence of intrusive and distressing thoughts accompanied by the urge to implement compulsive behaviors to reduce the anxiety generated by the obsessions [11–13]. In AN, behaviors such as food restriction, exercise and vomiting are often accompanied by rigid rituals, such as eating food according to a certain order, calculating the caloric content of each food ingested, or chewing food a precise number of times [14]. Often in OCD there are rituals related to food, sometimes leading to weight loss [15, 16]. In both disorders the OC tendencies may serve a similar function of affective regulation [17]. For these reasons clinicians are often in difficulty in distinguishing the nature of the observed OC in AN: i.e. which behaviors are primarily eating symptoms and which ones are expressive of a comorbid OCD. Moreover it is unclear if food-related OC symptoms have a similar pathogenesis with the non-food-related OC symptoms or they should be distinguished and treated with different approaches. A better comprehension of the relationship between the most common psychopathologic features of AN and non-food-related OC symptoms may help clinicians to manage their comorbidity.

The prevalence of OCD in subjects with EDs has been reported to vary from 10 to 60%, significantly higher than the 1–2% rate found in the general population [18, 19]. In subjects suffering from OCD, on the other hand, there is a 10–17% risk of being affected by EDs [20, 21].

A link between the disorders may be their relationship with the anxiety disorders' spectrum. In DSM-IV, OCD was classified among the anxiety disorders [22]. The AN is also characterized by high levels of anxiety with respect to food intake and weight increase [23, 24]. The quality of anxiety of both disorders may be atypical with respect to other anxiety disorders, since the use of the benzodiazepines has a limited effect in both [25]. Moreover, although anxiety disorders and OCD both have a high prevalence among women with AN, only OCD is a predictor for the subsequent development of AN [26].

Another point of junction is represented by personality characteristics. Both OCD and AN display a higher prevalence of cluster C personality disorders [27, 28]. The rate of obsessive-compulsive personality disorder (OCDP) was found to be 23–35% in OCD, compared to 1–2% in the general population [29, 30]. In restricter-type AN, OCPD represents the most frequent personality disorder with a prevalence similar to that in OCD [28]. OC traits, such as perfectionism, inflexibility, and the need for order, were also found in the offspring of participants with AN with OCD, regardless of a comorbid OCPD [31]. In terms of personality traits, both OCD and AN are characterized by low novelty seeking, high harm avoidance, high persistence and low self-directedness [32]. The presence of OC traits in childhood, such as perfectionism and the need for order, was associated with a greater rate of comorbid OCD and AN in adulthood [33].

The comorbidity between AN and OCD represents a therapeutic challenge: it is associated with a greater severity of eating symptoms, a tendency to physical hyperactivity, a higher rate of anxiety and depression, and a higher probability of relapse [4, 34–36]. On the other hand, the malnutrition that characterizes AN participants with AN has important cognitive effects, which can worsen the obsessive symptoms and influence the response therapies for OCD [37].

Despite the abovementioned well documented relationship between AN and OCD, it has been never explored the relationship of OC symptoms with the psychopathological roots of the AN in AN participants. Are OC symptoms related to particularly severe anxiety comorbidity? Are they a collateral symptomatic expression of highly malfunctioning personality traits? Do they strictly relate to the eating psycopathology?

Since impaired attachment and alexithymic traits [38] are relevant to the pathogenesis of AN, perhaps OC symptoms could be related to these psychopathological features which were not taken into account in previous evidences. To the best of our knowledge no study explored these questions before.

This paper seeks to answer the aforementioned unsolved questions by shedding light on the relationship between OCD symptoms in participants with AN and their personality, psychopathology, and attachment characteristics. The profile of participants with AN is compared to that of healthy controls, and symptoms of OC are related to the personality and psychopathology characteristics of participants with AN.

Methods

Sample

Participants were recruited from the University of Turin Regional Pilot Center for Eating Disorders, in Turin (Italy) which includes Inpatient, Day Hospital and Outpatient services. As a randomization criterion they were recruited all the available subjects who were in treatment in the center between June 2018 and June 2019. All participants received a psychiatric examination to determine the presence of AN using the Structured Clinical Interview for Diagnosis (SCID) for DSM-IV-TR, a tool that has fair to excellent inter-rater reliability on axis I and excellent on axis II diagnoses [39].

