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The role of disgust proneness and contamination-related thought-action fusion in mental contamination-related washing urges

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Abstract

Previous studies associated disgust proneness and thought-action fusion with mental contamination. The present study aims to investigate the associations among disgust propensity, disgust sensitivity, contamination-related thought-action fusion, mental contamination, and related factors, including internal/external negative emotions and washing urges. One hundred eighty female participants filled out the questionnaires assessing disgust proneness and contamination-related thought-action fusion and rated their baseline feeling of dirtiness and negative emotions. They listened to an audiotape instructing them to conceive themselves being subject to a nonconsensual kiss attempt by a male and rated their mental contamination, negative emotions, and the urge to wash levels. The path analysis indicated that disgust propensity and contamination-related thought-action fusion were significantly associated with disgust sensitivity. Their association with the urge to wash was positively mediated by mental contamination and negative emotions. This is the first study examining the above-mentioned cognitive and affective factors in a mediation model using a non-Western population. Our findings are crucial for understanding mental contamination and washing behavior.

Keywords Contamination fear · Mental contamination · Disgust propensity · Disgust sensitivity · Contamination thought-action fusion · Negative emotions · Urge to wash

Contamination fear is usually triggered by identifiable contaminants (Rachman, 2004). However, Rachman (1994) stated that feelings of dirtiness could also be experienced without touching a contaminant and called this phenomenon "mental contamination". Mental contamination can be triggered by images, thoughts, memories, immoral acts, assaults, and physical or psychological violations (Rachman, Coughtrey, Shafran, & Radomsky, 2014) and is usually accompanied by negative emotions (e.g., Elliott & Radomsky, 2009). Unlike contact contamination, individuals experiencing mental contamination have difficulty specifying the feeling's location and report an "internal" or diffuse dirtiness in their bodies. On the other hand, similar to contact contamination, mental contamination evokes an urge to neutralize negative emotions by cleaning (e.g., Coughtrey, Shafran, Knibbs, & Rachman, 2012). Previous studies showed that individuals engaging in repeated washing later experience a significant decrease in negative affect (Reuven, Liberman, & Dar, 2014). However, although washing reduces negative emotions in the short-term, it can lead to the persistence of mental contamination in the long-term. Studies have shown that cognitive interventions are more effective for treating mental contamination (e.g., Warnock-Parkes, Salkovskis, & Rachman, 2012) than exposure and response prevention (ERP; e.g., Coughtrey, Shafran, Lee, & Rachman, 2013). Therefore, examining cognitive and affective processes that underlie mental contamination can lead to improvement of treatment strategies.

One factor associated with mental contamination is thought-action fusion (TAF). TAF refers to a misinterpretation of the importance of unwanted intrusive thoughts (Shafran, Thordarson, & Rachman, 1996). People experiencing TAF believe that thinking about unacceptable thoughts is the moral equivalent of the actual performance of that action (i.e., TAF-Morality), and thinking about a disturbing event increases its probability to happen (i.e., TAF-Likelihood; Shafran et al., 1996). The positive association between TAF and mental contamination was supported by both self-report

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(Coughtrey et al., 2012; Cougle, Lee, Horowitz, Wolitzky-Taylor, & Telch, 2008) and experimental studies (Fergus & Rowatt, 2018). To assess TAF in the context of contamination fears, Rachman (2005) developed the Contamination Thought-Action Fusion (CTAF) Scale. Subsequent studies provided evidence for the association of CTAF with mental contamination (Fergus, 2014; Radomsky, Rachman, Shafran, Coughtrey, & Barber, 2014).

Disgust proneness is another construct related to mental contamination. Although traditional conceptualizations of contamination-based OCD emphasized the role of excessive fear and anxiety in fear of contamination (Rachman, 2004), disgust also contributes to its etiology and maintenance (Ludvik, Boschen, & Neumann, 2015). Disgust proneness has two main components: disgust propensity (DP) and disgust sensitivity (DS). The former refers to a general tendency to experience disgust, whereas the latter refers to the negativity regarding the experience of disgust (Fergus & Valentiner, 2009). Previous research showed that heightened DP and DS were linked to contamination fear (e.g., Goetz, Lee, Cougle, & Turkel, 2013) and mental contamination. Melli, Bulli, Carraresi, and Stopani (2014) showed that mental contamination has a mediator role in the relationship between DP and contamination-based OCD symptoms in OCD patients. Authors stated that other mediators such as DS were likely to be involved in this relationship. Travis and Fergus (2015) showed that DP had a stronger relationship with mental contamination when the tendency to appraise disgust negatively was stronger. Researchers suggested that DP could be a precursor to mental contamination, while DS enhances mental contamination. Lorona and Fergus (2018) found that DS moderated the relationship between DP and mental contamination. Their results were promising, but their sample consisted of religious undergraduates, limiting the generalizability of the findings. Similar results were reported in the context of trauma. In a study done by Ojserkis, McKay, and Lebeaut (2018) with trauma-exposed individuals, DS significantly moderated the relationship between DP and mental contamination.

