Disgust and anger perception of ambiguous facial expressions in obsessive-compulsive disorder

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Abstract

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Objectives: The aim of this study is to examine the recognition of non-ambiguous and ambiguous facial expressions in OCD patients compared to normal controls, especially in relations to disgust recognition which has been implicated in the disease model of OCD.

Methods: Forty-one patients with OCD and thirty-seven healthy controls performed the computerized emotion recognition task consisted of two paradigms, the non-ambiguous paradigm and the ambiguous paradigm. Morphed facial photographs of negative emotions of anger, disgust, fear and sadness were used.

Results: There were no differences between the OCD patients and the normal controls in the frequency of correct identification of non-ambiguous facial expressions ($F=1.46$, $p=0.23$). In response to ambiguous facial expressions, OCD patients were more likely to perceive disgust ($F=5.1$, $p=0.03$) and less likely to perceive anger ($F=5.9$, $p=0.02$). Among the disgust domains, only the domain of Contamination-Based Disgust positively correlated with perception of ambiguous facial expression as disgust, specifically ($r=0.25$, $p=0.03$), while negatively correlating with anger ($r= -0.26$, $p=0.03$).

Conclusion: OCD patients were significantly more likely to recognize ambiguous facial expressions as disgust. Current findings suggest that OCD patients might be more prone to perceiving stimuli as disgustful in ambiguous social context.

Key Words : Disgust perception, obsessive-compulsive disorder, facial expression recognition, contamination symptoms

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I. Introduction

Disgust has been implicated to underlie various psychiatric illnesses with supporting evidence accumulating. Initially defined as a revulsion response to distasteful foods[1], the current concept of disgust has broadened to include responses to a wide range of stimuli. These stimuli include poor hygiene, violations of the normal body envelope, death, reminders of animal-origin of humans and inappropriate sexual acts [2].

At its core, disgust has been hypothesized to serve an evolutionary function of preventing contamination and disease by the characteristic behavioral dimension of avoidance, a tendency to distance the self from the offensive object[1, 2]. Disgust also has specific physiological manifestation such as nausea and a distinct facial expression of narrowed nostrils, raising of upper lip and wrinkling of the brow[3, 4]. In a developmental perspective, perception of disgust is thought to be absent at birth and obtained through childhood[2]. The learning process is suggested to occur through experience with other peoples' disgust, involving the identification of the disgust-eliciting stimuli, recognition

of other peoples' facial expressions of disgust, and correlation between the two[5]. If there is a dysfunction in this appraisal process of disgust, the stimuli that elicit disgust in those with the dysfunction may be discrepant from the stimuli that elicit disgust in other individuals[5].

Impairment in this appraisal process of disgust has been suggested in the underlying pathophysiology of obsessive-compulsive disorder (OCD). OCD is a relatively common disorder, characterized by persistent and unwanted thoughts and ritualistic behavior. OCD patients often exhibit heightened appraisal of perceived vulnerability to infection and spread of contamination in response to offensive objects, which elicit contamination obsessions and washing compulsions[6]. Thus, it is suspected that a dysfunction in disgust appraisal, which would be associated with impairment or bias in recognition of disgust, may play a role in the disease model of OCD.

In contrast to the strong theoretical background of the role of disgust perception in OCD, research findings have not been as consistent. Sprengelmeyer et al.[7] reported that OCD patients show distinct impairment in recognizing facial expressions of disgust. These findings supported the role of disgust in OCD, and interest arose both for the significance and the magnitude of the results in which every subject with obsessive-compulsive (OC) symptom showed the deficit. However, subsequent studies have not shown such a clear association of disgust perception and OCD. Parker et al. [8] and Buhlmann et al.[9] both reported no significant differences in performance between OCD patients and normal controls in recognition of facial expressions. In a more recent study by Corcoran et al. [10], the results of Sprengelmeyer et al. were replicated, but the effect was not as robust as it originally appeared.

