RUNNING HEAD: MENTAL CONTAMINATION: RELATIONSHIP WITH PSYCHOPATHOLOGY

Mental contamination: Relationship with Psychopathology and Transdiagnostic Processes

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Abstract

Background: Mental contamination, the experience of feeling dirty in the absence of physical uncleanliness, is closely associated with obsessive compulsive disorder (OCD). Given that many features of OCD are found in other diagnoses, the primary aim of this study was to determine whether mental contamination is specific to OCD or whether it is also associated with psychopathology found in other disorders. We hypothesised that, in addition to OCD symptoms, mental contamination would be associated with other psychopathology, in particular symptoms of depression, anxiety and eating disorders, and with transdiagnostic processes such as perfectionism.

Methods: 120 participants (82%) completed measures of psychological disorders and transdiagnostic processes. Results were analysed using Pearson's *r* correlations and a multiple regression analysis.

Results: Mental contamination was most strongly associated with symptoms of OCD but was also associated with eating disorder symptoms, depression and anxiety. It was also correlated with perfectionism, intolerance of uncertainty and fear of compassion. OCD, eating disorder symptoms, fear of compassion and low self-esteem were significant independent predictors of mental contamination.

Conclusions: Mental contamination is associated with a range of psychopathology but is most strongly associated with symptoms of OCD. Further research is warranted to advance treatment for mental contamination.

Mental Contamination: Relationship with Psychopathology and Transdiagnostic Processes

Introduction

Mental contamination is the experience of feeling dirty and polluted in the absence of physical contact with a contaminant. The construct of 'Mental Pollution' was described in the mid-1990s (Rachman, 1994) and elaborated on a decade later (Rachman, 2004). Both these classic papers and the subsequent book on the topic emphasised the construct of mental contamination within obsessive-compulsive disorder (OCD; Rachman, Coughtrey, Shafran, & Radomsky, 2014). This emphasis of mental contamination within OCD reflected the fact that contamination fears and compulsions are the most common form of OCD and there is a close relationship between mental and contact contamination (Coughtrey, Shafran, Lee, & Rachman 2013; Shafran, Zysk & Williams, this issue). However, despite the well documented link with OCD, mental contamination was originally thought of as a transdiagnostic construct occurring across multiple disorders, but to date this has not been widely investigated (Rachman, 2004).

It is commonly acknowledged when diagnosing and classifying psychological disorders that it is not possible to 'carve nature at its joints' i.e. there have been challenges in identifying and establishing distinctions and discontinuities between clinical presentations (Cooper, 2015; Markon, Chmielewski, & Miller, 2011; Woods, 1979). Therefore there is growing interest in establishing which phenomena are present across diagnoses, and which are specific to a particular disorder. In fact, the vast majority of clinical phenomena occur across multiple disorders and very few are distinct. Those clinical phenomena that occur across multiple disorders are often termed 'transdiagnostic', although there is an important distinction between transdiagnostic processes that are considered to be shared mechanisms that contribute to the maintenance of psychopathology (Fairburn, Cooper, & Shafran, 2003) and transdiagnostic features or symptoms that simply occur across disorders.

Many of the symptoms of OCD do occur across disorders and therefore could be considered transdiagnostic. For example, checking behaviour characterises Generalised Anxiety Disorder (GAD; Shcut, Castonguay, & Borkovec, 2001), avoidance is a diagnostic feature that occurs across anxiety disorders (American Psychiatric Association, 2013), and at times, having repetitive, unwanted, intrusive thoughts can be hard to distinguish from rumination and worry (Macatee et al., 2016; Tolin, Worhunsky, & Maltby, 2006). Research on cleansing and morality suggests that while it is prominent

in OCD (Reuven, Liberman, & Dar, 2013), the phenomenon is not restricted to this psychopathology (Kalanthroff, Aslan, & Dar, 2015; Zhong & Liljenquist, 2006; West & Zhong, 2015).

