Current Psychology (2024) 43:23624–23634
https://doi.org/10.1007/s12144-024-06111-4

The links between disgust, feared selves and contamination fear: a mediation path-analytic model

Catherine Ouellet-Courtois[1] · Alexandra Dagher[2] · Adam S. Radomsky[2]

Accepted: 3 May 2024 / Published online: 21 May 2024

Abstract

A large body of work has highlighted the role of disgust in contamination-related OCD. However, there appears to be a lack of research examining the potential cognitive mechanisms through which disgust may potentiate symptoms of contamination fear. Research has shown that the "feared self" may be a cognitive factor involved in the development of OCD symptoms. The aim of this study was to assess the potential mediating effects of feared possible selves in the associations between disgust propensity (DP), disgust sensitivity (DS) and symptoms of contamination fear. A sample of 412 undergraduate participants completed measures of DP and DS, feared possible selves, and symptoms of both contact and mental contamination. Using path analysis, the results indicated that while DP was a significant predictor of contact and mental contamination, DS predicted both contamination symptom domains via the mediating effect of the "feared corrupted self". Notably, the association between DS and mental contamination was fully mediated by the "feared corrupted self". These findings highlight the role of the "feared corrupted self" in misappraisals of disgust and shed light on the relevance of assessing and targeting feared possible selves in the treatment of disgust in contamination fear.

Keywords Disgust · Feared selves · Contamination fear · Mental contamination · Obsessive-compulsive disorder

Obsessive-compulsive disorder (OCD) is characterized by repetitive intrusive thoughts, images, or impulses (obsessions) that individuals misappraise as significant and meaningful (American Psychiatric Association, 2013; Rachman, 1997, 1998). In an effort to neutralize the distress associated with obsessions and/or to prevent some dreaded event from occurring, those with OCD engage in repetitive or ritualistic behavioural or mental acts (i.e., compulsions; American Psychiatric Association, 2013). Symptoms related to fears of contamination represent one of the most prevalent manifestations of OCD, impacting nearly 50% of individuals with the disorder (Rachman & Hodgson, 1980; Jalal et al., 2022; Rachman, 2004). Those with contamination fear have recurring and distressing thoughts about the possibility of becoming contaminated and engage in washing and/or cleaning compulsions and avoid contact with potential contaminants as a means to minimize their perceived risk of contamination (Rachman, 2006).

Rachman (2004) noted how contamination fear can arise either through direct or indirect contact with a perceived contaminant. Contact contamination is elicited by direct physical contact with or proximity to a perceived contaminant (Rachman, 1994, 2004). Mental contamination, on the other hand, is defined as a psychological form of contamination where feelings of contamination arise despite having had no physical contact with a contaminant (Rachman et al., 2015; Radomsky et al., 2017). This form of contamination is often elicited by intrusive thoughts, memories, or images of immoral or unacceptable acts, prompting a sense of violation along with feelings of guilt and shame (Rachman, 1994, 2004, 2006). Mental contamination is proposed to elicit feelings of dirtiness and contamination that are widely dispersed within the body and mind (Rachman et al., 2015; Radomsky et al., 2017). While the site and source of contamination in contact contamination is easily accessible, individuals who experience feelings of mental contamination often have

✉ Catherine Ouellet-Courtois
catherine.ouellet-courtois@muhc.mcgill.ca

[1] Present address: Mood and Anxiety Disorders Program, McGill University Health Centre, Allan Memorial Institute, 1025 avenue des Pins Ouest, Montréal, QC H3A 1A1, Canada

[2] Department of Psychology, Concordia University, 7141 Rue Sherbrooke Ouest, Montreal, QC H4B 1R6, Canada

trouble clearly locating their sense of inner pollution (Rachman et al., 2015). Both contact and mental contamination involve beliefs about the spread and permanence of contamination (Tolin et al., 2004; Coughtrey et al., 2014). In fact, research suggests that there's a lay belief that "moral contaminants" can spread in the same way as germs, and that such perceived contaminants can evoke the same disgust reactions as real, physical contaminants (Coughtrey et al., 2014; Ouellet-Courtois & Radomsky, 2023).

A growing body of literature has highlighted the role of disgust in contamination-related OCD. Disgust is an evolutionary emotional response that is meant to elicit an aversive reaction towards potentially dangerous stimuli and that is purported to protect against contamination (Curtis et al., 2011; McNally, 2002; Olantunji et al., 2007). It has been argued that the adaptive emotion of disgust has extended from the physical to the psychological domain, such that repulsive reactions in the face of actual contaminants have evolved into embodied cleansing reactions in the face of imagined contaminants (e.g., moral violations; Rozin et al., 2000). Mounting research has underscored the critical role of disgust in both mental and contact contamination (Cisler et al., 2010; Knowles et al., 2018; Horberg et al., 2009). There are two components of disgust which are especially relevant to contamination-based OCD, namely disgust propensity and disgust sensitivity. The former is defined as the extent to which someone experiences the emotion of disgust while the latter refers to the degree of distress associated with a disgust experience (Olatunji et al., 2007; Van Overveld et al., 2006). Research has found that individuals with contamination-based OCD have greater disgust propensity and disgust sensitivity than the general population (Cisler et al., 2010; Olatunji et al., 2004).

There is a tendency to associate the emotion of disgust to physical contaminants; however, recent research has suggested that disgust also elicits psychological forms of contamination (Horberg et al., 2009; Rozin et al., 2000). Horberg and colleagues (2009) conducted a series of studies to assess the predictive power of disgust in moral condemnation of behaviours which violated principles of justice, purity and harm/care. Their findings revealed that individuals uniquely associate disgust responses to instances of purity violations (e.g., act of betrayal or infidelity). In fact, the emotion of disgust can signal the presence of immoral acts, and motivate individuals to distance themselves from people, places, or actions that may be deemed impure. Previous research has also found that victims of sexual trauma often exhibit heightened disgust propensity, which in turn is significantly associated with mental contamination (Badour et al., 2014). It has been suggested that memories of such traumatic instances elicit more frequent feelings of self-disgust, which in turn predict feelings of mental contamination within the victim (Badour et al., 2014). In all, disgust is a relevant emotion across multiple forms of contamination fear (both contact and mental) as it can motivate people to engage in avoidance and compulsive behaviours aimed at preserving and protecting both their physical and psychological integrity (Horberg et al., 2009).