In order to make the sample as homogeneous as possible and increase study specificity, we adopted restrictive inclusion and exclusion criteria. In particular, participants were: 1) full diagnosis of AN according to the SCID; 2) female only, to avoid gender related differences; 3) with BMI $\geq$ 14, to avoid severe malnutrition, which has been shown to affect brain functioning; 4) Caucasian of Italian origin or UE origin with mother-language knowledge of Italian language. We excluded participants with: 1) intellectual disability; 2) developmental or learning disorders; 3) acute psychotic disorders; 4) neurological disorder (e.g., multiple sclerosis, stroke, history of severe head trauma); 5) substance abuse.

From an initial group of 54 recruited subjects with AN, 13 were excluded (8 for low BMI below 14, 2 for failure to complete the tests, 3 for male gender). The final group consisted of 41 participants with AN (30 restrictive and 11 binge-purging type), aged between 16 and 30 years (Table 1). Among the included AN subjects 8 (19%) received a clinical diagnosis of OCD during clinical assessment.

Description of controls

A group of healthy controls randomly selected from the database of the Neurosciences Department of the University of Torino was included for the present study. The comparison to controls was done to highlight

the overall representativeness of the participants with AN with respect to previous literature [23, 32, 40–42], and to select the variables to be correlated with Y-BOCS scores. The database was composed of healthy subjects (university students voluntarily recruited after curricular lessons) which were screened for major psychiatric disorders using the SCID, and then assessed with the same self-administered instruments applied to participants with AN. The included control sample consisted of 82 healthy controls (HC), aged between 22 and 24 years old. Students were informed about the purpose of the study and obtained assurance about their anonymity. Written informed consent was obtained from each student before tests delivery.

The HC did not receive the Y-BOCS administration because they belonged to a formerly recruited database with respect to the present study. The recruitment of a healthy control group assessed with Y-BOCS and self-rated tests was not choose in consideration of the results in the previous literature which indicated very low Y-BOCS scores in the normal population [44], and thus suggested the impossibility to perform a consistent correlation analysis between the Y-BOCS scores and psychopathological measures in the healthy subjects.

Ethics

All participants provided written informed consent prior to be included in the study and assessed. This study was performed in accordance with the 1995 Declaration of Helsinki, as revised in Edinburgh, in October 2000. The students' recruitment and assessment was approved by the Bioethics Committee of the University of Turin, Italy (Protocol Number: 127252).

In agreement with the Inter-Hospital Ethical Committee (CEI), the ethical committee agreement was not requested for clinical participants since all procedures were part of the routine procedures applied by the clinical service.

Hetero-administered interview for OC symptoms

All participants with AN in the study were given the *Yale-Brown Obsessive-Compulsive Scale* (Y-BOCS) [43], a scale designed for use as a semi-structured interview for assessing type and severity of OC symptoms. The interviewer assesses the presence and severity of OC symptoms in the last week (including the time of the interview). Before proceeding with the interview, participants with AN were provided with a clear definition of the concepts of obsessions and compulsion.

Y-BOCS administration requires interviewer training before administration to the patient. The IS author underwent training before administering the patient interview.

The Y-BOCS scale was administered with a blind procedure with respect to the results of the self-administered inventories and clinical assessment: the interviewer was not informed about the results of

the self-administered inventories at the moment of the administration of the interview.

The interview produces results based on 0-4 Likert scales. The final results are articulated in six scales. Three are clinical scales: Obsessions (O), Compulsions (C), Total Score (O+C), and three qualitative scales: Global Severity, Insight and Reliability. The total Y-BOCS score displays 5 levels of severity: 0-7 subclinical; 8-15 mild; 16-23 moderate; 24-31 severe; 32-40 extreme.

Self-administered inventories

AN women and HC completed a battery of self-administered psychometric tests aimed at investigating the personological and psychopathological features of the participants with AN, as well as their attachment style. The battery includes:

The *Temperament and Character Inventory* (TCI) [45]: questionnaire composed of 240 items that investigate seven personality dimensions distinguished in the 4 dimensions of the temperament and the 3 of the character, according to the neurobiological model proposed by Cloninger.

Among the temperamental traits they are distinguished: Harm avoidance (HA), Novelty Seeking (NS), Reward Dependence (RD), Persistence (P).

The character dimensions include: Self-directedness (SD), Cooperativeness (C), Self-transcendence (ST). (Chronbach's Alpha for Italian version =0.72).

