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## Case Control Study

## Psychic euosmia among obsessive-compulsive personality disorder patients: A case control study

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**Abstract****BACKGROUND**

Psychic euosmia (PE) has been described as a supposed psychological predisposition for which pleasant smells elicit an immediate sense of pleasure, order and calmness in obsessive-compulsive personality disorder (OCPD). In this study we tried to verify the interpretation that PE is the counterpart of disgust that has been associated to contamination and moral purity. Disgust and morality are significantly associated in people with obsessive-compulsive personality traits. We expected that OCPD patients would experience higher levels of PE.

**AIM**

To investigate the PE frequency in OCPD patients and healthy controls (HC) and to evaluate the relationship between PE and disgust.

**METHODS**

A single-center, case-control study was conducted in an outpatient service for obsessive-compulsive and related disorders. The sample consisted of 129 subjects: 45 OCPD patients and 84 HC. In both groups we submitted the Disgust Scale Revised (DS-R) and the self-report Structured Clinical Interview for DSM-5 Screening Personality Questionnaire to which we added an additional yes or no

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question to investigate the presence of PE. In order to verify differences between groups, *t*-test was employed for continuous variables and <sup>2</sup> test for categorical variable; odds ratio was employed to analyze group differences in the PE survey. Correlation was explored with Pearson *r* correlations.

## RESULTS

No differences were observed between groups in gender composition or education. A slight significant difference was found in mean age ( $t = 1.988$ ;  $P = 0.049$ ). The present study revealed significantly higher proportions of PE among OCPD patients when compared to HC (OR: 5.3, 2.28-12.46). Patients with OCPD were more likely to report PE ( $n = 36$ ; 80%) whereas a much lower proportion endorsed PE in the HC group ( $n = 36$ ; 42.9%). Interestingly, no differences were observed between groups in mean score for the Disgust Scale. There was also no difference between the two groups in any of the Disgust Scale Revised subscales. Moreover, no significant correlations were observed in the OCPD group between PE and Disgust Scale Revised subscales.

## CONCLUSION

Results suggested that PE might be part of the clinical spectrum of OCPD, and it does not reflect the counterpart of disgust. This could also indicate that this phenomenon is a manifestation of orderliness or incompleteness. Further studies will need to be undertaken to better understand PE and its significance in OCPD.

**Key Words:** Psychic euosmia; Obsessive-compulsive personality disorder; Disgust; Orderliness; Olfactory; Personality

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**Core Tip:** Psychic euosmia (PE) is a positive aspect of obsessive-compulsive personality disorder (OCPD) recently described as a psychological predisposition for which pleasant smells elicit an immediate sense of pleasure, order and calmness. In the absence of other scientific observations, our group decided to investigate the presence of this phenomenon among OCPD patients and how PE ought to be considered. The present study revealed significantly higher rates of PE among OCPD patients compared to healthy control subjects. The absence of correlation between PE and the Disgust Scale in the OCPD group supports the hypothesis that this experience is not associated with disgust.

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## INTRODUCTION

Obsessive-compulsive personality disorder (OCPD), also known as anankastic personality disorder in the ICD-11<sup>[1]</sup>, is one of the most represented personality disorders in the general population with a prevalence ranging from 2.1% to 7.9%<sup>[2-4]</sup>. OCPD has a high comorbidity with obsessive-compulsive disorder (OCD), with a rate ranging from 23% to 47%<sup>[5-9]</sup> as well as body dysmorphic disorder<sup>[10,11]</sup>, autism spectrum disorder<sup>[12,13]</sup> and eating disorders<sup>[14,15]</sup>. The high rates of comorbidity have led researchers to speculate that OCPD bears a relationship with OCD<sup>[16]</sup>. Janet<sup>[17]</sup> described the manifestations and the core traits of OCPD, referring to particular aspects of “psychoasthenia,” such as excessive controlled emotional expression, inability to achieve perfection, indecisiveness, orderliness and stubbornness. Later, Lewis<sup>[18]</sup> described two types of personalities in persons with OCPD: One characterized by negative affect, stubbornness and irritability and the other by uncertainty and submissiveness. During the years, the description of OCPD has evolved and is