Furthermore, it is not only the symptoms or features of OCD that occur across disorders. There is now evidence that there are maintaining mechanisms which operate across disorders. For example, thought-action fusion, the belief that having an unwanted, unacceptable thought increases the likelihood that a specific adverse event will occur and that having such thoughts are the moral equivalent of carrying out that particular act, is a cognitive bias/belief that was first described in the context of OCD (Shafran, Thordarson, & Rachman, 1996; Shafran & Rachman, 2004). However, it quickly became apparent that thought-action fusion also occurred in GAD and other anxiety disorders (Thompson-Hollands, Farchione, & Barlow, 2013). Indeed, similar beliefs ('thought shape fusion') have been found in eating disorders (Kostopoulou, Varsou, & Stalikas, 2013). Conversely, constructs first considered in the context of other disorders (such as experiential avoidance) now appear to be relevant to OCD (Reuman, Jacoby, & Abramowitz, 2016).

The Obsessive Compulsive Cognitions Working Group identified six beliefs that characterised OCD but were transdiagnostic in that they occurred across disorders (Obsessive Compulsive Cognitions Working Group, 1997; Tolin et al., 2006). These beliefs included intolerance of uncertainty and perfectionism owing to the consensus of their clinical importance in the understanding and maintenance of OCD. The proposed importance of these transdiganostic constructs has been borne out through subsequent empirical work; for example, intolerance of uncertainty and perfectionism were demonstrated to predict treatment outcome in a recent study of response to cognitive behaviour therapy for OCD (Kyrios, Hordern, & Fassnacht, 2015). Intolerance of uncertainty can be defined as the excessive tendency to react negatively to an uncertain or ambiguous event or situation, even if the probability of such an event occurring or the likelihood of negative consequences is very low (Ladouceur, Gosselin, & Dugas, 2000). Experimental studies inducing uncertainty in subclinical people with obsessive compulsive symptoms demonstrate that such uncertainty leads to checking behaviour (Toffolo, Van den Hout, Hooge, Engelhard, & Cath, 2013) and there is considerable work demonstrating that, in turn, checking causes doubt (Radomsky, Dugas, Alcolado, & Lavoie, 2014). In a large analogue sample, intolerance of uncertainty was found to mediate the relationship between perfectionism and OCD (Reuther et al., 2013). It is also elevated in people with eating disorders (Brown et al., 2017).

The definition of perfectionism has long been debated. Frost and colleagues defined perfectionism as the "setting of excessively high standards for performance accompanied by overly critical self-evaluation" (Frost, Marten, Lahart, & Rosenblate, 1990, p.450). More recently the term 'clinical perfectionism' has been described as "the overdependence of self-evaluation on the determined pursuit of personally demanding self-imposed standards in at least one highly salient domain despite adverse consequences" (Shafran, Cooper, & Fairburn, 2002, p.778). Although several studies report a strong relationship between OCD and perfectionism (see Martinelli, Chasson, Wetterneck, Hart, & Björgvinsson, 2014), it should be noted that one of the subscales of perfectionism ('Doubts About Actions') on the commonly used Frost Multidimensional Perfectionism Measure (Frost et al., 1990) was actually taken directly from the Maudsley Obsessive Compulsive Inventory (Hodgson & Rachman, 1977), a measure of OCD. Studies showing associations between this subscale and OCD severity (e.g., Martinelli et al., 2014) are therefore really demonstrating the overlap in symptoms between OCD and perfectionism. However, other research excluding the doubts about actions subscale have also highlighted that individuals with OCD have significantly elevated perfectionism and that this interferes with their ability to successfully engage in treatment and predicts treatment outcome (Egan, Wade, & Shafran, 2011).