The present study extends previous research by examining the associations between CTAF, DP, DS, mental contamination, negative emotions, and urge to neutralize. In the proposed conceptualization (Fig. 1), we suggested that individual differences in DP can affect the appraisal of events, which can be related to a disgust reaction that varies from individual to individual. Moreover, some individuals show a higher tendency to hold dysfunctional beliefs that they will be contaminated when they think about the contamination. The belief that one is more likely to be contaminated when he/she thinks about contamination can create a suitable ground for negatively appraising disgust reactions (Olatunji, Cisler, McKay, & Phillips, 2010). We hypothesized that the individual differences in DP and CTAF would increase DS and DS, in turn, would increase the feeling of dirtiness evoked by the nonconsensual kiss paradigm. When mental contamination is triggered, negative emotions would emerge (e.g., Elliott & Radomsky, 2009). The negative feelings can be misinterpreted as signifiers of dirtiness and trigger washing or cleaning. Therefore, we hypothesized that mental contamination would increase negative emotion levels and higher negative emotion levels would be associated with a stronger urge to wash. Therefore, we expected that DS, mental contamination, and negative emotions would mediate the association of DP and CTAF with washing urges.

Method

Participants

We announced the study in various undergraduate courses and drew a convenience sample. Participants consisted of 180 female undergraduate students (Mean age = 20.26 years, *SD* = 1.98, range 18–30 years). Only female students were included in the study since the experimental paradigm was specifically designed to assess the mental contamination phenomenon in women. Participants who reported having been diagnosed with a mental disorder by a psychiatrist or clinical psychologist and received pharmacotherapy ($n = 6$) were excluded from further analysis. The final sample consisted of 174 individuals (Mean age = 20.28, *SD* = 1.86, range 18–29 years). All participants were single.

Measures

The Demographic Information Form

The demographic information form includes items assessing age, marital status, physical condition, and traumatic experiences in the last two months. In addition, participants reported whether they were diagnosed with a mental disorder and receive treatment.

The Baseline Ratings Form (Elliott & Radomsky, 2009)

The Baseline Ratings Form was designed to assess whether an audio recording can evoke mental contamination. Before listening to the record, participants rated their feelings of dirtiness on a scale that is based on subjective units of distress ranging from 0 *(not at all)* to 100 *(completely)*. Items from the Mental Contamination Report (Elliott & Radomsky, 2009), which assesses negative emotions (shame, guilt, humiliation, fear, sadness, cheapness and sleaziness, distress, anger, and anxiety), were also added to the Baseline Rating Form. Participants rated the extent to which they felt each emotion on a scale from 0 to 100. The questionnaire was translated to Turkish by Bilekli and Inozu (2018).

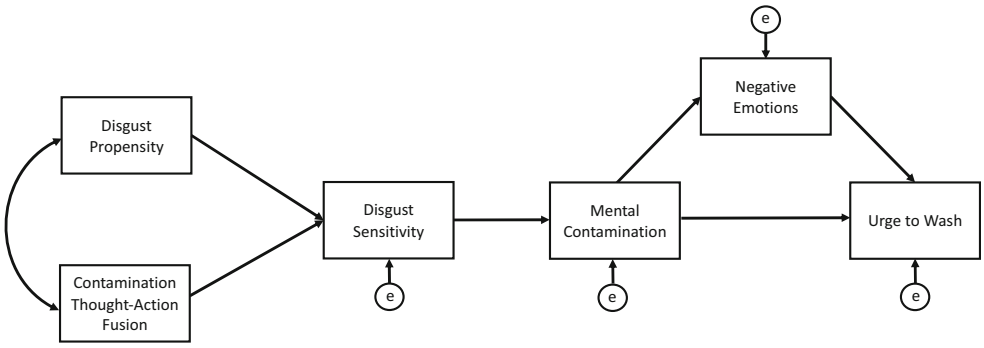

Fig. 1 Proposed Model of the Associations Between Disgust Propensity, Contamination Thought-Action Fusion, Disgust Sensitivity, Mental Contamination, Negative Emotions and Urge to Wash