Although intriguing, the results on disgust perception in OCD patients have not been conclusive. Moreover, methods have been limited in that most of the previous studies aimed to replicate the results of Sprengelmeyer et al. through similar procedures. Replication of a previous result is valuable, but limited

method of study may lead to error of disregarding other important aspects of disgust perception. There is a body of literature with diverse methods to investigate facial emotion perception in other conditions that may be of use in studying disgust perception of OCD. One of the useful methods in investigating the properties of facial emotion perception is using ambiguous facial expressions to examine perceptual preferences[11, 12]. Whereas recognition tasks of non-ambiguous facial expressions acknowledge whether individuals have an impairment in recognizing certain facial expression of emotion, tasks using ambiguous facial expressions reveal whether individuals have a perception bias toward certain emotion in response to ambiguous stimuli.

In the present study, we recruited OCD patients and healthy normal controls for the following purposes: (1) to compare the performance on the non-ambiguous facial expression emotion recognition task, especially in perception of facial expressions of disgust, and (2) to test if there are any perception biases in the classification of ambiguous facial expressions in OCD patients. If there should be any impairment or bias in recognizing disgust facial expressions in OCD patients as hypothesized, we further aimed to evaluate the specific domains of disgust that can explain the impairment or the bias.

II. Methods

1. Participants

Forty-one primary OCD patients were recruited from psychiatric outpatient clinic of Severance Hospital, Yonsei University Medical Center. Patients were interviewed and diagnosed by experienced psychiatrists on the basis of DSM-IV criteria. Those with comorbid diagnoses were not excluded provided that OCD was the main problem for which treatment was sought. Exclusion criteria were brain injury, any neurological condition, psychosis, substance abuse or any medical or physical condition that could affect the subject's performance. Thirty-seven healthy normal controls were selected to match the OCD patient group for sex, age and education level. They reported no history of neurological or any psychiatric disorder or any symptoms consistent with current mood disorder by clinical screen and were unmedicated at the time of the study.

2. Measures

A. Obsessive-compulsive symptoms

The Yale-Brown Obsessive-Compulsive Scale (YBOCS) was used to assess the severity of OCD symptoms. It is a widely used measure with good reliability and validity[13-15]. Psychiatrists implemented the YBOCS on the day of performing the computerized emotion identification task.

B. Depressive symptoms

Montgomery-Asberg Depression Rating Scale (MADRS) is a widely used measure to evaluate the severity of depressive symptoms in clinical and non-clinical samples. It has exhibited good reliability and validity[16] and has been found to be more sensitive in detecting changes due to antidepressant

treatment and correlate higher with overall change in depression than the Hamilton Rating Scale for Depression [16, 17].

C. Disgust sensitivity

The Disgust Scale is a reliable measure of sensitivity to disgust-eliciting stimuli and is the most widely used disgust measure to date. It assesses eight domains of disgust sensitivity, including the following: food, animals, body products, body envelope violations, death, sex, hygiene, and sympathetic magic[18]. The scale developers report satisfactory internal consistency and discriminant validity [18] and a moderate correlation (r=0.51) to disgust-related behavior [19].

Recent study of the Disgust Scale by Olantunji et al.[20] proposed a three-factor model to best describe the structure of disgust in relation to contamination ideation and excessive washing in OCD patients. The three disgust domains are Animal Reminder disgust, Core disgust and Contamination-based disgust[20]. Because disgust domain analysis in the present study is focused on correlation with OC symptoms, we used the three-factor model proposed by Olantunji et al.

3. Stimuli and Procedure

A. Stimuli

Photographs of facial expressions from two models, one male and one female, were selected from a set of published black and white photographs developed by Ekman and Friesen[21]. These photographs have been shown to elicit reliable responses in normal individuals[21]. While adhering to the previous methods of emotion recognition tasks, we used facial expressions of only the negative emotions. Happiness and surprise, which are rarely confused with disgust, were not used, to increase the difficulty level of the task and to test the robustness of the previous findings. Each prototypical facial expression of

anger, disgust, fear and sadness was morphed with every other facial expression to create a continuum that blended features of two emotions. Each continuum between two emotions consisted of five facial expressions with a 20% increment (e.g., 10% angry - 90% fearful, 30% angry - 70% fearful, 50% angry – 50% fearful, 70% angry – 30% fearful and 90% angry – 10% fearful).