The *Eating Disorder Inventory-2* (EDI-2) [46] is a questionnaire that evaluates the psychopathological characteristics salient in eating disorders.
These features were formulated in 91 items and divided into 11 subscales:
Drive to thinness (DT), Bulimia (BU), Body dissatisfaction (BD), Inadequacy (IN), Perfectionism (P), Interpersonal distrust (ID), Enteroceptive awareness (EA), Fear of maturity (MF), Ascetism (ASC), Impulsiveness (I), Social insecurity (SI). (Chronbach's Alpha for Italian version =0.81).

The *Toronto Alexithymia Scale* (TAS-20) [47]: questionnaire of 20 items, used to assess the level of alexithymia. It is divided into 3 factorial scales:
1. Difficulty in identifying feelings; 2. Difficulty in describing feelings; 3. Thought oriented towards the outside: cognitive style polarized towards the meticulous analysis of external reality.

The total TAS-20 score, obtained by adding the scores for the three subscales, is between 20 and 100, with a cut-off of 61. (Chronbach's Alpha for Italian version =0.72).

The *Symptom Checklist-90 SCL-90* (SCL-90) [48]: Test composed of 90 items that assesses the presence and severity of symptoms of mental illness in the last week (including the day of the evaluation) in different symptom domains. The subject's responses are interpreted on the basis of nine primary symptom dimensions, listed below:

Somatization (SOM), Obsessivity-Compulsivity (OC), Interpersonal hypersensitivity (IS), Depression (DEP), Anxiety (ANX), Hostility (HOS), Phobic anxiety (PHOB), Paranoid ideation (PAR), Psychoticism (PSY). A tenth dimension, the Total Score (TOT), is the sum of the previous ones. (Chronbach's Alpha for Italian version = 0.96).

The *Attachment Style Questionnaire* (ASQ) [49]: it is a self-administered questionnaire, composed of 40 items evaluated through a 6-point scale (1 totally disagree, 6 totally agreed), used to identify the style of attachment within interpersonal relationships. Analyzing the main components of the questionnaire based on the Bartholomew model the 40 items were divided into 5 scales: Trust (8 item) that defines the safe style, Discomfort due to intimacy (10 items), Secondariness of relations (8 items) (These last two items define an avoidant/detached style), Need for approval (7 items), Concern for relationships (7 items) (These last two items define a worried or anxious style). (Chronbach's Alpha for Italian version =0.79).

Data analysis

The Y-BOCS total score obtained by participants with AN was compared between the participants who had a clinical diagnosis of OCD and those without it. It was used the Mann-Whitney U test, a nonparametric test, since the normal distribution of the variables was impaired by the small group size of those with OCD (N = 8).

The total Y-BOCS score of AN participants was compared on a healthy population extracted from the literature using the Student's t-test [44].

The distribution of the patient's sample in the five Y-BOCS categories was detected.

A within-sample ANOVA comparison of Y-BOCS sub-scores and total score was made between the three subgroups of outpatients with AN, inpatients with AN in ordinary admission and DH inpatients with AN, to highlight possible differences related to the clinical pathway.

A comparison between participants with AN and healthy controls was performed using Student's t-tests for clinical, demographic and psychometric measures. The ANCOVA was applied to compare psychometric variables among groups using the demographic variables which resulted significantly different between groups (i.e. BMI and age). In consideration of the high number of comparisons, a correction for the p value was adopted to reduce type I errors, a $p<0.001$ value accepted for the next analysis.

A Pearson's correlation analysis was performed between the Y-BOCS scores of the participants with AN, and their BMI, age of onset of the disease, and those psychometric variables which differed between participants with AN and healthy controls. In consideration of the use of p correction in the previous analysis to produce variable reduction, and because of the explorative aims of the study, a more conservative correction was applied for the correlation analysis, with a $p<0.01$ value accepted.

The statistical software package Statistical Package for Social Sciences SPSS 27.0 was used for data analysis.

Results

Comparison of Y-BOCS score among AN clinical subgroups and between participants with AN and healthy population

Participants with AN with a clinical diagnosis of OCD displayed a higher Y-BOCS total score (31.50±4.75 vs 18.70±7.27; U=251,00; p<0.001); higher obsessions (15.63±2.87 vs 9.82±4.36; U=229,00; p<0.001); higher compulsions (15.88±3.31 vs 8.88±4.20; U=242,00; p<0.001); higher severity (4.75±0.46 vs 2.03±1.32; U=260,00; p<0.001).