Mental Contamination Report (MCR; Elliott & Radomsky, 2009)

The MCR assesses mental contamination symptoms. It consists of 29 self-report items filled out by participants after listening to a scenario that triggers mental contamination. The MCR evaluates different indicators of mental contamination, including the feeling of dirtiness, negative emotions (shame, guilt, fear, sadness, humiliation, cheapness, sleaziness, anger, anxiety, distress), and the urge to wash. Each item is rated on a scale from 0 *(not at all)* to 100 *(completely)*. Mental Contamination Report was translated into Turkish by Bilekli and Inozu (2018).

Disgust Propensity and Sensitivity Scale-Revised (DPSS-R; Cavanagh & Davey, 2000; modified by Fergus & Valentiner, 2009)

The DPSS-R assesses individual differences in DP and DS. The 32-item DPSS (Cavanagh & Davey, 2000) was first revised by van Overveld, De Jong, Peters, Cavanagh, and Davey (2006) and later by Fergus and Valentiner (2009). The final 12-item version of the DPSS revealed strong psychometric properties. The scale was adapted to Turkish by Uysal, İkikardeş, Gültekin, Yerlikaya, and Eremsoy (2013). Turkish form of the DPSS-R has comparable psychometric properties with the original questionnaire. In the present study, Cronbach alpha coefficients were .85 for DS and .90 for DP subscales.

Contamination Thought-Action Fusion Scale (CTAF; Rachman, 2005)

The CTAF is a 9-item inventory that measures the fusion between thoughts and behaviors regarding contamination. The scale was translated into Turkish by Inozu, Bilekli, and Ulukut (2016). Findings revealed satisfactory psychometric properties for both the original and the Turkish form of the scale (Inozu et al., 2016; Rachman, 2005). The Cronbach Alpha coefficient was .87 for this study.

Procedure

Voluntary participants were individually invited to a sound-attenuated laboratory room with two tables, two chairs, a computer, and earphones. First, they read and signed a written informed consent form to participate in the study. Next, they were asked to complete the DPSS-R, the CTAF Scale, and the Baseline Ratings Form, to wear headphones, and listen to an audio recording. The recording, which was a prime to evoke mental contamination, instructed participants to imagine themselves as the woman in the scenario. The recording consisted of the description of a college community meeting where an attractive male described as a well-behaved and moral person (e.g., helps other people) forcefully kisses the woman. The content of the audio recording was the same as that used by Bilekli and Inozu (2018) for the nonconsensual kiss condition. After listening to the recording, participants filled out the MCR. Lastly, they were debriefed.

Statistical Analyses

Preliminary analyses were carried out with SPSS 26.0. Missing values were replaced with the mean of the particular variables if missing values were less than 20% of the responses. Univariate outlier analysis did not reveal any outliers bigger or smaller than 4.00 z-scores (Mertler & Vannatta, 2005). Skewness and kurtosis values were in the acceptable range, according to the criteria by Field (2009). We conducted a path analysis with AMOS version 23.0. We used the ratio of $\chi 2$/ degrees of freedom (df), comparative fit index (CFI), goodness-of-fit index (GFI), and root mean square error of approximation (RMSEA) values to evaluate the model's fit to data (Hu & Bentler, 1999). We conducted a path analysis using the Monte Carlo method that is used when bootstrapping is not feasible due to the small sample size (Preacher & Selig, 2012).

Results

The Effect of Priming

Table 1 presents means, standard deviations, and correlations among the variables.

A repeated measures MANOVA was conducted to compare the effect of priming (time: Time 1, Time 2) on the feeling of dirtiness (mental contamination; mc) and negative emotions. The results indicated that there was a significant main effect of priming, Wilks' Lambda = 0.20, F (2, 172) = 335.44, $p < .001$, $\eta 2_{partial} = 0.80$. Participants reported significantly higher degree of feeling of dirtiness ($M = 48.08$, $SD = 31.78$) after listening the scenario, as compared to baseline assessment ($M = 12.04$, $SD = 17.64$), F (1, 173) = 226.96, $p < .001$, $\eta 2_{partial} = 0.57$). Similarly, participants' negative emotions increased after the priming ($M_{pre} = 83.17$, $SD_{pre} = 95.02$; $M_{post} = 436.07$, $SD_{post} = 245.76$, F (1,173) = 337.43, $p < .001$, $\eta 2_{partial} = 0.66$).