currently defined by the DSM-5 as “a pervasive preoccupation for orderliness, perfectionism, mental and interpersonal control at the expense of flexibility, openness and efficiency”<sup>[2]</sup>. At the same time, the DSM-5 coded OCD in a new taxonomy called obsessive-compulsive and related disorders (OCRD). As reported by Fineberg *et al*<sup>[16]</sup>, OCPD is typically associated with a restricted repertoire of rigid, stereotyped and disabling compulsive thinking patterns and behaviors with attaining completeness and intra- and interpersonal control, like doubting, checking and hoarding, are experienced as ego-syntonic or rather perceived as appropriate and correct by the person affected. Moreover, the same authors suggest the overlap of several characteristics between OCPD and OCD support the inclusion of OCPD in the OCRDs.

Thus, Riddle *et al*<sup>[19]</sup> described two specific dimensions in OCPD patients: One characterized by order and control and the other by hoarding and indecision. According to a dimensional approach, personality disorders can be considered “a quantitative” variation of personality traits, within a continuum between normality and psychopathology. In this sense, some manifestations such as orderliness and cleanliness in OCPD subjects do not necessarily represent a maladaptive variant. Few studies have focused on positive aspects of OCPD<sup>[20]</sup>.

Psychic euosmia (PE)<sup>[21]</sup> is a positive aspect of OCPD that was recently described as a psychological predisposition for which pleasant smells elicit an immediate sense of pleasure, order and calmness in OCPD. In the absence of other scientific observations, our group decided to investigate the presence of this phenomenon among OCPD patients and subsequently how PE ought to be considered. We delineate three possible hypotheses: PE is a manifestation of orderliness, is a just right component or is the counterpart of disgust that has been associated with contamination and moral purity. In this study we tried to verify this last interpretation. Accordingly, Ottaviani *et al*<sup>[22]</sup> supported the relationship between disgust and morality, which are significantly associated in people with obsessive-compulsive personality traits. It is possible to distinguish core disgust, elicited by different physical stimuli, and moral disgust, specifically human, induced by immoral behavior that violates justice and human dignity<sup>[23]</sup>. Disgust involves the autonomic nervous system; several studies showed neurovegetative equivalents, like nausea and changes in the normal rhythm of stomach contractions and fainting, were associated with changes in the cardiovascular system during disgust by activation of the vagus nerve<sup>[24-26]</sup>. Neuroimaging studies reported activation of brain areas implicated in the emotion of disgust, such as the insula. The insula has been strongly implicated in perceiving and experiencing different forms of disgust<sup>[27,28]</sup>.

The present study aimed at evaluating the presence of PE in a group of patients with a diagnosis of OCPD without comorbidity compared with healthy controls (HC). We expected that OCPD patients would experience higher levels of PE. The second aim was to ascertain the possible relationship between PE and disgust.

## MATERIALS AND METHODS

To investigate whether the frequency of PE differs in patients with OCPD and HC and whether this component is related to disgust, we conducted a case-control study in consecutive outpatients enrolled in 2019 at an outpatient service for OCRDs, Policlinico Umberto I, Rome. The study was conducted in agreement with the Declaration of Helsinki and approved by the local ethics committee. Written informed consent was obtained from all eligible participants following a complete description of study details. Participants were informed regarding their freedom to withdraw from the study at any time without any negative effect on their therapy. The sample consisted of 129 subjects: 45 patients affected by OCPD and 84 HC. HC were recruited through “word of mouth” among volunteers. All participants were assessed for the presence of a psychiatric disorder with clinical interview using the diagnostic criteria based on the DSM-5<sup>[2]</sup>. Both the HC subjects and the cases were assessed by the same trained personnel. Having comorbidity psychiatric diagnosis and/or cognitive impairment was considered an exclusion criterion. From an initial sample of 52 patients diagnosed with OCPD, 7 subjects were excluded from the analysis due to comorbidity with OCD. Demographic data were collected for all samples. To explore the presence of OCPD in both groups, we submitted self-report Structured Clinical Interview for DSM-5 Screening Personality Questionnaire<sup>[29]</sup> to which we added an additional question, derived from the most common unsolicited affirmation of patients regarding this phenomenon, to investigate the presence of PE: “Do you happen to feel an immediate sense of well-being, or be in a good mood all of a sudden, or feel

calmness as soon as you smell clean or fresh smells (like fresh laundry)? Give us some examples.”