Despite important associations between disgust and contamination fear, there appears to be a lack of research examining the potential cognitive processes involved in the associations between disgust and both contact and mental contamination. Cognitive models of OCD have proposed that OCD results from the misappraisal of intrusive thoughts as reflective of the self (e.g., that one could be "mad, bad or dangerous"; Rachman, 1997, 1998). Similarly, the cognitive theory of mental contamination posits that such feelings are triggered when an individual negatively misinterprets a perceived violation as indicative that they are weak, inferior, or worthless (i.e., being treated like dirt makes them feel like dirt; Rachman et al., 2015). Other cognitive-behavioral theories suggest that OCD may develop from core negative self-beliefs (Aardema & O'Connor, 2007; Ahern & Kyrios, 2016; Doron et al., 2008; Jaeger et al., 2021; Moulding et al., 2014). The notion of the "feared self" in OCD (Aardema et al., 2018) is entirely consistent with the cognitive model of OCD (e.g., Rachman, 1997, 1998). The "feared self" is believed to entail fears of inner pollution, corruption, negligence, and ugliness (Aardema, 2020; Aardema et al., 2018; Aardema & Wong, 2020). Feared self-perceptions can be elicited through intrusive thoughts about immorality, wherein an individual fears that the contents of these thoughts reflect their actual self or who they might become (Aardema & O'Connor, 2007; Aardema et al., 2013). Aardema and colleagues (2013) contend that due to their easily threatened self-perceptions, those with OCD are susceptible to the belief that they could readily become what they fear (e.g., a disgusting, repulsive person). Aardema and colleagues (2019) found that treatment aimed at reducing "feared self" perceptions significantly reduced symptoms of contamination-based OCD. Previous work has indicated that the "feared self" is associated with the emotion of disgust (Uzumcu et al., 2023), and that feared self-perceptions predict symptoms of contact contamination via feelings of mental contamination (Krause et al., 2020).

Following the initial development of the Fear of Self Questionnaire, Aardema and colleagues (2021) extended the questionnaire such that it now includes three dimensions, namely capturing corrupted, malformed, and culpable feared selves. The corrupted feared self is characterized as an obsessional self-theme in which individuals believe that they might be or become tainted, disgusting, or impure if they do not protect themselves from things that may corrupt them (Aardema et al., 2021). This construct is especially

relevant to OCD, considering that concerns of morality are often at the core of obsessional fears (Rachman, 1997, 1998, 2004). The malformed feared self relates to the belief that one might become malformed or unattractive, focusing specifically on concerns about one's physical appearance. This subscale has been found to show positive associations with symptoms of body dysmorphic disorder (BDD; Aardema et al., 2021) and eating disorders (Wilson et al., unpublished). Finally, the culpable feared self encompasses the fear of becoming negligent and inconsiderate, attributing blame to oneself for adverse situations (Aardema et al., 2021). The culpable self is also highly relevant to OCD, as individuals with the disorder are known to display an inflated sense of responsibility (Salkovskis, 1985).

While disgust may be an emotional factor leading to symptoms of contamination fear (both contact and mental), OCD-related beliefs can increase the extent to which disgust predicts contamination fear (Cisler et al., 2010; Ouellet-Courtois & Radomsky, 2023; Krause et al., 2022). Considering that cognitive theories of contamination and mental contamination postulate that symptoms of contamination fear arise due to misappraisals of intrusive thoughts or perceived violations as reflective of the self (Rachman, 2004; Rachman et al., 2015), feared selves might be wisely construed at least in part as violations of one's own standards, values or self. Therefore, the goal of this study was to elucidate how disgust may lead to both contact and mental contamination via feared selves using path analysis. Our investigation of the mediating effects of feared selves in the associations between symptoms of contamination fear and disgust proneness was largely exploratory, given the paucity of research combining feared selves, disgust and symptoms of contamination fear. To our knowledge, only a few studies have examined specific associations between feared self-identities (i.e., the corrupted, culpable and malformed feared self) and symptoms of contamination fear, which provided support for the role of both the corrupted and culpable selves (Aardema et al., 2021; Audet et al., 2023; Khosravani et al., 2023). It thus was hypothesized that feared selves would mediate the associations between disgust propensity/disgust sensitivity and symptoms of both contact and mental contamination. Further, considering that mental contamination involves a form of psychological contamination where appraisals about the self appear to be necessary, it was predicted that DP and DS would only lead to symptoms of mental contamination via feared selves. Finally, considering that the malformed self is mostly implicated in symptoms of BDD (Aardema et al., 2021), and that no research has suggested that body image concerns and contact contamination are related, no path was specified between the malformed self and contact contamination. On the other hand, given the association between mental contamination and body image concerns (Coughtrey et al., 2018), a path was specified between the malformed self and mental contamination.

Method

Participants

The sample consisted of 412 undergraduate students from Concordia University ($N=412$). To be eligible, participants had to be at least 18 years of age, and be able to read, write and communicate in English. See Table 1 for more demographic information on the sample. While 512 participants originally enrolled in the study, as per our protocol participants were excluded if they showed a conspicuous pattern of responses. Namely, participants were excluded if they took less than 30 min or greater than 3.5 h to complete the study ($n=70$), or if they did not complete the primary outcome measures ($n=30$). Data were excluded from participants who did not complete the manipulation check questions or

Table 1 Demographic characteristics, means and standard deviations on clinical measures

Demographics			Measures	M (SD)
Age	18–24 years old	78.4%	VOCI-CC	8.9 (9.3)
	25–34 years old	16.0%	VOCI-MC	18.42 (15.9)
	35–44 years old	5.1%		
	45–54 years old	0.5%		
Gender	Female	85%	FSQ-MV total	76.0 (28.5)
	Male	10.7%	*FSQ-MAL*	14.5 (5.8)
	Non-binary	2.4%	*FSQ-CUL*	29.5 (11.2)
	Prefer not to say	1.9%	*FSQ-COR*	28.5 (13.8)
Primary Language	English	49.1%		
	French	18.9%	DPSS-R total	29.9 (9.2)
	Other	32%	*DP*	16.6 (4.9)
Ethnicity	Caucasian	55.8%	*DS*	13.3 (5.2)
	South Asian	5.3%		
	East Asian	5.8%		
	Middle Eastern	13.3%		
	Black	2.7%		
	Hispanic/Latin American	6.6%		
	Indigenous	1%		
	Other	9.5%		

VOCI-CC, Vancouver Obsessional Compulsive Inventory – Contamination Subscale; *VOCI-MC,* Vancouver Obsessional Compulsive Inventory – Mental Contamination; *FSQ-MV,* Fear of Self Questionnaire Multidimensional Version; *FSQ-MAL,* Malformed subscale of the Fear of Self Questionnaire Multidimensional Version; *FSQ-CUL,* Culpable subscale of the Fear of Self Questionnaire Multidimensional Version; *FSQ-COR,* Corrupted subscale of the Fear of Self Questionnaire Multidimensional Version; *DPSS-R,* The Disgust Propensity and Sensitivity Scale – Revised; *DP,* Disgust Propensity; *DS,* Disgust Sensitivity. $N=412$

primary outcome measures, or who showed a conspicuous pattern of responses.

Measure

Vancouver obsessional compulsive inventory – contamination susbscale (VOCI-CC; Thordarson et al., 2004) The VOCI is a 55-item self-report measure of OCD symptoms that includes six subscales: contamination, checking, obsessions, hoarding, indecisiveness, and "just right" experiences. For the purpose of the present study, only the contamination subscale was used, which comprises 12 items. All items are rated on a five-point Likert scale ranging from 0 ("Not at all") to 4 ("Very much"). A total score for this subscale is computed by adding all items, with possible scores on the contamination subscale ranging from 0 to 48. The VOCI has strong psychometric properties, including excellent internal consistency (α = 0.94 to 0.98), excellent retest reliability (r = .91), and excellent convergent and divergent validity (Radomsky et al., 2006; Thordarson et al., 2004). In our sample, the VOCI-CC demonstrated excellent internal consistency (α = 0.90).