Participants with AN displayed a mean total Y-BOCS score which was in the moderate range (mean = 21.20, SD = 8.5) and thus was higher than that of the healthy population gathered from the literature (mean = 0.31, SD = 1.21; t = 5.34; p<0.001) [44].

Sociodemographic and clinical features in participant groups

Table 1 displays the comparison between participants' groups. The average BMI of participants with AN was lower than that of controls (p<0.001). The average age of the participants with AN was lower than healthy controls (p<0.010).

Y-BOCS sub-scores distribution among participants with AN and clinical subgroups comparison
The distribution of participants with AN among the classes of symptoms severity was the following: 12% of participants with AN falled into the subclinical severity category, 12% manifested mild symptoms, 42% symptoms of moderate severity, 17% severe symptoms and 17% symptoms of extreme degree.
No statistically significant differences were observed in the Y-BOCS scores among the treatment subgroups.

ANCOVA comparison between participants with AN and healthy controls
As shown in Table 2, participants with AN display higher HA (p<0.001) and lower SD (p<0.001). Participants with AN displayed higher scores in all EDI-2 subscales (p<0.001), and all SCL-90 scores (p<0.001), in difficulty in identifying feelings, difficulty in describing feelings, and TAS-20 total score (p<0.001), compared to healthy controls. Participants with AN scored significantly higher than the controls also in the need for approval subscale of the ASQ (p<0.001).

Pearson's linear correlation between Y-BOCS, and personality and psychopathology features

The variables which differed between participants with AN and healthy controls were correlated with Y-BOCS scores among the participants with AN. Table 3 displays only the significant correlations observed between Y-BOCS scores and the other features. The total Y-BOCS score positively correlated with need for approval (p<0.007) and difficulty in describing feelings (p<0.007). The Y-BOCS subtotal score "obsessions" positively correlated with need for approval (p<0.002), anxiety (p<0.003), and phobic anxiety

($p<0.002$). The Y-BOCS subtotal score “compulsions” positively correlates with difficulty in describing feelings ($p<0.002$).
The Y-BOCS severity index positively correlated with drive to thinness ($p<0.007$), depression ($p<0.002$), anxiety ($p<0.008$), need for approval ($p<0.001$).

Discussion

Our sample included 19% of participants with AN with clinical OCD, according to literature estimate of OCD prevalence in AN subject [50–52]. Participants with AN with a clinical OCD displayed greater symptoms severity at Y-BOCS administration. The finding of a 34% rate of participants with AN carrying severe OCD symptoms is higher with respect to the prevalence of OCD [53, 54]. This datum suggests a possible an underestimation of OCD in the AN population using clinical assessment. This may be because OCD is masked by the OC symptoms attributed to the eating symptoms. The mean total Y-BOCS in our participants with AN is very close to the average value documented by literature [23, 55, 56], and the levels of severity are not significantly different among therapeutic subgroups: this suggests a good representativeness of the sample with respect to literature.

Participants with AN displayed personality traits and eating psychopathology characteristics already highlighted by the literature [23, 32, 40–42]. High values of HA and low SD have been related to trait anxiety, depressive symptoms and OCD [32, 57]. A personality jointure between the AN and OCD symptoms is not confirmed by the present results. In fact, HA and SD scores do not correlate with Y-BOCS scores.

Correlation of the Y-BOCS with personality and psychopathology features

The need for approval displays the more significant and extensive correlation with the Y-BOCS dimensions. The need for approval represents the need to feel appreciated and recognized to feel confident, and it is an indicator of an insecure anxious attachment [58]. Insecure-anxious attachment is predictive of higher levels of obsessive-compulsiveness in OCD [59–61]. Moreover an insecure attachment corresponds to greater levels of anxiety and greater vigilance on intrusive thoughts [62, 63]. Some authors suggested that insecure attachment may play a role in reinforcing distorted cognitions typical of OCD acting as a mediator between these and obsessive symptoms [60, 64]. Literature suggests that in AN women the need for approval is related to many eating psychopathology dimensions, including drive to thinness and perfectionism, to general psychopathology, and to greater obsessive-compulsiveness in particular [65]. The high need for approval appears to be the major statistical predictor of body dissatisfaction regardless of personality traits [66]. Moreover the greater need for approval, along with the “core” personality traits of AN, has been suggested as the main characteristic which differentiates AN-affected and nonaffected siblings living in the same family [65].