Given the clear relationship between mental contamination and OCD, and between OCD and both intolerance of uncertainty and perfectionism, it is likely that intolerance of uncertainty and perfectionism are also related to mental contamination. Clinically, patients with mental contamination fears often report both intolerance of uncertainty (e.g., they experience high levels of anxiety in situations where there is ambiguity over whether contamination may have occurred) and perfectionism (e.g., they have high moral standards) and therefore it is likely that these processes are also related to mental contamination (Rachman, 2004). Intolerance of Uncertainty and Perfectionism are not the only two transdiagnostic constructs that are of potential relevance to OCD and mental contamination. There has been an important and growing research literature on the role of the 'self' in OCD with data suggesting that part of the motivation for compulsive behaviour may be the restorative impact on self-esteem (Ahern, Kyrios, & Meyer, 2015). Related work on self-compassion (the ability to experience empathy and feelings of kindness, warmth and gentleness towards oneself, particularly in times of difficulty; Gilbert, 2009, 2010) indicates that people with OCD are relatively low in self-compassion (Wetterneck, Lee, Smith, & Hart, 2013; Wetterneck, Singh, & Hart, 2014), which could

both contribute to, and be a consequence of, OCD. Given that the treatment of mental contamination is relatively new (Rachman et al., 2014), it is important to know whether mental contamination is related to other transdiganostic processes and to symptoms of other disorders beyond OCD, in order to ensure that future treatment developments are effective. This is particularly relevant as a recent meta-analysis has demonstrated that transdiganostic treatments for anxiety are efficacious (Newby, McKinnon, Kuyken, Gilbody, & Dalgleish, 2015).

Taken together, it is possible that treating underlying transdiganostic processes such as perfectionism, intolerance of uncertainty, self-esteem and self-compassion may improve outcome rates for anxiety disorders. Therefore, the first aim of the current study was to test the hypothesis that mental contamination would be associated with perfectionism, intolerance of uncertainty, self-esteem and self-compassion and, specifically, that these transdiagnostic constructs would predict levels of mental contamination.

Given that so many of the features of OCD are found in other diagnoses, it is also of interest to determine whether mental contamination is specific to this disorder or whether it is associated with psychopathology found in other disorders. There has already been work demonstrating the association between trauma, disgust and mental contamination (e.g., Badour, Bown, Adams, Bunaciu, & Feldner, 2012; Badour, Ojserkis, McKay, & Feldner, 2014), and there is some indication that the relationship between trauma and mental contamination is moderated by tolerance of negative emotions (Fergus & Bardeen, 2015). In addition, given the high comorbidity between OCD and depression (Overbeek, Schruers, & Griez, 2002), anxiety (Crino & Andrews, 1996), and eating disorders (Altman & Shankman, 2009), it would be anticipated that there would be a close relationship between mental contamination and the psychopathology of each of these disorders. The second aim of the current study was therefore to examine the associations between mental contamination and symptoms of OCD, depression, anxiety and eating disorders. In addition to examining simple associations, exploratory analyses were conducted in order to examine the unique contributions of these transdiganostic constructs and symptom measures with mental contamination (above and beyond the other study variables).

Method

Participants

Participants were recruited through university notice boards, online platforms, recruitment websites and social media platforms as part of a wider study to assess the efficacy of an internet-based guided self-help cognitive behavioural therapy intervention for perfectionism (Kothari, Egan, Wade, Andersson, & Shafran, 2016; Shafran et al., 2017). Recruitment therefore targeted populations where perfectionism may be problematic; it therefore included, but was not restricted to, university students. To be eligible for inclusion, all participants had to be aged over 18 years, fluent in English and score one standard deviation above the published norm of the 'concern of mistakes' subscale of the Frost Multidimensional Perfectionism Scale (Frost, Marten, Lahart, & Rosenblate, 1990), i.e. a score of ≥ 29 (Suddarth & Slaney, 2001). Scores on this subscale ranged between 29 and 40. Participants were excluded from the study if they reported suicidal thoughts or intent. In total, 120 participants (82% female) aged between 18 and 58 years (M = 28.92, SD = 7.98) participated in the study; 28% were currently receiving treatment for a mental health disorder including medication.