Vancouver obsessional compulsive inventory – mental contamination scale (VOCI-MC; Radomsky et al., 2014) This is a 20-item self-report measure of mental contamination. Items are rated on a five-point Likert scale ranging from 0 ("Not at all") to 4 ("Very much"). The total score for this measure is calculated by adding all items, with possible total scores ranging from 0 to 80. The VOCI-MC has demonstrated excellent internal consistency (α = 0.93 to 0.97), good convergent, and divergent validity (Radomsky et al., 2014). In the present sample, the VOCI-MC showed excellent internal consistency (α = 0.95).

The disgust propensity and sensitivity scale-revised (DPSS-R, Van Overveld et al., 2006; revised by Olatunji et al., 2007) This is a 12-item self-report questionnaire with two 6-item subscales assessing disgust propensity (DP; the tendency to respond with disgust) and disgust sensitivity (DS; the aversion to the experience of disgust). Items are rated on a five-point Likert scale ranging from 0 ("Never") to 4 ("Always"). The total and subscale scores are derived by summing up all items. In the current sample, the DPSS-R showed satisfactory psychometric properties with good internal consistency for both the DP (α = 0.82) and DS (α = 0.81) subscales.

The fear of self questionnaire, multidimensional version (FSQ-MV; Aardema et al., 2021) This 27-item self-report questionnaire includes three subscales to measure feared selves, namely the malformed subscale (FSQ-MAL), which assesses a feared malformed self (e.g., "I fear being unattractive"), the culpable subscale (FSQ-CUL; e.g., "I fear being an irresponsible, negligent person"), and the corrupted subscale (FSQ-COR; e.g., "I fear perhaps being a violent, crazy person"). Items are rated on a six-point Likert scale ranging from 1 ("strongly disagree") to 6 ("strongly agree"). The total and subscale scores for this measure are calculated by adding all items, with possible total scores ranging from 27 to 162. Internal consistency for this scale was excellent in a non-clinical sample (αs = 0.90-0.94; Aardema et al., 2021). In the present study, the internal consistency was also excellent (α = 0.96).

Procedure

These data were collected in the context of a larger experimental study examining the impact of beliefs about one's morality on OCD symptoms, which was preregistered via the Open Science Framework (OSF) prior to data collection (https://doi.org/10.17605/OSF.IO/R6SYB) (manuscript in preparation).[1] This study received formal ethical approval from the Concordia University Human Research Ethics Committee on August 17, 2022 (certificate number 30,016,624).

Participants enrolled in the study through Concordia University's undergraduate participation pool and took part in this study online. Participants were told that the purpose of this study was to examine the relationship between certain personality traits, values, thoughts and behaviors. At the beginning of the study, participants provided informed consent by reading an online consent form and ticking a box to indicate that they had read and agreed to the terms described. Next, participants provided basic demographic information. At the end of the experiment, participants completed a questionnaire battery that included the VOCI, VOCI-MC, DPSS-R, and FSQ-MV. There were no missing data, as participants were required to answer each question item in order to be able to move forward with the study. Participants were provided course credit for their participation.

Statistical plan

Before proceeding with the analyses, the data were screened for any univariate and multivariate outliers. This screening

[1] Participants were randomized to one of two experimental conditions. Two sets of multivariate analyses of variance (MANOVAs) suggested that there was no effect of the experimental manipulation on any of the dependent (endogenous) variables under investigation in the current study (i.e., FSQ-MV subscales and contamination symptom domains; all p's > 0.05).

revealed no outliers reflecting impossible values. Preliminary analyses were conducted to ensure that assumptions for path analysis were met. All variables and residuals were found to be normally distributed (i.e., kurtosis < 10, skewness < 3; Kline, 2016). Further, the associations among all variables were linear. There was no multicollinearity among predictor variables and residuals were not correlated. According to recommendations, an adequate sample size for path analysis with multivariate normal data should be 10–20 times the number of parameters, with a higher ratio of observations to estimated parameters being preferred (Kline, 2016). In the current study, the sample size was greater than 20 times the number of parameters (18 parameters X 20 = 360).

Structural equation modelling was used to evaluate the fit of our proposed model detailing hypothesized associations between the two exogenous variables of disgust (DP and DS) and five endogenous variables consisting of feared selves and contamination fear (FSQ-MAL, FSQ-CUL, FSQ-COR, VOCI-CC and VOCI-MC). The Mplus Version 8.5 software was used for these analyses. Fit indices were examined, namely: (a) minimum fit function chi-square (χ^2_{GoF}), which represents the distance between the specified model and the saturated model and its degrees of freedom (*d.f.*); (b) the Root Mean Square Error of Approximation (RMSEA); (c) the Comparative Fit Index (CFI), and (d) the Standardized Root Mean Squared Residual (SRMR). The chi-square value should be non-significant, indicating that the model does not differ significantly from the saturated model (in which all parameters would have been successfully estimated), and ideally the degrees of freedom should be less than 2 (Norman & Streiner, 2003). For the RMSEA, values below 0.05 indicate a good fit that is close to the saturated model (MacCallum et al., 1996; Schermelleh-Engel et al., 2003). For the CFI and TLI, values above 0.90 indicate good fit and values above 0.95 indicate a very good fit (Bentler & Bonett, 1980; Hu & Bentler, 1999; Kline, 2005). For the SRMR, the acceptable range is between 0 and 0.08 (Hu & Bentler, 1999).

Should the specified model show inadequate fit to the data, modification indices were examined using the "MODINDICES" function in Mplus, which provide information on the changes that can be made (e.g., adding or removing a path) to achieve a better fitting model. An over-identified model, where the number of equations is greater than the number of unestimated parameters (i.e., degrees of freedom) is considered best.

Predictive paths were added between DP and DS and each of the three feared selves (FSQ-MAL, FSQ-CUL and FSQ-COR). In addition, predictive paths were added from FSQ-CUL and FSQ-COR to VOCI-CC and VOCI-MC. On the other hand, only one predictive path was added from FSQ-MAL to VOCI-MC, and no predictive path was added from the FSQ-MAL to VOCI-CC, as there is no theory or evidence to support that BDD-related concerns and contact contamination are related. Finally, correlations were added between disgust domains (DP and DS), between feared selves (FSQ-MAL, FSQ-CUL and FSQ-COR), and between contamination symptom domains (VOCI-CC and VOCI-MC).

To test for the mediating effect of the feared selves (FSQ-MAL, FSQ-CUL and FSQ-COR) on the association between disgust (DP and DS) and symptoms of contamination fear (VOCI-CC and VOCI-MC), the VIA command for indirect effects in Mplus was used. All variables and paths were set free (without any specified constraints). The full Mplus input syntax is provided in Appendix I.