The higher levels of alexithymia in participants with AN are consistent with the literature data [67, 68]. Indeed, the present study evidences a strong relation of the difficulty in describing feelings with total OC symptoms, compulsions in particular. Even if some reports suggest that alexithymia is not always present in AN, research suggests a relevant role of this trait in predicting worse psychopathological functioning and treatment difficulties [69]. Hilde Bruch (1973) emphasizes the difficulty in subjects affected with AN in distinguishing between bodily sensations, such as hunger and satiety, and emotional tensions, as a consequence of an inadequate process of individuation-separation from the parental figures [70].

The contribution of alexithymia to the OC symptoms expression can thus be linked to the evidence of an insecure attachment expressed in our participants with AN. The capacity for mentalization (i.e. the ability to interpret human behavior in terms of mental states) in today's attachment theory descends from an appropriate maternal communication and from a mother who is sensitive with respect to the child's experience [71, 72]. An insecure attachment would take the form of a deficit in the concept of self, which has been proposed to be the psychopathological core of eating disorders [38, 73, 74]. The self is understood as an integrated structure, which organizes and coordinates various functions (emotional, cognitive, social, motor and vegetative sensory) in relation to stimuli coming from within and from the environment [75]. People with AN would use their body image as a "proxy" of their own self since they lack of an integrated sense of self [76, 77]. A devaluation of the self as a result of the internalization of "bad" Internal Operating Models would therefore correspond to a dissatisfaction with one's own body [76]. An insecure attachment has been observed to be associated with a negative view of oneself, an excessive need for approval and the fear of abandonment [78].

The extensive correlation pattern of the phobic anxiety, anxiety, and depression with Y-BOCS scores was more expected since they represent a frequent comorbid psychopathology of AN [23, 24], and because of the affinity of the OCD with the anxiety spectrum [22]. It is noteworthy the correlation of the obsessions with phobic anxiety. This may suggest that obsessions in women with AN may be the result of the massive expression of a coping mechanism (phobic avoidance) which is shared by phobic anxiety and food avoidance, an essential component of the pathogenesis of AN [79].

Drive to thinness and asceticism are the only eating psychopathology features related to OC symptoms. AN women with OCD show a great desire to be thin which is reached due to their high tendency to self-sacrifice which is due to asceticism [80]. Moreover both these traits and OC symptoms can be related to a common mechanism of “shifting” form inner problems to external ones [76, 81].

Conclusion

Strengths of the study

Present data evidence that participants with AN are characterized by high levels of OC symptoms and that these are consistently related with their eating and general psychopathology. Nevertheless the exploration of the roots of OC symptoms in participants with AN reveal unexpected relations.

The main jointure between the AN and the OC symptomatology does not lie neither in the common personality core [32] nor in the eating psychopathology, which displays limited correlation with the OC symptoms. The phobic-anxious features are relevant for the obsessions, but not for the compulsions. Unexpectedly, the need for approval coupled with the alexithymia suggest a relevant attachment root of OC symptoms in participants with AN.

Obsessive–compulsive personality, anxiety traits, and OCD are often present in childhood prior to the onset of AN and display a strong familial association [82]. AN and OCD share the strongest polygenic risk correlations from Genome Wide Association Studies (GWAS) [83]. The current findings suggest that also insecure-anxious attachment may be considered a common factor implicated in the development of both the AN [65, 66, 84, 85] and the OCD [69, 86]. OCD and AN could be alternative ways to compensate for anxious traits and insecure attachment. Further research may explore if the genetic roots of AN and DOC may represent a liability for insecure attachment itself. The regularity of compulsive rituals in OCD, as well as the severe "ascetic" control of bodily impulses in AN, could represent a maladaptive attempt to manage the fear of abandonment and the unpredictability of the relationship with the other [74, 87, 88].

Given the worse prognosis associated with the coexistence of both AN and OCD, early recognition of OC symptoms may lead to more effective treatment and better prognosis. Moreover, a better understanding of the psychopathological characteristic underlying the OC symptoms in the two disorders may better address drug and psychotherapeutic treatments.