Measures

Vancouver Obsessive Compulsive Inventory – Mental Contamination Scale (VOCI-MC; Rachman, 2006). This 20 item scale assesses aspects of mental contamination. The VOCI-MC is not a subscale of the original VOCI (Thordarson et al., 2004) but is named as such as it was designed to follow a similar format (Radomsky, Rachman, Shafran, Coughtrey, & Barber, 2014). Participants rate each item e.g. 'I often feel dirty under my skin' on a five-point scale from 0 = *not at all* to 4 = *very much.* The VOCI-MC is a measure of mental contamination in its own right and is not specific to OCD (Radomksy et al., 2014). The VOCI-MC has excellent internal consistency (α = .93 in a community sample of 410 participants) and good convergent (r = .70-.74), divergent and discriminant validity (Radomsky et al., 2014). In the current study, the internal consistency of the VOCI-MC was α = .91.

Obsessive Compulsive Inventory-Revised (OCI-R; Foa et al., 2002). This 18 item scale is a shortened version of the original OCI, designed to assess OCD symptoms and severity. Participants are asked to rate each item e.g. 'I wash my hands often and longer than necessary' on a five-point scale from 0 = *not at all* to 4 = *extremely*. The OCI-R is a psychometrically sound measure with reported internal consistency (α = .90 in a clinical sample), test-retest reliability (r = .82 over a two week period), and discriminant validity (Foa et al., 2005). Due to the recent changes in diagnostic criteria for OCD (APA, 2013), we also analysed the results using an adjusted OCI-R score excluding

the three hoarding subscale items. In the current study, the internal consistency of the OCI-R was α = .70.

Clinical Perfectionism Questionnaire (CPQ; Fairburn, Cooper, & Shafran, 2003). This 12 item scale assesses clinical perfectionism over the past 28 days. Participants are asked to rate each item e.g. 'Over the past month, have you felt a failure as a person because you have not succeeded in meeting your standards?' on a four-point scale from 1 = *not at all* to 4 = *all the time.* The CPQ has good internal consistency (α = .71 in a community sample) and good construct validity when compared with clinicians' ratings r = .26, p = .005) and discriminant validity between patients and non-clinical controls (Egan et al., 2016). In the current study, the internal consistency of the CPQ was α = .78.

Frost Multidimensional Perfectionism Scale (FMPS; Frost et al., 1990). Two subscales, concern over mistakes and personal standards were used. The concern over mistakes subscale has nine items associated with worries over making mistakes. The personal standards subscale has seven items that reflect high standards of performance. Both subscales are rated on a five-point scale from 1 = *strongly disagree* to 5 = *strongly agree.* The FMPS has good internal consistency (α = .88 in a community sample) and has been found to be reliable and valid for use with non-clinical and clinical populations (Frost et al., 1990; Hewitt & Flett, 1991; Hewitt, Flett, Turnbull-Donovan, & Mikail, 1991). Test-retest reliability coefficients range between r = .67-.80 and concurrent validity estimates between r = .55 - .77 (Frost et al., 1990; Hewitt & Flett, 1991; Hewitt et al., 1991). In the current study, the internal consistency of the concern over mistakes subscale of the FMPS was α = .87 and the personal standards subscale was α =.94.

Eating Disorders Examination Questionnaire (EDE-Q; Fairburn & Beglin, 1994). This self-report questionnaire is based on the gold-standard Eating Disorders Examination self-report interview (Fairburn & Cooper, 1993). The 22 items assessing the core attitudinal features of eating disorders were used. These comprise four subscales assessing restraint, shape, weight, and eating concerns over the previous 28 days. Each item e.g. 'have you had a definite desire to have a totally flat stomach' is rated on a seven-point scale from 0 = *not one day* to 6 = *every day*. The EDE-Q has excellent internal consistency (α = .95; Aardoom, Dingemans, Slof Op't Landt, & Van Furth, 2012), and good discriminant validity (Aardoom et al., 2012) and test-retest reliability (r = .88; Berg, Peterson, Frazier, & Crow, 2011). The 22 item score has been used as the primary indicator of

outcome in treatment trials of eating disorders in children and adults (Le Grange, Crosby, Rathouz, & Leventhal, 2007; Fairburn et al., 2009; Lock et al., 2010; Wade, Treasure, & Schmidt, 2011). In the current study, the internal consistency of the EDE-Q was α = .90.