Results

Zero-order correlations

Zero order correlations were computed between all measures, namely the VOCI-CC, VOCI-MC, FSQ-MV subscales, DP and DS. As demonstrated in Table 2, all measures were positively correlated (p's < 0.001). Means and standard deviations can be found in Table 1.

Goodness-of-fit of proposed model

The model is depicted in Fig. 1. Structural equation modelling indicated that the specified model showed excellent fit to the data: $\chi^2_{GoF} = 0.335$; $d.f. = 1$; $p = 56$; $RMSEA = 0.0$; $CFI = 1$; $TLI = 1$; $SRMR = 0.003$, such that no model modification indices were provided by Mplus.

Associations between disgust, feared selves and contamination fear

As Fig. 1 indicates, while DS significantly predicted FSQ-MAL, FSQ-CUL and FSQ-COR, DP only predicted FSQ-MAL and FSQ-CUL. Furthermore, of all feared selves, only FSQ-COR significantly predicted both symptom domains of contamination fear (VOCI-CC and VOCI-MC) (Table 3).

Indirect effects via feared selves

The model indicated significant direct effects of DP on both VOCI-CC and VOCI-MC. On the other hand, there was a significant direct effect of DS on VOCI-CC, but not on VOCI-MC. Two significant indirect effects also emerged: there was a significant indirect effect of DS to VOCI-CC via FSQ-COR, as well as a significant indirect effect of DS to

Table 2 Zero-order correlations between measures

	1.	2.	3.	4.	5.	6.	7.
1. VOCI-CC	-						
2. VOCI-MC	0.633**	-					
3. FSQ-MAL	0.353**	0.466**	-				
4. FSQ-CUL	0.383**	0.552**	0.610**	-			
5. FSQ-COR	0.552**	0.686**	0.574**	0.744**	-		
6. DP	0.403**	0.482**	0.327**	0.329**	0.333**	-	
7. DS	0.424**	0.477**	0.339**	0.335**	0.412**	0.668**	-

VOCI-CC, Vancouver Obsessional Compulsive Inventory – Contamination Subscale; *VOCI-MC,* Vancouver Obsessional Compulsive Inventory – Mental Contamination; *FSQ-MAL,* Malformed subscale of the Fear of Self Questionnaire Multidimensional Version; *FSQ-CUL,* Culpable subscale of the Fear of Self Questionnaire Multidimensional Version; *FSQ-COR,* Corrupted subscale of the Fear of Self Questionnaire Multidimensional Version; *DP,* Disgust Propensity; *DS,* Disgust Sensitivity. $N = 412$. $^{**}p < .01$

VOCI-MC via FSQ-COR. In fact, DS predicted VOCI-MC *only* via FSQ-COR (see Fig. 1). See Table 4 for standardized indirect effects of feared selves on contamination fear.

Discussion

Despite the growing body of literature assessing the role of disgust in contact and mental contamination, less research has investigated the potential cognitive mediators that may explain this association. The aim of this study was to assess the cognitive pathways through which disgust may lead to both contact and mental contamination. We hypothesized that feared possible selves would explain the associations between disgust sensitivity and propensity and symptoms of both contact and mental contamination. The results of this study partially supported our hypotheses. Namely, only the "feared corrupted self" was a significant mediator in the association between disgust sensitivity and symptoms of both contact and mental contamination. Notably, the "feared corrupted self" *fully mediated* the link between disgust sensitivity and mental contamination. However, none of the feared possible selves acted as a mediator in the association between disgust propensity and contamination fear. In all, the present findings suggest that the "feared corrupted self" reflects a critically important element in the association between disgust sensitivity and both contact contamination and mental contamination, and is even more crucial to the

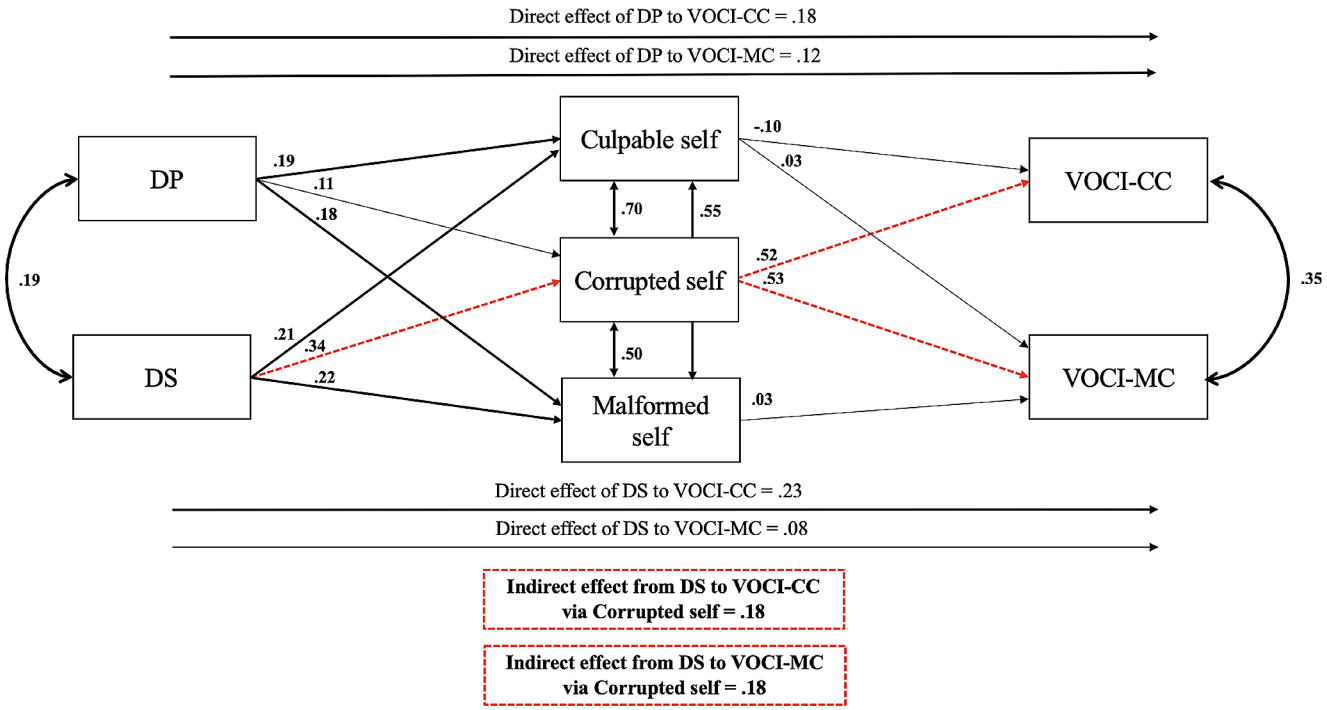

Fig. 1 Mediation path-analytic model of the associations between disgust, feared selves and contamination Fear. Bolded lines indicate statistically significant paths. Dashed lines indicate paths for statistically significant indirect effects. Standardized estimates are provided. DP = Disgust Propensity; DS = Disgust Sensitivity; VOCI-CC = Vancouver Obsessional Compulsive Inventory – Contamination Subscale; VOCI-MC = Vancouver Obsessional Compulsive Inventory – Mental Contamination