Path Analysis

In the proposed path model, the associations of CTAF and DP with the urge to wash through DS, mental contamination, and negative emotions after the priming were tested using the Monte Carlo method (see Fig. 1). Goodness-of-fit statistics revealed that the model showed an appropriate fit to the data (χ^2/df = 2.87, $GFI = .96$, $CFI = .96$, $NFI = .94$; $RMSEA = .10$). An examination of the results indicated that coefficients for all paths were significant (see Fig. 2).

The results indicated that CTAF and DP were significantly associated with DS ($\beta = 0.12$, $p < 0.05$; $\beta = 0.64$, $p < 0.001$, respectively) that was related to mental contamination after the priming ($\beta = 0.33$, $p < 0.01$), which was, in turn, significantly associated with negative emotions ($\beta = 0.62$, $p < 0.001$) and the urge to wash ($\beta = 0.49$, $p < 0.001$). Successively, the level of negative emotions was significantly related to urge to wash ($\beta = .36$, $p < 0.01$). The model explained 60% of the variance in urge to wash.

Furthermore, the test of significant indirect effects using the Monte Carlo method showed that the relationship between CTAF and mental contamination (after priming) was significantly mediated by DS (95% *CI* [0.53, 4.52]). In addition, the relationship between DP and mental contamination was significantly mediated by DS (95% *CI* [5.10, 12.25]). The indirect effect of CTAF and DP on the urge to wash, mediated by DS and mental contamination, was statistically significant (95% *CI* [0.28, 2.32] and 95% *CI* [2.74, 6.59] respectively). More importantly, the indirect effect of CTAF through DS, feelings of mental contamination and negative emotions was also significant (indirect $\beta = 0.45$, 95%*CI* [0.12–1.08], $p = .014$). Similarly, the indirect effect of DP on the urge to wash mediated through feelings of mental contamination and negative emotions was significant (indirect $\beta = 1.97$, 95%*CI* [1.19, 3.14], $p = .005$). All significant indirect effects are presented in Table 2.

Discussion

Despite the growing recognition of the role of affective and cognitive vulnerability factors in the etiology of pathological mental contamination and washing urges, there is a relative lack of studies investigating the associations among these variables. The present study investigates the relationships between affective and cognitive mechanisms that underlie mental contamination and washing urges related to mental contamination. We examined how the pre-existing individual differences in DP, CTAF, and DS were associated with mental contamination, negative emotions, and the urge to wash. Consistent with the hypothesis, the high levels of DP and CTAF were significantly associated with high levels of DS. Furthermore, DS mediated the association of DP and CTAF with mental contamination, and mental contamination was associated with elevated negative emotions and the urge to wash. Our results suggested that cognitive and affective factors can interplay to potentiate mental contamination.

Table 1 Summary of Means, Standard Deviations and Intercorrelations Among Variables

Variable		M	SD	1	2	3	4	5	6
1.	CTAF	8.98	7.55	–					
2.	DP	16.33	4.63	.26**	–				
3.	DS	10.12	5.12	.37**	.65**	–			
4.	Mental contamination	48.08	31.78	.38**	.27**	.34**	–		
5.	Negative emotions	436.07	245.76	.32**	.24**	.28**	.61**	–	
6.	Urges to Wash	307.62	196.39	.40**	.31**	.33**	.71**	.64**	–

Note. * $p < .05$. ** $p < .01$. CTAF = Contamination Thought Action Fusion Scale; DP = Disgust Propensity and Sensitivity Scale Revised – Disgust Propensity Subscale; DS = Disgust Propensity and Sensitivity Scale Revised – Disgust Sensitivity Subscale