Depression Anxiety and Stress Scale (DASS; Lovibond & Lovibond, 1995). This 42 item self-report questionnaire is designed to measure depression, anxiety, and stress over the past week. Each item e.g. 'I felt scared without any good reason' is rated on a four point scale from 0 = *did not apply to me at all* to 3= *applied to me very much, or most of the time.* The DASS has good internal consistency (α = .88 in a community sample) and has good test-retest reliability (*r* = .71-.81) and discriminant validity (*r* = -.45 - .40; Antony, Bieling, Cox, Enns, & Swinson, 1998; Brown, Korotitsch, Chorpita, & Barlow, 1997; Crawford & Henry, 2003). In the current study, the internal consistency of the DASS was α = .91.

Fear of Compassion Scale (FCS; Gilbert, McEwan, Matos, & Rivis, 2011). This is a 15 item scale that measures fear of expressing kindness and compassion towards oneself. Each item e.g. 'I feel that I don't deserve to be kind and forgiving to myself' is rated on a five point scale from 0 = *don't agree at all* to 4 = *completely agree.* The FCS has excellent internal consistency in a sample of 222 students (α = .92). It has been shown to be reliable and valid for use among clinical and community samples (Gilbert et al., 2011; Gilbert et al., 2012). In the current study, the internal consistency of the FCS was α = .96.

Rosenberg Self Esteem Scale (RSES; Rosenberg, 1965). This widely used ten item scale measures global self-esteem. Each item e.g. 'I feel like I have a number of good qualities' is rated on a four point scale from 1 = *strongly disagree to* 4 = *strongly agree.* The RSES has excellent internal consistency (α = .81 in a large worldwide sample of 16,998) and good convergent (*r* = .57-.79) and discriminant validity (*r* = .27-.52) in a community sample of 503 participants (Schmitt & Allik, 2005; Sinclair et al., 2010). In the current study, the internal consistency of the RSES was α = .93.

Intolerance of Uncertainty Scale (IUS; Freeston, Rheaume, Letarte, Dugas, & Ladouceur, 1994). This 27 item questionnaire measures the idea that uncertainty is unacceptable, reflects badly on a person, and leads to frustration, stress and the inability to take action. Each item e.g. 'My mind can't be relaxed if I don't know what will happen tomorrow' is rated on a five point scale from 1 = *not at all characteristic of me* to 5 = *entirely characteristic of me.* The IUS has excellent internal consistency *α* = .94), good test-retest reliability over a five week period (*r* = .74), and good

convergent and divergent validity, as demonstrated by the ability to distinguish groups of participants who met all, some or none of the criteria for GAD in a large (n = 276) community English sample (Buhr & Dugas, 2002). In the current study, the internal consistency of the IUS was α = .82. To allow comparison with other research, we also conducted correlations with the shortened form of the IUS which comprises 12 items (IUS-12; Carleton, Norton, & Asmundson, 2007).

Procedure

Ethical approval was granted by the University College London Research Ethics Committee (Project ID 6222:001). All participants were initially given information about the study and provided written informed consent. Participants then provided demographic information. All measures were completed electronically. Participants received a £10 voucher for completing the measures.

Results

The mean scores on all measures are shown in Table 1. All measures were normally distributed. The mean score on the VOCI-MC was below the clinical cut-off for mental contamination (Radomsky et al., 2014). Scores on the VOCI-MC ranged from 0-77, with 30 participants (25%) scoring in the sub-clinical range (scores over 20; Coughtrey et al., 2013) and an additional 11 (9%) scoring over the clinical cut-off of 40 (Radomsky et al., 2014). The relationships between mental contamination, psychopathology, and transdiagnostic processes were examined using Pearson's r correlations. Correlations were Bonferroni corrected due to multiple testing with alpha set at .005.