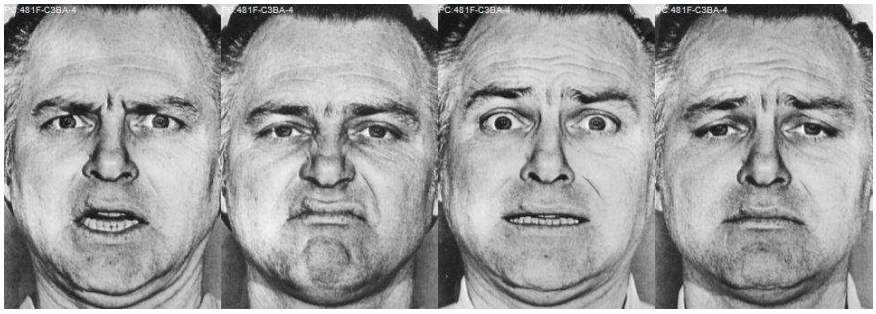

Fig 1. Non-ambiguous facial expressions of anger, disgust, fear and sadness (more than 90% morphed)

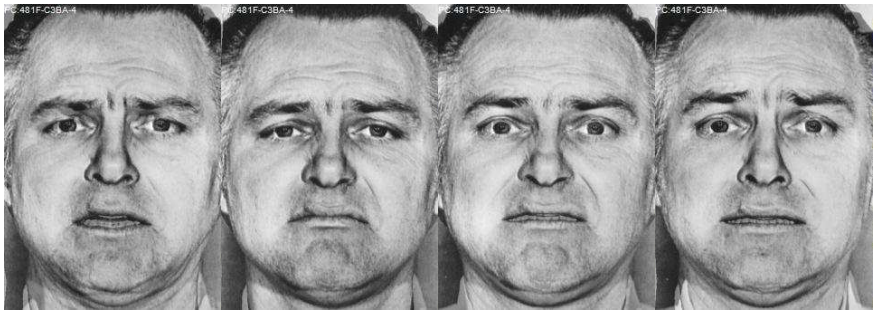

Fig 2. Ambiguous facial expressions of anger, disgust, fear and sadness (50% morphed)

B. Procedure

All participants completed a computerized emotion recognition task consisted of two paradigms: the non-ambiguous paradigm and the ambiguous paradigm. Facial expressions with more than 70% morphed emotion were categorized as

the non-ambiguous stimuli, whereas 50% morphed facial expressions were considered as the ambiguous stimuli.

Participants were shown 60 different facial expressions, repeated for 6 blocks of trials, in random order. Participants were asked to choose whether each facial expression most resembled anger, disgust, fear or sadness. They would select the word choice between anger, disgust, fear and sadness located below the photographs on the screen. The order of the answer choices were counterbalanced across blocks. Each photograph remained on the computer screen until a response was made. All participants were asked the meaning of the emotion words before the performing the computerized task to test for comprehension of the words. The entire task took approximately 30 minutes.

4. Statistical Analyses

All statistical analyses were carried out with the Statistical Package for the Social Sciences (SPSS) version 12.0 for Windows (SPSS Inc., Chicago, Illinois). In the non-ambiguous facial recognition task, frequency of correct identification of facial expressions for each emotion was the dependent variable in the multivariate analysis of covariance (MANCOVA) with participant group as the independent variable. In the ambiguous facial recognition task, frequency of emotion identification of ambiguous facial expressions with each of the four emotions was analyzed between participant groups by MANCOVA. Partial correlation analyses were conducted in order to find an association between frequencies of emotion identification and the specific domains of disgust sensitivity with adjustment for age, sex and depression severity. Among the OCD patients, the association between frequencies of emotion identification and Contamination/washing subtypes vs. other symptom subtypes were also tested by MANCOVAs. All analyses models were adjusted for age, sex and depression severity, which have been suggested to affect performance on facial expression recognitions tasks [22].