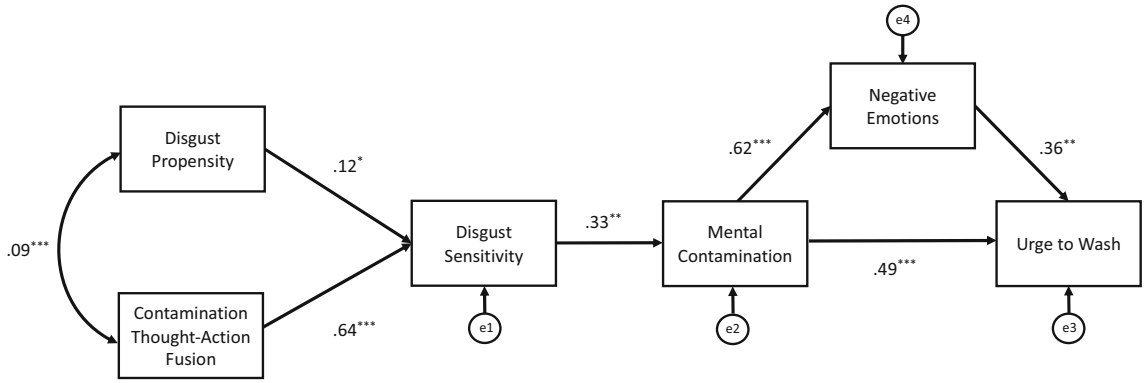

Fig. 2 Final Model of the Associations Between Disgust Propensity, Contamination Thought-Action Fusion, Disgust Sensitivity, Mental Contamination, Negative Emotions and Urge to Wash

The correlation analysis indicated that DP, DS, CTAF, mental contamination, negative emotions, and the urge to wash had significant small to moderate correlations. The path model provided a better picture of the associations among the variables. First, the DS-mediated indirect effect of DP and CTAF on mental contamination was significant. Our results suggested that a higher tendency to experience disgust can be associated with vulnerability to dysfunctional beliefs about disgust. When an individual's sense of disgust is easily triggered, he/she can be more likely to appraise disgust as negative or harmful and tend to withdraw from disgust-evoking cues. Furthermore, holding one type of dysfunctional belief can create a general tendency to have other kinds of dysfunctional beliefs (Abramowitz, Khandker, Nelson, Deacon, & Rygwall, 2006). CTAF can promote negative mood states like disgust, guilt, shame, and anxiety by making an individual feel that his/her contamination-related thoughts are dangerous and unacceptable, potentially increasing the risk of mental contamination (Radomsky et al., 2014). Findings of the present study showed that the increased CTAF bias was significantly associated with increased susceptibility to interpret disgust as negative (DS).

More importantly, the study revealed that the increased DS was significantly associated with mental contamination, and mental contamination, in turn, was significantly associated with increased negative emotions and the urge to wash. According to the preliminary results indicating positive associations among DS, mental contamination, and sexual assault, elevated DS can strengthen negative interpretations of disgust (Badour, Feldner, Blumenthal, & Bujarski, 2013b). Victims might feel contaminated due to elevated DS, which can contribute to the maintenance of posttraumatic stress symptoms (Steil, Jung, & Stangier, 2011). Previous research also showed that mental contamination mediates the relationship between DS and sexual trauma-related posttraumatic stress symptoms (e.g., Badour et al., 2013a, b). In addition, Melli et al. (2014) found that mental contamination mediated the relationship between DP and contamination-based obsessive symptoms and proposed that other mediators were likely to be involved in this relationship. Consistent with the previous findings (Coughtrey et al., 2012; Cougle et al., 2008; Fergus & Rowatt, 2018; Melli et al., 2014), the results of the present study extended previous findings by examining the factors associated with increased DS. Furthermore, our results provided a more comprehensive relationship pattern through the

Table 2 The Standardized Beta Coefficients and Confidence Interval Values of Indirect Effects in the Path Model

Paths	Estimate	95% CI	p
CTAF ➜ DS ➜ Mental contamination	1.99	0.53–4.56	.022
CTAF ➜ DS ➜ Mental contamination ➜ Negative emotions	0.99	0.27–2.24	.019
CTAF ➜ DS ➜ Mental contamination ➜ Urge to wash	0.99	0.28–2.32	.019
CTAF ➜ DS ➜ Mental contamination ➜ Negative emotions ➜ Urge to wash	0.45	0.12–1.08	.014
DP ➜ DS ➜ Mental contamination	8.77	5.11–12.25	.013
DP ➜ DS ➜ Mental contamination ➜ Negative emotions	4.35	2.61–6.05	.011
DP ➜ DS ➜ Mental contamination ➜ Urge to wash	4.36	2.74–6.59	.007
DP ➜ DS ➜ Mental contamination ➜ Negative emotions ➜ Urge to wash	1.98	1.19–3.14	.005

Note. CTAF = Contamination Thought-Action Fusion Scale; DP = Disgust Propensity and Sensitivity Scale Revised – Disgust Propensity Subscale; DS = Disgust Propensity and Sensitivity Scale Revised – Disgust Sensitivity Subscale

mediator role of DS, mental contamination, and negative feelings in the relationship between DP, CTAF, and urges to wash.