Scores on the VOCI-MC were significantly positively correlated with the transdiagnostic processes of perfectionism (CPQ, FMPS concern over mistake subscale), intolerance of uncertainty (IUS) and fear of compassion (FCS), and with symptoms of psychological disorders including obsessive-compulsive symptoms (OCI-R), eating disorder symptoms (EDE-Q), and depression and anxiety (DASS) see Table 1. There was no significant relationship between mental contamination and the FMPS personal standards subscale, and the correlation with self-esteem (RSES) did not reach the Bonferroni corrected significance level, see upper diagonal of Table 1.

The difference in magnitude of correlations were compared using Steiger's equation (Lee & Preacher, 2013). Scores on the VOCI-MC were most strongly associated with symptoms of OCD (OCI-R) compared to the correlation with symptoms of eating disorders ($z(n = 120) = 3.06$, $p = .002$) and depression and anxiety ($z(n = 120) = 2.97$, $p = .002$).

---INSERT TABLE 1 HERE---

Partial correlations were conducted to control for depression and anxiety (DASS scores), see shaded lower diagonal of Table 1. Scores on the VOCI-MC remained significantly correlated with perfectionism (CPQ but no longer the FMPS-CM), fear of compassion (FCS), and with symptoms of OCD (OCI-R) and eating disorders (EQE-Q). However, the relationship between mental contamination and intolerance of uncertainty no longer reached significance.

A multiple regression was conducted to see if transdiagnostic processes and measures of psychopathology predicted mental contamination. Using the enter method, the multiple regression model was significant, $R^2 = .59$, $F(9,119)=19.80$, $p < .001$. Scores on the OCI-R, FCS, EDE-Q and RSES were significant predictors of mental contamination, see table 2.

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Discussion

The present study found that mental contamination was significantly associated with a range of transdiagnostic variables, including perfectionism, intolerance of uncertainty, and fear of compassion. Fear of compassion and low self-esteem were independent predictors of mental contamination after accounting for other variables. It is well established that mental contamination is closely associated with OCD, disgust, and trauma (Badour et al., 2012; Badour et al., 2014; Coughtrey et al., 2013); however the findings of this study replicate and extend the existing research to also highlight the links between mental contamination with perfectionism and fear of compassion and low self-esteem.

Mental contamination was associated with depression, anxiety and eating disorder psychopathology, but the association was strongest with symptoms of OCD. Furthermore, symptoms of OCD were a significant independent predictor of mental contamination. These findings support the documented link between mental contamination and OCD (Coughtrey et al., 2013; Rachman et al., 2014; Radomsky et al., 2013; Reuven et al., 2013). Whilst depression, anxiety and stress were positively associated with mental contamination they were not a unique predictor, supporting the hypothesis that the links between contamination fears and negative affect may be due to the association between obsessions and mood state and the high comorbidity of OCD with anxiety (Coughtrey et al., 2012; Crino & Andrews, 1996; Ricciardi & McNally, 1995). However, participants in

this study were excluded if they reported suicidal ideation or intent and therefore it is possible that participants in this study did not report high levels of depression. Future research is needed with a clinical sample of patients with depression (including suicidality) to fully examine the link between mental contamination and low mood.

There was also a significant association between mental contamination and symptoms of eating disorders. To our knowledge, this is the first study to highlight the relationship between eating disorders and contamination fears. As there are high rates of comorbidity between OCD and eating disorders (Altman & Shankman, 2009) it is possible that this link is due to shared cognitive biases such as thought action fusion, perfectionism, or intolerance of uncertainty. Thought action fusion is common in OCD (Shafran et al., 1996) and has also been linked to mental contamination; for example, patients who think repugnant thoughts often report intense feelings of internal dirtiness, to a similar extent as if they had actually experienced the unwanted event (Rachman et al., 2014; Coughtrey et al., 2013). Similarly thought shape fusion is seen in patients with eating disorders (Kostopoulou et al., 2013) and clinical perfectionism was first investigated in relation to eating disorders (Shafran et al., 2002), therefore it may be that these shared underlying processes account for the relationship between eating disorder symptoms and contamination fears. However, the feelings of contamination may relate more to dietary intake, as patients with mental contamination often restrict their eating in order to prevent further contamination. It would be of interest to examine this relationship further with clinical samples of eating disorder patients.