III. Results

1. Demographics and clinical characteristics

Demographics and clinical characteristics of the participants are presented in Table 1. Men consisted 76.9% of the participants, with a similar proportion across groups (χ^2=0.06, p=0.80). Mean age was 25.4 years (S.D. 5.64), with no group differences (t=-0.85, p=0.40). No differences were found in education level and IQ between the two groups (t=-0.80, p=0.40; t=-1.81, p=0.75, respectively).

Because OCD patients exhibited more than one type of OCD symptoms as is typically the case, OCD symptoms of the current sample are described as follows, using the factor analyzed symptom dimensions of Mataix-Cols[23]: symmetry/ordering (92.6%, n=38), hoarding (56.1%, n=23), contamination/cleaning (82.9%, n=34), aggressive/checking (100%, n=41), sexual/religious obsessions (63.4%, n=26).

The mean age of onset of OCD was 16.0 years (S.D. 5.4), and the mean duration of illness was 9.7 years (S.D. 5.8). The mean MADRS score for the OCD group was 13.68 (S.D. =7.23). The mean YBOCS total score of OCD group was 20.62 (S.D.=7.46). Subscale scores were 10.71 (S.D.=3.65) for obsessions and 10.07 (S.D.=3.94) for compulsions.

Table 1. Demographics and clinical characteristics

	OCD (N=41)	Normal control (N=37)	P
Sex (%) Male	32 (78.0%)	28 (75.7%)	0.81[a]
Female	9 (22.0%)	9 (24.3%)	
Age (year)	24.85 (5.34)	25.95 (5.97)	0.40
Education years	13.89 (2.45)	14.24 (2.01)	0.51
IQ	108.92 (14.41)	114.47 (10.50)	0.07
Onset age of OCD (year)	16.0 (5.40)	–	–
Duration of OCD (year)	9.7 (5.80)	–	–
YBOCS total	20.62 (7.46)	–	–
YBOCS obsessions	10.71 (3.65)	–	–
YBOCS compulsions	10.07 (3.94)	–	–
MADRS	13.68 (7.23)	1.46 (2.74)	0.00
Disgust sensitivity	54.35 (17.50)	44.91 (13.74)	0.01

Mean values presented with standard deviation in parenthesis.

OCD: obsessive-compulsive disorder, YBOCS: Yale-Brown Obsessive Compulsive Scale

MADRS: Montgomery Asberg Depression Rating Scale

[a]Comparison by χ^2 test. All other comparisons were analyzed by t-tests.

2. Non-ambiguous task of facial expression recognition

Table 2 presents the frequency of correct identification of the non-ambiguous facial expressions for each of the four emotions. There were no significant differences between the OCD patient group and the normal control group in the frequency of correct identification of non-ambiguous facial expressions (F=1.46, p=0.23), after adjusting for age, sex and depression severity.

Table 2. Mean frequency and standard deviation of correct identification of non-ambiguous stimuli

Expression	OCD	Normal controls
Anger	51.32 (15.79)	58.00 (10.18)
Disgust	52.02 (16.49)	55.70 (14.1)
Fear	48.20 (17.46)	54.51 (10.99)
Sadness	53.34 (11.89)	57.27 (3.24)

Pillai's Trace, F=1.46, p=0.23

Mean values presented with standard deviation in parenthesis.

2. Ambiguous task of facial expression recognition

The frequency of emotion identification of ambiguous facial expressions is shown in Table 3. After adjusting for age, sex and depression severity, OCD patients were significantly more likely to perceive ambiguous stimuli of facial expressions as disgust and less likely to perceive them as anger, compared to normal controls. There were no significant differences found in any of the other emotion identification between the two groups.

Table 3. Mean frequency and standard deviation of emotion identification of ambiguous stimuli

Emotion	OCD	Normal	F	p
Anger	14.63 (7.83)	17.14 (6.14)	5.96	0.017*
Disgust	19.39 (8.24)	16.05 (5.46)	5.08	0.027*
Fear	17.00 (6.82)	17.10 (4.78)	1.54	0.218
Sadness	20.98 (8.37)	21.70 (7.49)	1.19	0.279

Pillai's Trace, F=3.28, p=0.03

Mean values presented with standard deviation in parenthesis. *$p<0.05$

3. Domains of disgust sensitivity

In an effort to assess the quality of disgust perception of facial expressions, correlations between disgust sensitivity scores and the frequency of identified facial expressions in ambiguous task were analyzed. Only the domain of Contamination-Based Disgust positively correlated with perception of ambiguous facial expression as disgust, specifically (r=0.25, p=0.03) while negatively correlating with anger (r=-0.26, p=0.03). No other disgust domains were correlated with any of the emotions in response to ambiguous stimuli (Table 4).