The importance of this work is further underscored by some of its other contributions. Although disgust is a universal feeling, previous studies indicated that there are differences across cultures (e.g., Sawchuk, Olatunji, & De Jong, 2006). Our study is the first to examine the aforementioned variables in a non-Western culture. Having a better understanding of washing/cleaning urges has implications for the improvement of treatment strategies as well. The path model showed the role of vulnerability factors such as propensity and sensitivity to disgust, dysfunctional beliefs that equate thoughts and actions, mental contamination, and negative internal and external emotions in contamination-related OC symptoms. Although they are tentative, our findings suggest that individuals' perceptions about and response to disgust should be considered in the context of treatments for OCD patients with contact and mental contamination symptoms. Rachman (2010) proposed that the treatment of mental contamination in OCD should focus on cognitions, unlike standard treatment protocols for contamination-based OCD. Our findings revealed that the treatment protocols should normalize disgust by challenging dysfunctional appraisals related to the negative perceptions of contamination (Steil et al., 2011), particularly among individuals who have high DP. Studies indicate that fear declines more quickly than disgust with repeated exposure in a controlled setting (e.g., Olatunji, Wolitzky-Taylor, Willems, Lohr, & Armstrong, 2009). Our results suggest that interventions aiming both to modify beliefs about disgust (DS) and contamination (CTAF) and to increase disgust tolerance (DP) can decrease mental contamination and negative emotionality, which, in turn, may decrease the need for washing.

Studies indicated that 56–61% of participants with contamination fears have both contact contamination and mental contamination (Coughtrey et al., 2012). Therefore, the findings of this study can also be interpreted within the framework of evolutionary, neurobiological, and neurocognitive perspectives that link disgust to obsessive-compulsive phenomena. From an evolutionary psychology perspective, disgust functions as an adaptive mechanism. It protects individuals from being infected by potential pathogens through avoidance of contact and rejection of bad tastes (Angyal, 1941; Bhikram, Abi-Jaoude, & Sandor, 2017; Haidt, McCauley, & Rozin, 1994). The adaptive function of disgust also involves the interpretation of information about potential contaminants. The evolutionary perspective on disgust suggests that interpretation of information about contaminants is impaired in contamination-related OCD, leading to a state of false alarm for contamination (Bhikram et al., 2017, see further discussion in Curtis, De Barra, & Aunger, 2011). High DP may be a vulnerability factor for contamination-based OCD because it is characterized by a judgmental bias in which individuals are likely to interpret unpleasant stimuli as highly contaminated, which can increase the likelihood of experiencing pathological disgust (Mitte, 2008). In fact, individuals with contamination fear and washing compulsions exhibit the highest levels of DP compared to individuals who have other symptoms of OCD (Woody & Tolin, 2002). Our results pointed out the role of DS in the association between DP and mental contamination. Increased DS may intensify the impaired information process and judgmental bias in processing disgust feeling that is experienced as an imagined or direct contact with contaminants, which can motivate a person to perform persistent cleaning acts to neutralize negative feelings.

Neuroimaging research has also shown that contamination-based OCD is associated with the insula cortex that processes disgust (Berle & Phillips, 2006). A meta-analysis of fMRI studies has shown the relationship between the perception of facial disgust and the anterior insula (Fusar-Poli et al., 2009). Current literature highlights the role of the insula and corticostriatal thalamocortical (CSTC) circuits in disgust processing (Bhikram et al., 2017). The brain regions impaired in OCD (e.g., dorsolateral prefrontal cortex, orbitofrontal cortex, anterior cingulate cortex, basal ganglia, striatum) are also believed to be important in processing disgust (Bhikram et al., 2017). Our proposed model provided further support for the role of DP and DS in contamination fear, and the pathophysiology of OCD can help explain the heightened DP and DS in OCD patients (see Gaikwad, 2014 for a detailed discussion). Future studies should examine neurobiological correlates of the influence of dirty-kiss scenarios using current neuroimaging technologies.