Table 3 Standardized direct effects of disgust and feared selves on contamination fear

Predictor	*β*	*SE*	*p*-value
Contact contamination			
Disgust propensity	**0.18**	**0.05**	**0.001**
Disgust sensitivity	**0.12**	**0.05**	**0.02**
Culpable self	−0.10	0.06	0.08
Corrupted self	**0.51**	**0.06**	**< 0.001**
Mental contamination			
Disgust propensity	**0.23**	**0.05**	**0.00**
Disgust sensitivity	0.08	0.05	0.07
Culpable self	0.03	0.05	0.53
Corrupted self	**0.53**	**0.05**	**0.00**
Malformed self	0.03	0.04	0.44
Culpable self			
Disgust propensity	**0.19**	**0.06**	**0.002**
Disgust sensitivity	**0.21**	**0.06**	**0.001**
Corrupted self			
Disgust propensity	0.12	0.06	0.08
Disgust sensitivity	**0.34**	**0.06**	**< 0.001**
Malformed self			
Disgust propensity	**0.18**	**0.06**	**0.003**
Disgust sensitivity	**0.22**	**0.06**	**< 0.001**

Significant effects are in bold; $N = 412$

latter. This provides further evidence for the cognitive models of obsessions and mental contamination, in which symptoms of contamination fear are purported to result from the misappraisal of intrusive thoughts or perceived violations that threaten beliefs about the self (Rachman, 2004; Rachman et al., 2015).

One important finding of the present study is that disgust sensitivity only predicted mental contamination through the mediating effect of the "feared corrupted self". Moral concerns are especially relevant in the context of mental contamination, wherein individuals experience a sense of internal impurity resulting from physical or psychological violations (Rachman, 2004, 2006). In fact, the "feared corrupted self" might capture what Rachman and colleagues (2015) described as perceived violations, which involve feelings of inner pollution that trigger further negative emotions such as fear, disgust, guilt and shame. It has been posited that obsessional concerns regarding immorality are important triggers of the "feared corrupted self" (Llorens-Aguilar et al., 2022; Melli et al., 2016). Namely, those who score high on the "feared corrupted self" are more likely to interpret the presence of immoral thoughts as indicative of an immoral character (Aardema et al., 2021). Further, the emotion of disgust is often elicited by immoral acts and can signal the need to engage in behaviour to restore one's sense of morality (Horberg et al., 2009; Ouellet-Courtois & Radomsky, 2023; Zhong & Liljenquist, 2006). Of note, one recent experiment demonstrated that an experimental violation of individuals' moral self-concept triggered feelings of mental contamination (Krause & Radomsky, 2023). It would thus appear that concerns about morality could explain how disgust, the feared corrupted self, and mental contamination are intertwined. This in line with the cognitive model of mental contamination that describes how negative self-appraisals of perceived violations maintain the person's feelings of mental contamination and self-disgust (Rachman et al., 2015).

Table 4 Standardized indirect effects of feared selves on contamination fear

Mediator	*β*	*SE*	*p*-value
Disgust sensitivity to contact contamination			
Via culpable self	−0.02	0.01	0.12
Via corrupted self	**0.18**	**0.04**	**< 0.001**
Disgust propensity to contact contamination			
Via culpable self	−0.02	0.01	0.13
Via corrupted self	0.05	0.03	0.09
Disgust sensitivity to mental contamination			
Via culpable self	0.01	0.01	0.54
Via corrupted self	**0.18**	**0.04**	**< 0.001**
Via malformed self	0.01	0.01	0.45
Disgust propensity to mental contamination			
Via culpable self	0.01	0.01	0.54
Via corrupted self	0.06	0.03	0.08
Via malformed self	0.01	0.01	0.46

Significant effects are in bold; $N = 412$

Our results indicated that disgust sensitivity significantly predicted all facets of the "feared self" (i.e., feared corrupted self, feared malformed self, and feared culpable self). It is worth noting that disgust sensitivity and the construct of the "feared self" both encompass cognitive appraisals that are not reflected in disgust propensity. The "feared self" arises when an individual attributes great significance to distressing or repugnant intrusive thoughts, interpreting them as reflective of their true self (Aardema et al., 2013; Llorens-Aguilar et al., 2022). Similarly, disgust sensitivity is evoked when one appraises their experience of disgust negatively (e.g., "I think feeling disgust is bad for me"), which may lead to an overestimation of the level of threat imposed by the disgust experience (Olatunji et al., 2007). These shared cognitive misappraisals may explain why the "feared self" emerges as a significant mediator in the association between disgust sensitivity and contamination fear, but does not account for any shared variance between disgust propensity and contamination fear. In short, it would appear that, for disgust sensitivity to evoke either contact or mental contamination, negative appraisals of disgust must indicate something about the self, leading the individual to conclude that they are disgusting or repulsive and thus contaminated. This appraisal – linking disgust experiences to

being repulsive – appears to lead to heightened contamination fears. This is in line with past research highlighted the role of emotional reasoning in contamination fear, whereby individuals with contamination concerns tend to infer risk of contracting an illness based on their feelings of disgust (Verwoerd et al., 2013).

Contrary to our initial hypotheses, our findings did not provide evidence that a "feared culpable self" is a predictor of contact or mental contamination symptoms. Similarly, our results did not align with our expectations that a feared malformed self would predict symptoms of mental contamination. In fact, our results indicated that solely a "feared corrupted self" had a significant effect on both contact and mental contamination. These results corroborate previous research that highlighted the role of "feared corrupted self" in contamination fear. For instance, past research has indicated that the "feared corrupted self" emerged as the sole significant predictor of mental contamination (Aardema et al., 2021). Further, Aardema and colleagues (2019) found that reductions in feared selves over the course of treatment were unique predictors of improvements on a measure of symptoms of contamination fear. In the validation study of the multidimensional version of the Fear of Self Questionnaire, the authors highlighted how the "feared corrupted self" closely mirrored a majority of the questionnaire's items, and that the dimension of the "feared self" was strongly related to the culpable and malformed self (Aardema et al., 2021). The current results also indicated strong associations between the three dimensions of the "feared self", and this overlap may partly explain why the "feared corrupted self" was the only dimension that emerged as a significant mediator. In all, it appears that the "feared corrupted self" most closely captures the negative self-beliefs among individuals experiencing both mental and contact contamination concerns.