Present data suggest possible psychotherapeutic considerations: the AN needs a comprehensive approach (e.g. CBT-enhanced) which directly approaches relational and attachment problems [89]. It is possible that paying more attention to attachment may be useful for OCD subjects. Anyway it seems to be strategic to approach attachment troubles in those subjects which express a comorbidity between the disorders [90]. Approaching the attachment problems by building an empathic, authoritative, stable and caring therapeutic relationship may represent a necessary strategy to overcome the resistance to changes with both AN and OCD participants with AN [91].

Limits of the study

The cross-sectional nature of the study does not allow to explore the temporal relationship between insecure-anxious attachment, obsessive-compulsive symptoms and anorexia. To confirm the association observed between the need for approval and the presence of obsessive-compulsive symptoms in the AN, a larger and more homogeneous sample of participants with AN would be preferable and DSM 5 criteria should be applied. The control group was composed of university students and this could represent a recruitment bias. The Y-BOCS test was not administered to a control group of OCD subjects. A study of attachment dynamics directly comparing with the same assessment tools the participants with AN affected with anorexia nervosa and participants with AN affected with OCD, in comorbidity or not, could provide further insight the relationship between the attachment features and the psychopathologic expression.

What is already known on this subject?

It is well known a link between AN and OC symptoms. AN often display eating symptoms with OC features. There is a frequent comorbidity between the disorders. Both disorders have been related to anxiety symptoms, but both display clear differences with respect to anxiety disorders. Finally, AN and OCD share personality traits which may represent a mediator between the two symptom clusters.

What this study adds?

The OC symptoms displayed by AN subjects are underestimated if a specific assessment is not carried on. The OC symptoms of participants with AN are not strictly related to the personality traits that the AN shares with the OCD. The OC symptoms are independently related to attachment features, in particular the need for approval, and to phobic anxiety. The new interpretative paradigm from this finding supports a greater role of attachment troubles in fostering OC symptoms.

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Tables

Table 1. Clinical and demographic data

	Participants with AN (n= 41)	Controls (n=82)	t	*P*
	mn±sd	mn±sd		
BMI	16.55±2.07	21.20±2.32	10.788	0.001
CGI score	5.07±0.60	-	-	-
Age of onset (years)	15.93±3.17	-	-	-
Age (years)	21.03±6.12	23.13±0.85	2.535	0.013
Binge-eating/week	1.46±4.17	-	-	-

AN= anorexia nervosa; mn= mean; sd= standard deviation; BMI= body mass index; CGI= clinical global impression.

Table 2. Comparison of personality and psychopathology variables: significant differences