Table 4. Correlation of disgust sensitivity domains with frequency of emotion identification of ambiguous facial expressions in OCD patients

Disgust sensitivity	Perceived expression of emotion							
	Anger		Disgust		Fear		Sadness	
	r	p	r	p	r	p	r	p
DS total	-0.08	0.52	0.19	0.12	-0.18	0.14	-0.03	0.80
Core Disgust	-0.02	0.88	0.19	0.11	-0.15	0.22	-0.05	0.67
Animal Reminder Disgust	0.01	0.96	0.05	0.68	-0.19	0.12	0.09	0.45
Contamination-Based Disgust	-0.26	0.03*	0.25	0.03*	-0.09	0.46	0.07	0.59

r: correlation coefficient, *p<0.05

IV. Discussion

OCD patients were significantly more likely to identify disgust and less likely to identify anger in response to ambiguous facial expressions compared to normal controls in the present study. The results support the initial hypotheses that individuals with OCD may have a bias toward disgust in identification of ambiguous stimuli. However, there were no differences between OCD patients and the normal controls in recognition of non-ambiguous facial expressions, which is in line with the previous studies that had failed to replicate the initial results by Sprengelmeyer et al.[7] This does not conclude, however, that there is no impairment in recognition of non-ambiguous facial expressions.

In Parker et al.[8] who also showed no group differences between OCD patients and normal controls in non-ambiguous facial recognition, effect of OCD symptom severity was suggested. Parker et al. suggested that disgust recognition deficits may emerge only in particularly severe cases of OCD, because one particular subject with the most severe OC symptom (YBOCS total score>30) showed impairment in recognizing non-ambiguous disgust. In the current study, a separate analysis of partial correlation was conducted to test the possible effect of symptom severity. Results showed that performances of non-ambiguous disgust recognition and anger recognition were specifically associated with total YBOCS scores after controlling for age, sex and depression severity ($r= -0.50$, $p<0.001$; $r=-0.39$, $p=0.01$, respectively). Since the mean YBOCS score in the current study (mean YBOCS score=20.62, S.D.=7.46) is lower than that of Corcoran et al.[10] (mean YBOCS score= 22.97), the effect of symptom severity may have led to the discrepancies in the results of non-ambiguous disgust recognition.

There may be other factors to be considered for differences between the current finding and that of Sprengelmeyer et al.[7] and Corcoran et al.[10] Even though age, sex and depression have been suggested to affect the performance

of facial expression recognition tasks[24-29], these factors were not controlled in the previous analyses of Sprengelmeyer et al.[7] and Corcoran et al.[10] In the present study, age, sex and depression severity measured by MADRS scores were controlled in all analyses. Another major factor of effect may be differences between stimuli that were used in the analysis. In the previous studies, prototypical images were used for analysis. However, current study identified and analyzed facial expressions with 70% or 90% dominant emotions as non-ambiguous stimuli to increase the difficulty level of the task. The difference in the level of difficulty might have resulted in the discrepancy of results. Lastly, differences in ethnicity and cultural backgrounds cannot be overlooked. Clinical data from various cultures have suggested that OCD is a disorder with good degree of transcultural homogeneity, but different cultural experiences may shape its phenomenology[30, 31]. Since participants from previous line of research on facial emotion recognition in OCD were composed of mainly Caucasian samples, they might present with different characteristics from the Korean OCD patients in the current study.