There is emerging literature on the construct of self-disgust, which may have a conceptual overlap with the "feared self" in OCD. Self-disgust often emerges following a traumatic event that triggers a sense of violation, such as a sexual assault. Badour and colleagues (2012) explored the role of disgust in individuals who had experienced traumatic events, and examined the associations between self-focused disgust, other-focused disgust (i.e., disgust directed towards others) and symptoms of OCD and/or post-traumatic stress. Their findings revealed a unique and significant association between self-disgust and symptoms of contact contamination in OCD. Conversely, other-focused disgust was found to be linked with symptoms of post-traumatic stress. These results suggest that those who experience self-disgust, following a traumatic event, are more susceptible to contamination-based OCD symptoms, as these individuals may experience a compelling urge to engage in compulsive washing in order to remove their feelings of self-disgust and to reinstate their "inner cleanliness". This sense of self-disgust often persists, with individuals feeling as though they are forever tainted by the traumatic experience, such that feelings of inner contamination are often resistant to change (Fairbrother & Rachman, 2004; Jung & Steil, 2012). Of relevance to mental contamination, Berle and Phillips (2006) emphasized that self-disgust often emerges as a result of immoral obsessions, where individuals find themselves grappling with self-revulsion triggered by immoral intrusive thoughts. These thoughts are often misconstrued as reflections of their own character. This experience closely resembles that of the "feared self", where individuals believe that their repugnant and immoral intrusive thoughts may uncover something at the core of their identity (Aardema & O'Connor, 2007; Aardema et al., 2013). It is thus possible that self-disgust, though not assessed within this study, could show significant overlap with the "feared self" and play a critical role in the occurrence of contamination concerns.

The current study is characterized by several strengths. Firstly, it is the first of its kind, to our knowledge, to investigate the associations between disgust, feared selves, and both domains of contamination fear. Other key strengths lie in the study's sample size/power and excellent model fit. Further, this study sheds light on the specific dimension of the "feared self" that can account for the association between disgust and contamination fears (i.e., feared corrupted self). Consequently, this study builds on prior work (Aardema et al., 2019) and provides further evidence for the need to address the feared corrupted self in the context of contamination-based OCD treatment. Lastly, this study offers further empirical support for the cognitive model of mental contamination, which is posited to be caused by the misinterpretation of the personal significance of a psychological or physical violation, leading to negative appraisals about the self (Rachman et al., 2015).

Limitations and future directions

Despite its strengths, this study does have limitations. First, the use of an undergraduate sample, mostly consisting of white females, limits diversity and the generalizability of our findings to other populations. The current findings therefore require replication in a more diverse sample that better reflects the general population. A second limitation of this study was the correlational nature of the analyses. While these findings provide valuable insights into the association between disgust, feared selves and contamination fears, they do not allow us to establish causality. Our findings regarding the impact of disgust and the "feared

self" on symptoms of contamination fear would therefore require additional validation using experimental designs that enable the manipulation of variables. Results suggest that disgust sensitivity may lead to symptoms of contamination fear when the experience of disgust is misappraised as indicative of something about the self (e.g., that one is a disgusting, repulsive person). Experimentally, this could be further tested by priming disgust in the laboratory, and seeing whether this elicits a "feared self", which in turn triggers feelings of contamination and urges to wash. Furthermore, in light of the postulation that OCD symptoms are driven by a confusion between sensory-based information and feared imagined possibilities (O'Connor & Aardema, 2011; O'Connor, 2002; Aardema & O'Connor, 2007), it is possible that symptoms of contamination arise over time as individuals repeatedly confuse their self-disgust experiences (e.g., when being the witness or victim of injustice, when being bullied) with an identification to the immoral qualities that they fear to have. Future longitudinal investigations should clarify the temporal links between disgust, feared selves and contamination fear.

In all, the present study provides evidence for the mediating effect of the "feared corrupted self" in the association between disgust sensitivity and contamination fears (both mental and contact contamination). It offers preliminary evidence supporting the assessment of the "feared self" in clinical settings when treating individuals with contamination fears who report concerns revolving around disgust, especially when these are not captured by assessments of perceived violations. Exploring the role of self-disgust in the context of the relationship between disgust and contamination fear also presents a fruitful avenue for future research. As previously mentioned, self-disgust appears to share a conceptual overlap with perceived violations, the "feared self" and mental contamination. We hope that these findings will motivate further scientific inquiry in the associations between disgust, negative violation appraisals and self-beliefs, and symptoms of contamination fear.

Appendix

Mplus syntax for the mediation path-analytic model

```
DATA:
FILE IS disgust.csv;
!TYPE IS FULLCORR MEANS STDEVIATIONS;
!NOBSERVATIONS = 412;
VARIABLE:
NAMES ARE ID COND CUS COS MAS DP DS CC MC DASS;
USEVARIABLES ARE DP DS CUS COS MAS MC CC;
MISSING ARE ALL (999);
Idvariable = id;
ANALYSIS:
ESTIMATOR = ML;
MODEL:
!Y ON X M;
CC MC on DP DS CUS COS;
MC on DP DS MAS;
!M on X;
CUS COS MAS on DP DS;
DP with DS;
CUS with COS;
CUS with MAS;
COS with MAS;
CC with MC;
MODEL INDIRECT:
CC VIA CUS DS;
CC VIA COS DS;
MC VIA CUS DS;
MC VIA COS DS;
MC VIA MAS DS;
CC VIA CUS DP;
CC VIA COS DP;
MC VIA CUS DP;
MC VIA COS DP;
MC VIA MAS DP;
OUTPUT:
sampstat stdyx mod MODINDICES (ALL);
```

Authors contribution Catherine Ouellet-Courtois: Conceptualization, Methodology, Project administration, Data curation, Formal Analysis, Writing - Original draft preparation, and Supervision. Alexandra Dagher: Writing - Original draft preparation. Adam S. Radomsky: Supervision, Writing - Reviewing and editing, and Funding acquisition.

Funding This research was supported by a Canadian Institutes of Health Research (CIHR; grant number: PJT-153180) provided to the last author. CIHR had no role in the study design, data collection, analysis, interpretation of data, writing, nor in the decision to submit the article for publication.

Data availability The data is available upon request to the corresponding author.

Declarations

Competing interests The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

Aardema, F. (2020). COVID-19, obsessive-compulsive disorder and invisible life forms that threaten the self. *Journal of Obsessive-Compulsive and Related Disorders, 26*, 100558.

Aardema, F., & O'Connor, K. (2007). The menace within: Obsessions and the self. *Journal of Cognitive Psychotherapy, 21*, 182–197. https://doi.org/10.1891/088983907781494573

Aardema, F., & Wong, S. F. (2020). Feared possible selves in cognitive- behavioral theory: An analysis of its historical and empirical context, and introduction of a working model. *Journal of Obsessive Compulsive and Related Disorders, 24*, 100479. https://doi.org/10.1016/j.jocrd.2019.100479

Aardema, F., Moulding, R., Radomsky, A. S., Doron, G., Allamby, J., & Souki, E. (2013). Fear of self and obsessionality: Development and validation of the fear of self questionnaire. *Journal of Obsessive–Compulsive and Related Disorders, 2*, 306–315. https://doi.org/10.1016/j.jocrd.2013.05.005

Aardema, F., Moulding, R., Melli, G., Radomsky, A. S., Doron, G., Audet, J. S., & Purcell- Lalonde, M. (2018). The role of feared possible selves in obsessive-compulsive and related disorders: A comparative analysis of a core cognitive self-construct in clinical samples. *Clinical Psychology and Psychotherapy, 25*, e19–e29. https://doi.org/10.1002/cpp.2121

Aardema, F., Wong, S. F., Audet, J. S., Melli, G., & Baraby, L. P. (2019). Reduced fear-of-self is associated with improvement in concerns related to repugnant obsessions in obsessive-compulsive disorder. *The British Journal of Clinical Psychology, 58*(3), 327–341. https://doi.org/10.1111/bjc.12214

Aardema, F., Radomsky, A. S., Moulding, R., Wong, S. F., Bourguignon, L., & Giraldo-O'Meara, M. (2021). Development and validation of the multidimensional version of the fear of self questionnaire: Corrupted, culpable and malformed feared possible selves in obsessive-compulsive and body-dysmorphic symptoms. *Clinical Psychology & Psychotherapy, 28*(5), 1160–1180. https://doi.org/10.1002/cpp.2565

Abramowitz, J. S., Fabricant, L. E., Taylor, S., Deacon, B. J., McKay, D., & Storch, E. A. (2014). The relevance of analogue studies for understanding obsessions and compulsions. *Clinical Psychology Review, 34*, 206–217.