	Participants with AN (n=41)	Controls (n=82)	F	*P*
	mn±sd	mn±sd		
Novelty Seeking (TCI)	16.62±8.88	18.31±5.44	0.774	0.464
Harm Avoidance (TCI)	29.32±18.25	18.53±7.37	8.560	**0.001**
Reward Dependence (TCI)	14.32±5.17	15.33±4.03	1.280	0.283
Persistence (TCI)	7.59±12.62	4.66±2.22	1.429	0.245
Self-Directedness (TCI)	20.38±8.96	28.30±8.75	12.479	**0.001**
Cooperativeness (TCI)	28.92±9.00	30.60±7.62	1.580	0.212
Self-Trascendence (TCI)	11.57±7.33	12.03±7.24	0.571	0.567
Drive to thinness (EDI-2)	14.97±6.16	2.02±4.18	86.540	**0.001**
Bulimia (EDI-2)	3.45±5.18	1.48±3.00	3.451	0.036
Body Dissatisfaction (EDI-2)	14.66±7.71	5.56±7.08	15.566	**0.001**
Inadequacy (EDI-2)	16.18±9.82	3.31±4.86	35.733	**0.001**
Perfectionism (EDI-2)	7.24±3.72	4.86±3.68	4.149	0.019
Interpersonal Distrust (EDI-2)	10.61±5.61	3.36±3.60	29.663	**0.001**
Interoceptive Awareness (EDI-2)	17.03±9.30	2.19±3.09	64.459	**0.001**
Maturity Fears (EDI-2)	9.97±6.35	3.97±4.98	11.224	**0.001**
Asceticism (EDI-2)	10.03±4.95	3.37±2.75	32.154	**0.001**
Impulsivity (EDI-2)	10.61±8.47	1.99±3.22	22.892	**0.001**
Social Insecurity (EDI-2)	9.97±4.26	3.95±3.71	24.465	**0.001**
Somatization (SCL-90)	22.84±11.11	7.03±6.03	57.990	**0.001**
Obsessive-compulsivity (SCL-90)	23.88±10.13	8.56±5.62	57.224	**0.001**
Interpersonal Oversensibility (SCL-90)	20.19±9.44	7.02±5.84	41.671	**0.001**
Depression (SCL-90)	31.12±12.73	9.97±7.75	59.891	**0.001**
Anxiety (SCL-90)	22.46±9.87	7.21±4.92	60.199	**0.001**
Hostility (SCL-90)	9.77±7.33	3.06±2.49	28.388	**0.001**
Phobic Anxiety (SCL-90)	9.38±6.78	1.84±2.01	41.339	**0.001**
Paranoid Ideation (SCL-90)	10.08±5.96	4.33±4.13	16.171	**0.001**
Psycoticism (SCL-90)	13.38±8.04	3.98±3.49	39.251	**0.001**
SCL-90 total score	170.27±82.06	57.03±34.86	55.558	**0.001**
Confidence (ASQ)	30.11±29.66	30.87±4.85	0.260	0.772
Discomfort with Closeness (ASQ)	28.40±7.14	27.05±6.29	0.526	0.593
Relationships as Secondary (ASQ)	36.81±5.30	33.86±5.95	4.764	0.011
Need for approval (ASQ)	29.59±6.06	22.65±5.35	16.944	**0.001**
Preoccupation with Relationships (ASQ)	21.30±5.82	19.25±5.69	0.772	0.465
Difficulty in Identifying Feelings (TAS-20)	24.78±5.26	11.99±5.43	59.321	**0.001**
Difficulty in Describing Feelings (TAS-20)	18.50±5.10	12.87±5.52	12.836	**0.001**

Externally-Oriented Thinking (TAS-20)	19.14±4.56	17.22±5.42	1.305	0.276
Alexithimia (total score) (TAS-20)	61.36±12.00	42.17±9.33	36.933	**0.001**

Accepted significance p<.001. *Mn= mean; sd= standard deviation. Bold characters indicate the variables which are included in the next analysis.*

Table 3. Pearson correlation between Y-BOCS scores, personality and psychopathology

Y-BOCS variable	Correlated variable	r	*P*
Y-BOCS total score	Harm Avoidance (TCI)	-0.029	0.863
	Self-Directedness (TCI)	-0.084	0.622
	Drive to Thinness (EDI-2)	0.392	0.015
	Body Dissatisfaction (EDI-2)	0.198	0.234
	Inadequacy (EDI-2)	0.139	0.404
	Interpersonal Distrust (EDI-2)	0.181	0.277
	Interoceptive Awareness (EDI-2)	0.210	0.206
	Maturity Fears (EDI-2)	-0.137	0.413
	Asceticism (EDI-2)	0.367	0.023
	Impulsivity (EDI-2)	0.310	0.058
	Social Insecurity (EDI-2)	0.221	0.183
	Somatization (SCL-90)	0.255	0.219
	Obsessive-Compulsivity (SCL-90)	0.214	0.294
	Interpersonal Oversensibility (SCL-90)	0.215	0.290
	Depression (SCL-90)	0.349	0.080
	Anxiety (SCL-90)	0.419	0.033
	Hostility (SCL-90)	0.184	0.369
	Phobic Anxiety (SCL-90)	0.492	0.011
	Paranoid Ideation (SCL-90)	0.052	0.802
	Psycoticism (SCL-90)	0.183	0.372
	SCL-90 total score	0.237	0.243
	Need for Approval (ASQ)	0.433	**0.007**
	Difficulty in Identifying Feelings (TAS-20)	0.196	0.253
	Difficulty in describing feelings (TAS-20)	0.444	**0.007**
	Alexithimia (total score) (TAS-20)	0.250	0.142
Y-BOCS subtotal obsessions	Harm Avoidance (TCI)	0.060	0.722
	Self-Directedness (TCI)	-0.278	0.095
	Drive to Thinness (EDI-2)	0.342	0.036
	Body Dissatisfaction (EDI-2)	0.259	0.116
	Inadequacy (EDI-2)	0.221	0.183
	Interpersonal Distrust (EDI-2)	0.184	0.268
	Interoceptive Awareness (EDI-2)	0.225	0.175
	Maturity Fears (EDI-2)	0.065	0.699
	Asceticism (EDI-2)	0.352	0.030
	Impulsivity (EDI-2)	0.309	0.059
	Social Insecurity (EDI-2)	0.277	0.092
	Somatization (SCL-90)	0.415	0.039
	Obsessive-Compulsivity (SCL-90)	0.428	0.029
	Interpersonal Oversensibility (SCL-90)	0.328	0.102