Given the strong relationship between OCD and perfectionism (Martinelli et al., 2014), it is perhaps not surprising that scores on the FMPS and the CPQ were significantly correlated with mental contamination. Clinically, patients with mental contamination fears often present with extremely high moral standards which may be why they are more likely to interpret their intrusive thoughts as repugnant and unwanted (Rachman et al., 2014). This may account for the association between perfectionism and mental contamination in this study, particularly with the personal standards subscale of the FMPS. However, all participants in this study had elevated levels of perfectionism, which may have confounded the results, and perfectionism was not a significant independent predictor of mental contamination in the multiple regression model. Furthermore, in this study we used only two subscales of the FMPS (personal standards and concern about mistakes). This was to avoid the inclusion of the doubts over actions subscale which may have potentially

confounded the results (as this subscale was taken from the Maudsley Obsessive Compulsive Inventory; Hodgson & Rachman, 1977) and followed the protocol of previous randomised controlled trials investigating the treatment of perfectionism (Egan et al., 2014; Lloyd, Schmidt, Khondoker, & Tchanturia, 2014). However, future research should consider using the full FMPS to ensure that all aspects of multi-dimensional perfectionism are represented.

Fear of self-compassion was a significant independent predictor of mental contamination. It is possible that this is due to the link between OCD and low self-compassion (Wetterneck et al., 2013, 2014). Clinically, patients with mental contamination often present with difficulties in showing compassion towards themselves with regard to the intrusive, often repugnant, obsessions that they experience (Rachman et al., 2014). Future research is needed to examine the role of self-compassion in patients with mental contamination as if self-compassion is compromised then there is potential for use of compassion focused approaches in the treatment of mental contamination.

The theory of mental contamination highlights a link between fears of contamination and low self-esteem, and addressing low self-esteem is included as a component of treatment for mental contamination (Coughtrey et al., 2013; Rachman et al., 2014). In the current study, low self-esteem was a significant predictor of mental contamination. It is possible that the link between mental contamination and self-esteem is particularly relevant to morphing fears, where patients believe that they can take on the undesirable characteristics of others or in extreme circumstances turn into someone they dislike or fear (Rachman, 2006). Clinically, patients often describe how these fears are linked to a fragile or unstable sense of who they are and treatment includes techniques to address low self-esteem (Rachman et al., 2014). Further research is needed to explore this issue and to see whether standardised treatments for self-esteem have a significant impact on symptoms of mental contamination and morphing fears in particular.

Participants in this study all had elevated levels of perfectionism but were a non-clinical sample. It is increasingly being recognised that mental contamination is a common phenomenon not restricted to clinical populations (Rachman et al., this issue), and indeed a sub-set of the sample reported sub-clinical and clinical levels of mental contamination. However, a limitation of this study is that not all participants had clinically relevant mental contamination and research is needed to replicate these findings within a clinical sample. Furthermore, in order to understand the role of mental

contamination across psychopathologies further research is needed with clinical samples, including patients with eating disorders. It would be beneficial for future research to examine the discriminant validity of mental contamination through inclusion of measures of psychopathology not predicted to be related to mental contamination.

In conclusion, the findings of this study indicate that mental contamination is relevant to other psychopathology beyond anxiety and OCD, in particular eating disorders. Further research is needed to explore whether the effective treatment of mental contamination can also improve other transdiganostic symptoms including perfectionism, low self-esteem and fear of self-compassion.

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Table 1. The mean scores on measures of transdiagnostic processes and correlation matrix.