Ahern, C., & Kyrios, M. (2016). Self processes in obsessive-compulsive disorder. In M. Kyrios, R. Moulding, G. Doron, S. S. Bhar, M. Nedeljkovic, & M. Mikulincer (Eds.), *The self in understanding and treating psychological disorders* (pp. 112–122). Cambridge University Press. https://doi.org/10.1017/CBO9781139941297.013

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders*. American Psychiatric Publishing.

Audet, J. S., Jacmin-Park, S., Kheloui, S., Gravel, C., Juster, R. P., & Aardema, F. (2023). COVID-19 related stress and fears of contamination: The impact of feared self-perceptions. *Current Psychology*, 1–12. https://doi.org/10.1007/s12144-023-04553-w

Badour, C. L., Bown, S., Adams, T. G., Bunaciu, L., & Feldner, M. T. (2012). Specificity of fear and disgust experienced during traumatic interpersonal victimization in predicting posttraumatic stress and contamination-based obsessive–compulsive symptoms. *Journal of Anxiety Disorders, 26*(5), 590–598. https://doi.org/10.1016/j.janxdis.2012.03.001

Badour, C. L., Ojserkis, R., McKay, D., & Feldner, M. T. (2014). Disgust as a unique affective predictor of mental contamination following sexual trauma. *Journal of Anxiety Disorders, 28*(7), 704–711. https://doi.org/10.1016/j.janxdis.2014.07.007

Bentler, P. M., & Bonett, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin, 88*, 588.

Berle, D., & Phillips, E. S. (2006). Disgust and obsessive-compulsive disorder: An update. *Psychiatry, 69*(3), 228–238. https://doi.org/10.1521/psyc.2006.69.3.228

Cisler, J. M., Brady, R. E., Olatunji, B. O., & Lohr, J. M. (2010). Disgust and obsessive beliefs in contamination-related OCD. *Cognitive Therapy and Research, 34*(5), 439–448. https://doi.org/10.1007/s10608-009-9253-y

Coughtrey, A. E., Shafran, R., & Rachman, S. J. (2014). The spread of mental contamination. *Journal of Behavior Therapy and Experimental Psychiatry, 45*(1), 33–38. https://doi.org/10.1016/j.jbtep.2013.07.008

Coughtrey, A., Shafran, R., Bennett, S., Kothari, R., & Wade, T. (2018). Mental contamination: Relationship with psychopathology and transdiagnostic processes. *Journal of Obsessive- Compulsive and Related Disorders, 17*, 39–45.

Curtis, V., de Barra, M., & Aunger, R. (2011). Disgust as an adaptive system for disease avoidance behaviour. *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences, 366*(1563), 389–401. https://doi.org/10.1098/rstb.2010.0117

Doron, G., Moulding, R., Kyrios, M., & Nedeljkovic, M. (2008). Sensitivity of self-beliefs in obsessive compulsive disorder. *Depression and Anxiety, 25*(10), 874–884. https://doi.org/10.1002/da.20369

Fairbrother, N., & Rachman, S. (2004). Feelings of mental pollution subsequent to sexual assault. *Behaviour Research and Therapy, 42*, 173–189.

Horberg, E. J., Oveis, C., Keltner, D., & Cohen, A. B. (2009). Disgust and the moralization of purity. *Journal of Personality and Social Psychology, 97*(6), 963–976. https://doi.org/10.1037/a0017423

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal, 6*, 1–55.

Jaeger, T., Moulding, R., Yang, Y. H., David, J., Knight, T., & Norberg, M. M. (2021). A systematic review of obsessive-compulsive disorder and self: Self-esteem, feared self, self-ambivalence, ego-dystonicity, early maladaptive schemas, and self concealment. *Journal of Obsessive-Compulsive and Related Disorders, 31*, 1–47. https://doi.org/10.1016/j.jocrd.2021.100665

Jalal, B., Chamberlain, S. R., Robbins, T. W., & Sahakian, B. J. (2022). Obsessive-compulsive disorder-contamination fears, features, and treatment: Novel smartphone therapies in light of global mental health and pandemics (COVID-19). *CNS Spectrums, 27*, 136–144. https://doi.org/10.1017/S1092852920001947

Jung, K., & Steil, R. (2012). The feeling of being contaminated in adult survivors of childhood sexual abuse and its treatment via a two-session program of cognitive restructuring and imagery modification: A case study. *Behavior Modification, 36*, 67–86.

Khosravani, V., Samimi Ardestani, S. M., Wong, S. F., Moulding, R., Aardema, F., Sharifibastan, F., & Aminaee, M. (2023). Cross-sectional direct and indirect relationships between the corrupted feared self and obsessive–compulsive symptoms in a clinical sample: The role of mental contamination. *British Journal of Clinical Psychology, 62*(4), 800–815. https://doi.org/10.1111/bjc.12440

Kline, R. B. (2005). *Principles and practice of structural equation modeling* (2nd ed.). Guilford Press.

Kline, R. B. (2016). *Principles and practice of structural equation modeling* (4th ed.). Guilford Press.

Knowles, K. A., Jessup, S. C., & Olatunji, B. O. (2018). Disgust in anxiety and obsessive-compulsive disorders: recent findings and future directions. *Current Psychiatry Reports, 20*, 1–10.

Krause, S., & Radomsky, A. S. (2023). An experimental investigation of moral self-violation and mental contamination. *Cognitive Therapy and Research*, 1–11.

Krause, S., Wong, S., O'Meara, M. G., Aardema, F., & Radomsky, A. S. (2020). It's not so much about what you touch: Mental contamination mediates the relationship between feared self-perceptions and contact contamination. *Journal of Obsessive-Compulsive and Related Disorders, 25*, 100507.

Krause, S., Ouellet-Courtois, C., Sandstrom, A., & Radomsky, A. S. (2022). Thinking about disgust: Cognitive processes mediate

the associations between disgust proneness and OCD symptom domains. *International Journal of Cognitive Therapy, 15*, 231–254.