The common unsolicited affirmation of patients often refers to a prompt mood improvement upon encountering good scents in general, or fresh laundry borax on their clothes, pillows or home settings. We have asked for examples in order to verify if subjects' answers were congruent with the framework of PE.

Moreover, all participants completed the Disgust Scale Revised (DS-R) to evaluate the disgust sensitivity. We used the Italian version<sup>[30]</sup> of DS-R<sup>[31,32]</sup>. This version is a self-report questionnaire that includes 25 items describing stimuli that elicit disgust across three distinct domains: Core disgust, animal-reminder disgust and contamination-based disgust. The scale is divided into two sections, and each section presents items for each domain. There are 13 items plus 1 trick question in the first section and 12 items plus 1 trick question in the second section. All items are rated on a 5-point scale from 0 (strongly disagree/not disgusting at all) to 4 (strongly agree/extremely disgusting). The total scale score is the sum of the 25 items, after reversing the scores for items 1, 6 and 10.

Statistical analysis was performed with SPSS 24 (IBM) software. In order to verify differences between groups, *t*-test was employed for continuous variables and  $\chi^2$  test for categorical variable. In order to verify differences between groups in the presence of PE, the odds ratio and its 95% confidence level according to the Woolf's method were calculated<sup>[33]</sup>. Correlation between variables was explored with Pearson *r* correlations. Bonferroni correction for multiple comparisons was applied. Statistical review of the study was performed by a biomedical statistician. The statistical methods of this study were reviewed by Pasquini P, MD, MPH, former Head of Department of Epidemiology and Biostatistics at Istituto Superiore di Sanità, Rome, Italy.

## RESULTS

Socio-demographic characteristics of the subjects are shown in [Table 1](#). No differences were observed between groups in gender composition or education. A significant difference was found in mean age as the patient group was older than the HC ( $P = 0.049$ ). Regarding the presence of PE, significant differences were found between groups in how they answered the corresponding item during the interview (OR 5.34, 2.28-12.46) ([Table 2](#)). Among our 45 study subjects with OCPD, 36 (80%) were positive, while among 84 HC only 36 (42.9%) were positive. Interestingly, no differences were observed between groups in mean score on the Disgust Scale ( $t = 1.298$ ;  $P = 0.197$ ). There was also no difference between the two groups in the DS-R subscales ([Table 3](#)). No significant correlations were observed in the OCPD group between PE and DS-R subscales.

## DISCUSSION

The present study revealed significantly higher proportions of PE among OCPD patients when compared to HC subjects. Thereby meaning that PE might be part of the clinical spectrum of OCPD. We also found that there were no significant differences in disgust sensitivity between OCPD patients and HC. Moreover, the absence of correlation between PE and subscales of Disgust Scale in OCPD group supported the hypothesis that this experience was not associated with disgust in this population.

This finding suggests that PE does not reflect the counterpart of disgust and might also indicate that this phenomenon is a manifestation of orderliness or incompleteness. Indeed, the sense of calmness derived by an experience of a pleasant smell would seem to complete the sense of perfection in an otherwise uncomfortable person. This might suggest that PE could be a manifestation of incompleteness. According to the dimensional approach, such maladaptive variants of personality disorder traits could transition imperceptibly into a spectrum of normal<sup>[16,34]</sup>. The same could be true for adaptive traits. As an example, in a normalcy *vs* pathology continuum approach, being conscientious or a tendency to be orderly and well organized may resemble a normal condition with several advantages in certain situations. Not surprisingly few studies have focused on positive aspects of OCPD<sup>[35]</sup>. On the other hand, PE could be conceptualized as a normal reaction.