Despite its strengths, our study also has some limitations. The sample size of our study was small. Kline (2011) states that 10 or 20 participants for each parameter are sufficient for structural equation modeling analysis. Although our sample size meets the requirements for testing the path model, the results should be replicated with larger sample sizes. Moreover, our study consisted of only female participants, limiting the generalization of the findings to a wider population. Future research can consider using gender-neutral scenarios to investigate the applicability of these findings to both males and females. Finally, we had a demographically restricted analog sample of undergraduates. Future studies are needed to establish the generalizability of these findings to clinical populations.

The study also has certain limitations regarding its design. We used a cross-sectional research design, we are unable to infer causality and we acknowledge that alternative orders can be suggested. Future studies can use experimental designs to better understand the nature of the relationships among study variables. Another limitation of the design of our study was the use of the same non-consensual kiss scenario for all participants. Future studies can employ paradigms such as the dirty kiss (Millar, Salkovskis, & Brown, 2016), the immorality

(Elliott & Radomsky, 2009), and the perpetrator effect (Rachman, Radomsky, Elliott, & Zysk, 2012) and examine whether disgust proneness or CTAF are more strongly linked to certain paradigms than others. Finally, the imaginary exchange of saliva might be a confounding variable for the non-consensual kiss paradigm. Millar et al. (2016) found that violations that do not involve imagined physical contact did not result in feelings of contamination regardless of the evocation of betrayal. Researchers have suggested that understanding whether mental contamination is evoked by imagined physical contact or imagined betrayal was difficult. Therefore, the imaginary exchange of saliva that evokes contact contamination instead of mental contamination can be a confounding variable for the non-consensual kiss paradigm. Future studies using paradigms that do not include imaginary physical contact are necessary to disentangle the effects of these variables from one another.

Sociomoral disgust and self-disgust are also likely to be associated with mental contamination. Sociomoral disgust is related to violations and unethical behaviors performed by humans (Sparkman, 2011). Since mental contamination can have a moral component, sociomoral disgust can also be related to mental contamination. Self-disgust refers to disgust toward oneself rather than external sources (Power & Dalgleish, 2016). In the cultures that emphasize the importance of moral purity, consensual and nonconsensual kiss scenarios can cause feelings of dirtiness via self-disgust. Future studies should examine the role of sociomoral disgust and self-disgust in mental contamination and cleaning impulses. Finally, although the use of the non-consensual kiss paradigm is widespread in mental contamination studies, the mental imagery of a non-consensual kiss can evoke not only disgust and fears of contamination but also thoughts and emotions related to sexuality, aggression, and religious or cultural taboos regarding purity. Rachman (2006) noted the moral aspect of mental contamination and drew attention to the role of rigid moral-codes and/or strict value-systems in mental contamination. Moreover, the basic doctrines of Islam might be related to more conservative and rigid attitudes toward sex. Islam considers having pre-marital and extra-marital relationships as a great sin. However, the sacred texts of other major religions also proscribe premarital and extramarital sexual intimacy (Adamczyk & Hayes, 2012). Therefore, future studies with cross-cultural designs should examine the influence of cultural values on mental contamination.

In conclusion, this study is the first to co-examine cognitive (i.e., CTAF, DS), affective (i.e., negative emotions), and symptom-relevant factors (mental contamination) in a mediation model. The results indicated that DP and CTAF predicted urges to wash, while DS, mental contamination, and internal/external negative emotions mediated their associations. Despite its limitations, our study combined self-report and experimental measures to extend the literature on vulnerability factors associated with mental contamination.

Authors' Contributions Mujgan Inozu conceptualized the study. Ilgun Bilekli Bilger and Ezgi Trak collected the data. Mujgan Inozu and Ilgun Bilekli Bilger conducted the analysis. All authors contributed to the writing of the manuscript.

Data Availability The datasets generated and analyzed during the current study are available from the corresponding author on reasonable request.

Code Availability Not applicable.

Compliance with Ethical Standards

Conflict of Interest The authors have no relevant financial or non-financial interests to disclose.

Ethics Approval This study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by the Ethics Committee of Hacettepe University, ref. number 35853172/ 431–1639.

Consent to Participate Informed consent was obtained from all individual participants included in the study.

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