Llorens-Aguilar, S., Arnáez, S., Aardema, F., & García-Soriano, G. (2022). The relationship between obsessions and the self: Feared and actual self-descriptions in a clinical obsessive-compulsive disorder sample. *Clinical Psychology & Psychotherapy, 29*(2), 642–651. https://doi.org/10.1002/cpp.2656

MacCallum, R. C., Browne, M. W., & Sugawara, H. M. (1996). Power analysis and determination of sample size for covariance structure modeling. *Psychological Methods, 1*, 130–149.

McNally R. J. (2002). Anxiety sensitivity and panic disorder. *Biological Psychiatry, 52*, 938–946. https://doi.org/10.1016/s0006-3223(02)01475-0

Melli, G., Aardema, F., & Moulding, R. (2016). Fear of self and unacceptable thoughts in obsessive-compulsive disorder. *Clinical Psychology & Psychotherapy, 23*(3), 226–235. https://doi.org/10.1002/cpp.1950

Moulding, R., Aardema, F., & O'Connor, K. P. (2014). Repugnant obsessions: A review of the phenomenology, theoretical models, and treatment of sexual and aggressive obsessional themes in OCD. *Journal of Obsessive-Compulsive and Related Disorders, 3*, 161–168.

Norman, G. R., & Streiner, D. L. (2003). Path analysis and structural equation modeling. In *Biostatistics: The bare essentials, Third Edition*, (pp. 156–176). BC Decker.

O'Connor, K. (2002). Intrusions and inferences in obsessive compulsive disorder. *Clinical Psychology & Psychotherapy, 9*, 38–46. https://doi.org/10.1002/cpp.303

O'Connor, K., & Aardema, F. (2011). *Clinician's handbook for obsessive compulsive disorder: Inference-based therapy*. Wiley.

Olatunji, B. O., Sawchuk, C. N., Lohr, J. M., & de Jong, P. J. (2004). Disgust domains in the prediction of contamination fear. *Behaviour Research and Therapy, 42*(1), 93–104. https://doi.org/10.1016/s0005-7967(03)00102-5

Olatunji, B. O., Cisler, J. M., Deacon, B. J., Connolly, K., & Lohr, J. M. (2007). The disgust propensity and sensitivity scale-revised: Psychometric properties and specificity in relation to anxiety disorder symptoms. *Journal of Anxiety Disorders, 21*(7), 918–930. https://doi.org/10.1016/j.janxdis.2006.12.005

Ouellet-Courtois, C., & Radomsky, A. S. (2023). Can immorality be contracted? Appraisals of moral disgust and contamination fear. *Behaviour Research and Therapy*, 104336. https://doi.org/10.1016/j.brat.2023.104336

Rachman, S. (1994). Pollution of the mind. *Behaviour Research and Therapy, 32*, 311–314. https://doi.org/10.1016/0005-7967(94)90127-9

Rachman, S. (1997). A cognitive theory of obsessions. *Behaviour Research and Therapy, 35*, 793–802. https://doi.org/10.1016/s0005-7967(97)00040-5

Rachman, S. (1998). A cognitive theory of obsessions: Elaborations. *Behaviour Research and Therapy, 36*, 385–401. https://doi.org/10.1016/S0005-7967(97)10041-9

Rachman, S. (2004). Fear of contamination. *Behavior Research and Therapy, 42*, 1227–1255. https://doi.org/10.1016/j.brat.2003.10.009

Rachman, S. (2006). *Fear of contamination: Assessment and treatment*. Oxford University Press.

Rachman, S. J., & Hodgson, R. J. (1980). *Obsessions and compulsions*. Prentic-Hall.

Rachman, S., Coughtrey, A. E., Shafran, R., & Radomsky, A. S. (2015). *Oxford guide to the treatment of mental contamination: VOCI Mental Contamination Scale (VOCI-MC)*. Oxford University Press.

Radomsky, A. S., Ouimet, A. J., Ashbaugh, A. R., Lavoie, S. L., Parrish, C. L., & O'Connor, K. P. (2006). Psychometric properties of the French and English versions of the Vancouver obsessional-compulsive inventory and the symmetry ordering and arranging questionnaire. *Cognitive Behaviour Therapy, 35*, 164–173.

Radomsky, A. S., Rachman, S., Shafran, R., Coughtrey, A. E., & Barber, K. C. (2014). The nature and assessment of mental contamination: A psychometric analysis. *Journal of Obsessive-Compulsive and Related Disorders, 3*, 181–187. https://doi.org/10.1016/j.jocrd.2013.08.003

Radomsky, A., Coughtrey, A., Shafran, R., & Rachman, S. (2017). Abnormal and normal mental contamination. *Journal of Obsessive-Compulsive and Related Disorders, 17*. https://doi.org/10.1016/j.jocrd.2017.08.011

Rozin, P., Haidt, J., & McCauley, C. R. (2000). Disgust, In M. Lewis & J. M. Haviland-Jones (Eds.) Handbook of emotions, 2nd Edition (pp. 637–653). New York: Guilford Press.

Salkovskis, P. M. (1985). Obsessional-compulsive problems: A cognitive-behavioural analysis. *Behaviour Research and Therapy, 23*, 571–583. https://doi.org/10.1016/0005-7967(85)90105-6

Schermelleh-Engel, K., Moosbrugger, H., & Müller, H. (2003). Evaluating the fit of structural equation models: Tests of significance and descriptive goodness-of-fit measures. *Methods of Psychological Research Online, 8*, 23–74.

Thordarson, D. S., Radomsky, A. S., Rachman, S., Shafran, R., Sawchuk, C. N., & Hakstian, A. R. (2004). The vancouver obsessional compulsive inventory (VOCI). *Behaviour Research and Therapy, 42*, 1289–1314. https://doi.org/10.1016/j.brat.2003.08.007

Tolin, D. F., Worhunsky, P., & Maltby, N. (2004). Sympathetic magic in contamination-related OCD. *Journal of Behavior Therapy and Experimental Psychiatry, 35*(2), 193–205. https://doi.org/10.1016/j.jbtep.2004.04.009

Üzümcü, E., Evliyaoğlu, E. S., & Inozu, M. (2023). The role of gender, fear of self and disgust propensity in mental contamination: A model test using mental contamination induction. *Current Psychology, 42*, 9596–9608. https://doi.org/10.1007/s12144-021-02285-3

Van Overveld, W. J. M., de Jong, P. J., Peters, M. L., Cavanagh, K., & Davey, G. C. L. (2006). Disgust propensity and disgust sensitivity: Separate constructs that are differentially related to specific fears. *Personality and Individual Differences, 41*(7), 1241–1252. https://doi.org/10.1016/j.paid.2006.04.021

Verwoerd, J., de Jong, P. J., Wessel, I., & van Hout, W. J. (2013). If I feel disgusted, I must be getting ill: Emotional reasoning in the context of contamination fear. *Behaviour Research and Therapy, 51*, 122–127.

Wilson, S., Acar, M., Hirji, R., & Racine, S. E. (Unpublished work). Unattractive, corrupted, and culpable feared self-themes: Expanding our understanding of self-concept in relation to eating pathology.

Zhong, C. B., & Liljenquist, K. (2006). Washing away your sins: Threatened morality and physical cleansing. *Science, 313*, 1451–1452.