A strength of our study is that comorbidity was excluded. However, our study is limited in that the sample size was small, we did not examine a second control group composed of patients affected by other psychiatric disorders, and we only interviewed

**Table 1 Socio-demographical characteristics of the sample**

Variable	HC, n = 84	OCPD, n = 45	Statistics	
	mean ± SD	mean ± SD	t	P value
Age	38.9 ± 15.2	44.9 ± 17.3	1.988	0.049
Education in yr	15.9 ± 2.7	15.3 ± 3.1	1.103	0.272
<b>Sex</b>	<b>n (%)</b>	<b>n (%)</b>	<b>χ<sup>2</sup></b>	<b>P value</b>
Male	36 (42.9)	21 (46.7)	0.233	0.629
Female	48 (57.1)	24 (53.3)		

<sup>a</sup>P < 0.05.

HC: Healthy controls; OCPD: Obsessive-compulsive personality disorder; SD: Standard deviation.

**Table 2 Estimated odds ratio for the presence of psychic euosmia**

	OCPD, n	HC, n
Presence of PE	36	36
Absence of PE	9	48

HC: Healthy controls; OCPD: Obsessive-compulsive personality disorder; PE: Psychic euosmia.

**Table 3 Mean scores and standard deviation in each Disgust Scale Revised subscale**

Disgust Scale-Revised subscales	OCPD, n = 45	HC, n = 84	Statistics	
	mean ± SD	mean ± SD	t	P value
Core	28.2 ± 8.5	27.2 ± 8.2	0.692	0.490
Animal reminder	16.0 ± 6.7	14.6 ± 6.5	1.140	0.257
Contamination	9.2 ± 4.9	7.8 ± 3.5	1.765	0.082
Total	53.5 ± 17.3	49.6 ± 15.6	1.298	0.197

HC: Healthy controls; OCPD: Obsessive-compulsive personality disorder.

help-seeking patients attending an outpatient clinic for OCD. This may have biased our sample. To the best of our knowledge, this is the first case-control study on PE. There is need for additional research to better understand PE and its significance in OCPD.

## CONCLUSION

Results suggest that PE might be part of the clinical spectrum of OCPD, and it does not reflect the counterpart of disgust. In our study, PE is over-represented among OCPD subjects. This supports an association, and one might speculate that PE is related to orderliness and cleanliness in this population. Using an evolutionary hypothesis, PE may reflect one's ability to differentiate between unpleasant and pleasant odors, which may have made a difference in terms of survival or death<sup>[36]</sup>.

## ARTICLE HIGHLIGHTS

### Research background

According to a dimensional approach, personality disorders can be considered “a

quantitative" variation of personality traits within a continuum between normality and psychopathology. In this sense, some manifestations such as orderliness and cleanliness in obsessive-compulsive personality disorder (OCPD) subjects do not necessarily represent a maladaptive variant. Psychic euosmia (PE) is a positive aspect of OCPD that was recently described as a psychological predisposition for which pleasant smells elicit an immediate sense of pleasure, order and calmness in OCPD.

### **Research motivation**

Few studies have focused on positive aspects of OCPD. In the absence of other scientific observations, our group decided to investigate the presence of this phenomenon among OCPD patients and subsequently how PE ought to be considered.

### **Research objectives**

We delineate three possible hypotheses: PE is a manifestation of orderliness, is a just right component, or is the counterpart of disgust that has been associated to contamination and moral purity. In this study we tried to verify this last interpretation.

### **Research methods**

The sample consisted of 129 subjects: 45 patients affected by OCPD and 84 healthy controls. To explore the presence of OCPD in both groups we submitted self-report Structured Clinical Interview for DSM-5 Screening Personality Questionnaire to which we added an additional question to investigate the presence of PE. All participants completed the Disgust Scale Revised to evaluate the disgust sensitivity. We used the Italian version of the Disgust Scale Revised.

### **Research results**

Regarding the presence of PE, a significant difference was found between groups in how they answered the corresponding item during the interview. Among the 45 study subjects with OCPD, 36 (80%) were positive. While among 84 HC, only 36 (42.9%) were positive. Interestingly no differences were observed between groups in the mean score at the Disgust Scale.

### **Research conclusions**

Results suggest that PE might be part of the clinical spectrum of OCPD, and it does not reflect the counterpart of disgust. In our study, PE is over-represented among OCPD subjects. This supports an association, and one might speculate that PE is related to orderliness and cleanliness in this population.

### **Research perspectives**

To the best of our knowledge, this is the first case-control study on PE. There is need for additional research to better understand PE and its significance in OCPD.

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