	Mean (SD)	VOCI-MC	OCI-R	OCI-R adjusted	CPQ	FMPS-PS	FMPS-CM	EDE-Q	DASS	FCS	RSES	IUS	IUS-12
VOCI-MC	13.87 (16.86)	-	.72**	.72**	.43**	.23	.34**	.45**	.46**	.50**	-.21	.32**	.28**
OCI-R	27.88 (13.71)	*.64***	-	.98**	.43**	.13	.20	.41**	.48**	.36**	-.26*	.33**	0.25
OCI-R adjusted	22.68 (11.95)	*.64***	*.97***	-	.43**	.16	.18	.40**	.45**	.35**	-.24	.35**	.28*
CPQ	33.19 (4.80)	*.29**	*.28***	*.29***	-	.28*	.33**	.28*	.45**	.48**	-.33**	.34**	.34**
FMPS-PS	29.69 (3.62)	*.17*	*.06*	*.09*	*.23*	-	.44**	.14	.16	.32**	-.05	.20	.30**
FMPS-CM	36.92 (4.42)	*.19*	*.02*	*.01*	*.19*	*.41***	-	.16	.39**	.53**	-.36**	.40**	.39**
EDE-Q	2.43 (1.63)	*.39***	*.35***	*.34***	*.20*	*.11*	*.08*	-	.24	.38**	-.27*	.23	.27*
DASS	27.45 (12.14)	-	-	-	-	-	-	-	-	.61**	-.54**	.55**	.47**

FCS	28.98 (14.80)	*.31***	*.11*	*.11*	*.29***	*.29**	*.41***	*.31***	-	-	-.54**	.54**	.55**
RSES	22.48 (2.27)	*.05*	*-.01*	*.02*	*-.11*	*.05*	*-.2*	*-.17*	-	*-.31***	-	-43**	-.34**
IUS	91.37 (20.95)	*.09*	*.09*	*.17*	*.13*	*-.14*	*.24*	*.13*	-	*.31***	*-.18*	-	.84**
IUS-12	43.00 (10.40)	*.09*	*.04*	*.08*	*.16*	*.26**	*.25*	*.19*	-	*.37***	*-.12*	*.79***	-

Note. Pearson's *r* correlations reported in the upper diagonal. Partial correlations controlling for anxiety and depression (DASS) are reported in italics in the shaded lower diagonal.

N = 120

** = $p < .001$

* = $p < .005$ (Bonferroni adjusted p-value)

VOCI-MC = Vancouver Obsessive Compulsive Inventory-Mental Contamination Scale; OCI-R = Obsessive Compulsive Inventory Revised; OCI-R Adjusted = OCI-R total minus hoarding items; CPQ = Clinical Perfectionism Questionnaire; FMPS-PS = Frost Multidimensional Perfectionism Scale Personal Standards Subscale; FMPS-CM = Frost Multidimensional Perfectionism Scale Concern Over Mistakes Subscale; EDE-Q = Eating Disorders Examination Questionnaire;

DASS = Depression, Anxiety and Stress Scale; FCS = Fear of Compassion Scale; RSES = Rosenberg Self-Esteem Scale; IUS = Intolerance of Uncertainty Scale; IUS-12 = Intolerance of Uncertainty Scale Short Form.

Table 2. Significance of predictors of the VOCI-MC total score in the multiple regression analysis.

Variable	*B*	Standard Error	Beta	*t*
OCI-R	.69	.09	.56	7.54*
CPQ	.14	.25	.04	.54
FMPS-PS	.007	.32	.001	.02
FMPS-CM	.45	.29	.12	1.56
EDE-Q	1.44	.70	.14	2.04*
DASS	.12	.12	.08	.95
FCS	.27	.10	.24	2.56*
RSES	.56	.24	.18	2.31*
IUS	.07	.10	.05	.70

Note:

* = p <.001

VOCI-MC = Vancouver Obsessive Compulsive Inventory-Mental Contamination Scale; CPQ = Clinical Perfectionism Questionnaire; FMPS-PS = Frost Multidimensional Perfectionism Scale Personal Standards Subscale; FMPS-CM = Frost Multidimensional Perfectionism Scale Concern Over Mistakes Subscale; EDE-Q = Eating Disorders Examination Questionnaire; DASS = Depression, Anxiety and Stress Scale; FCS = Fear of Compassion Scale; RSES = Rosenberg Self-Esteem Scale; IUS = Intolerance of Uncertainty Scale.