	Depression (SCL-90)	0.479	0.013
	Anxiety (SCL-90)	0.560	**0.003**
	Hostility (SCL-90)	0.197	0.334
	Phobic anxiety (SCL-90)	0.590	**0.002**
	Paranoid Anxiety (SCL-90)	0.152	0.459
	Psycoticism (SCL-90)	0.324	0.107
	SCL-90 total score	0.329	0.101
	Need for Approval (ASQ)	0.495	**0.002**
	Difficulty in Identifying Feelings (TAS-20)	0.089	0.606
	Difficulty in describing feelings (TAS-20)	0.284	0.093
	Alexithimia (total score) (TAS-20)	0.091	0.596
Y-BOCS subtotal compulsions	Harm Avoidance (TCI)	-0.106	0.534
	Self-Directedness (TCI)	0.118	0.487
	Drive to Thinness (EDI-2)	0.341	0.036
	Body Dissatisfaction (EDI-2)	0.091	0.588
	Inadequacy (EDI-2)	0.028	0.866
	Interpersonal Distrust (EDI-2)	0.132	0.429
	Interoceptive Awareness (EDI-2)	0.144	0.389
	Maturity Fears (EDI-2)	-0.290	0.077
	Asceticism (EDI-2)	0.290	0.078
	Impulsivity (EDI-2)	0.234	0.158
	Social Insecurity (EDI-2)	0.113	0.499
	Somatization (SCL-90)	0.047	0.824
	Obsessive-Compulsivity (SCL-90)	-0.040	0.845
	Interpersonal Oversensibility (SCL-90)	0.059	0.775
	Depression (SCL-90)	0.146	0.478
	Anxiety (SCL-90)	0.190	0.354
	Hostility (SCL-90)	0.129	0.529
	Phobic Anxiety (SCL-90)	0.287	0.155
	Paranoid Ideation (SCL-90)	-0.056	0.785
	Psycoticism (SCL-90)	0.006	0.979
	SCL-90 total score	0.095	0.644
	Need for Approval (ASQ)	0.279	0.095
	Difficulty in Identifying Feelings (TAS-20)	0.252	0.139
	Difficulty in describing feelings (TAS-20)	0.495	**0.002**
	Alexithimia (total score) (TAS-20)	0.341	0.042
Y-BOCS severity	Harm Avoidance (TCI)	0.094	0.580
	Self-Directedness (TCI)	-0.143	0.399
	Drive to Thinness (EDI-2)	0.428	**0.007**

Body Dissatisfaction (EDI-2)	0.312	0.057
Inadequacy (EDI-2)	0.021	0.899
Interpersonal Distrust (EDI-2)	-0.025	0.883
Interoceptive Awareness (EDI-2)	0.045	0.787
Maturity Fears (EDI-2)	-0.167	0.315
Asceticism (EDI-2)	0.394	0.014
Impulsivity (EDI-2)	0.115	0.491
Social Insecurity (EDI-2)	0.220	0.184
Somatization (SCL-90)	0.393	0.052
Obsessive-Compulsivity (SCL-90)	0.282	0.163
Interpersonal Oversensibility (SCL-90)	0.372	0.061
Depression (SCL-90)	0.571	**0.002**
Anxiety (SCL-90)	0.506	**0.008**
Hostility (SCL-90)	0.260	0.200
Phobic Anxiety (SCL-90)	0.377	0.057
Paranoid Ideation (SCL-90)	0.136	0.508
Psycoticism (SCL-90)	0.309	0.125
SCL-90 total score	0.448	0.022
Need for Approval (ASQ)	0.543	**0.001**
Difficulty in Identifying Feelings (TAS-20)	0.160	0.353
Difficulty in describing feelings (TAS-20)	0.170	0.323
Alexithimia (total score) (TAS-20)	0.124	0.473

Accepted significance p<.01.

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