In the present study, while no differences were found between OCD patients and normal controls in recognition of non-ambiguous facial expressions with dominant emotions, significant difference was seen in recognition of ambiguous facial expressions without dominant emotions. This may imply that the increased level of difficulty due to ambiguity of the stimuli may be an important factor. When facial expressions are non-ambiguous and too easy for individuals to recognize, differences in performance of facial recognition may not be apparent even if there is an underlying emotion recognition deficit. The strength of the dominantly expressed emotion in non-ambiguous pictures may be too strong in that the effect of non-ambiguous facial expressions may overpower the effect of underlying disgust deficits in OCD patients. Using ambiguous stimuli increases the difficulty level of the tasks, thereby overcoming the possible effect of stimuli itself.

In social situations, facial expressions are thought to be ambiguous by nature[32]. Emotion appraisals in the everyday life involve processing complex and ambiguous stimuli around us. Non-ambiguous prototypical facial expressions used in the previous studies of OCD facial recognition may not be representative of social contexts in which erroneous disgust appraisals appear. The significance of ambiguous stimuli has been noted in other psychiatric conditions. In borderline personality disorder patients, no significant differences were found in recognition of non-ambiguous facial expressions, but they were more likely to identify anger in response to ambiguous facial expressions[33]. Ambiguous stimuli better represent the social contexts in which maladaptive patterns of borderline personality disorder patients appear. Nomura et al.[34] used photographs of morphed facial expressions with equally blended emotions to identify neural substrates involved in emotional processing of everyday life in the nonclinical population. Ambiguous facial expressions were used to represent the type of emotion stimuli seen by humans in a social context. Some studies have used stimuli containing multiple faces in one to emphasize ambiguity[35, 36]. Gilboa-Schechtman et al. used the stimuli of "facial crowds" consisting of various facial expressions for the purpose of studying the neural circuitry involved in social appraisal of those with social anxiety disorders[35].

Current finding shows that OCD patients exhibit a bias toward disgust in perceiving ambiguous facial expressions. It has been hypothesized, though not directly tested until the present study, that individuals with OCD might not only be impervious to others' expressions of disgust as in few of the previous studies but also highly sensitive to them. If the learnt association of disgust with particular facial expressions failed to develop in individuals with OCD, both not being able to recognize what others see as a expression of disgust and overidentifying a non-disgust expression as disgust may be a possible phenomenology of OCD.

Along with the above results of disgust bias, OCD patients underidentified the emotion of anger in response to ambiguous facial expressions in the present study. This result is interesting in that anger is the emotion known to be most easily confused with disgust in healthy individuals[21, 37]. Since the two emotions are easily confused, it is possible that ambiguous facial expressions with a component of anger might have been more easily identified as disgust, thus resulting in results of underidentification of anger while OCD patients tended to overidentify disgust.

There are other possibilities to be further explored on the perception bias of underidentifying facial expressions of anger. Expression of anger is often used and perceived as a threatening stimulus that induces avoidance-related behavior[38]. Character traits of OCD patients exhibit high harm avoidance[39, 40], and this trait may lead to increased avoidance of threatening stimuli. In emotion recognition tasks, ambiguous facial expressions with anger components (50% anger blended with 50% other emotions) may be perceived as threatening and consequently avoided. Supporting evidences have been reported in other lines of research. De Ruiter and Brosschott[41] have suggested a twofold process in reaction to threatening stimulus in which individual first shifts attention to the threatening stimulus, then ultimately avoids the stimulus. Findings on attentional bias away from threatening faces and reduced sensitivity of anger recognition have been reported in social anxiety disorders[42-47], but further studies are warranted in OCD with its distinctive properties.

In an effort to assess the quality of disgust of OCD in facial recognition, domains of disgust sensitivity were analyzed. In 2007, Olantunji et al.[20] proposed a three-factor model which demonstrated a superior model fit over the two-factor model. Results of the study showed that OCD patients with washing concerns scored significantly higher than OCD patients without washing concerns or the normal controls on the domains of Core Disgust and Contamination-Based Disgust, but not on the domain of Animal Reminder

Disgust. Contamination-Based Disgust is the disgust reaction based on the perceived threat of transmission of contagion, and Core Disgust is based on a sense of offensiveness and the threat of disease, including stimuli such as rotten food and waste products, whereas Animal Reminder Disgust includes stimuli that serve as reminder of animal origins of humans [20]. In the current study, Contamination-Based Disgust alone correlated with overidentification of disgust and underidentification of anger in ambiguous stimuli. No other domains of disgust were correlated. Our result may further support the specificity of Contamination-Based Disgust domain in the dimensional model of disgust sensitivity, especially corresponding to the symptomatology of OCD.

Limitations of the present study are not unexpected, given the difficulties of studying a complex, multifaceted emotion. First, the other-race effect of the stimuli cannot be overlooked. Researchers have reported performance disadvantage when processing facial expressions of different ethnicity[48-50]. Despite this general disadvantage, however, studies have shown that individuals from various cultures identify the predicted emotions for the face photographs of Ekman and Friesen[21], implying a pan-cultural element in facial expressions of emotions in which facial muscular movements are associated with discrete primary emotions[51]. Second, question remains in whether the associations are indicative of any causal role played either by disgust in inducing OCD symptoms or by OCD symptoms in triggering disgust responses. Experimental designs where either disgust or OCD symptoms are manipulated to investigate the effect on the other might point toward investigating the causal relationship. Treatment studies will also be needed in the future to evaluate whether existing treatments address disgust effectively or whether new modalities of treatment may be developed based on the association of disgust and OCD. Lastly, because the method of the current study is novel from the previous studies of facial recognition in OCD, immediate interpretations of the findings on ambiguous facial expressions may yet be limited. Various

approaches directed at this possible effect of stimuli will need to be accumulated. Current study may be a step toward understanding the properties of disgust recognition and its role in the disease model of OCD.

V. Conclusion

OCD patients were significantly more likely to recognize ambiguous facial expressions as disgust, whereas no significant difference was found in recognizing non-ambiguous facial expressions. This perception bias of disgust in OCD patients was associated with contamination/washing subtypes of OCD symptoms. Current findings suggest that OCD patients, particularly those with contamination concerns and washing symptoms, might have a selective bias in perceiving ambiguous stimuli as disgust.

VI. References

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Abstract (in korean)

강박장애 환자에서 모호 얼굴 표정 자극에
대한 역겨움 및 분노 인식

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정경운

연구 목적 : 본 연구는 강박장애 환자에서 명확 얼굴표정 검사 및 모호 얼굴표정 검사를 이용하여 얼굴 표정 인식의 장애가 있는지, 특히 강박장애의 질병 모델에서 제시되고 있는 역겨움 정서에 대한 표정 인식 장애가 있는지를 살펴보고자 하였다.

연구 방법 : 연구대상은 강박장애 환자 41명과 정상 대조군 37명으로 하였다. 몰핑기법으로 만든 다양한 정서가를 가진 부정 정서의 얼굴 표정 사진을 사용하여, 70% 이상의 정서가를 가진 얼굴 표정을 제시하는 명확 과제와 50%의 정서가를 가진 얼굴 표정을 제시하는 모호 과제를 시행하였다.

연구결과 : 명확한 얼굴표정에 대하여 강박장애 환자군은 정산군과 정답율에서 차이를 보이지 않았다 (F=1.46, p=0.23). 모호 과제의 경우, 환자군은 모호한 얼굴 표정 사진에 대하여 역겨움 정서로 인식하는 경우가 정상 대조군에 비하여 유의미하게 많았으며 (F=5.1,

p=0.03), 분노 정서로 인식하는 경우는 유의미하게 적었다 (F=5.9, p=0.02). 역겨움 정서에 대한 민감도를 측정하는 역겨움 척도에서 오염 관련 영역과 모호한 얼굴 표정 사진을 혐오 정서로 인식하는 경향이 양의 상관관계를 보였으며 (r=0.25, p=0.03), 분노 정서로 인식하는 경향이 음의 상관관계를 보였다 (r= -0.26, p=0.03).

결론 : 강박장애 환자들은 모호한 얼굴 표정 사진을 역겨움 정서로 인식하는 경향이 높았고, 분노로 인식하는 경향이 낮았다. 본 결과는 강박장애 환자들이 모호한 외부 자극을 역겨움 정서로 인식할 가능성이 높음을 시사한다.

핵심되는 말 : 강박장애, 혐오, 얼굴 표정, 오염 강박증상