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Analyses of mental contamination Part II, individual differences

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Abstract

Recent research on mental contamination (internal, psychological feelings of dirtiness) has focused primarily on examining the experimental variables necessary to provoke contamination-related thoughts, feelings and behaviour; yet, relatively little is known regarding the individual differences among participants' mental contamination responses to these situational and experimental characteristics. The purpose of this study was to determine whether variables associated with symptoms, beliefs and appraisals could predict the experience of mental contamination after an established provocation. Female undergraduate students ($n = 70$ from Part I of this study; Elliott & Radomsky, in press), completed a series of questionnaires then listened to an audio recording and imagined that they were receiving a forced, non-consensual kiss from a man described as moral or immoral. Participants indicated the presence and degree of mental contamination and appraisals of the man and act, then completed a behavioural task for which spontaneous washing was recorded. Results indicated that, although symptoms of physical contamination were able to predict feelings of mental contamination, appraisal variables emerged as unique predictors of feelings of mental contamination. Results are discussed in terms of cognitive-behavioural conceptualizations of and treatments for contamination fears.

Keywords: contamination; OCD; washing behaviour; appraisals; individual differences; mental contamination.

Analyses of mental contamination: Part II, individual differences

Obsessive-compulsive disorder (OCD) is a serious and often severe anxiety disorder that affects roughly 1-2.5% of the general population (American Psychiatric Association, 2000). The World Health Organization indicated that OCD was the 10th leading cause of disability worldwide (1999). Despite the presence of relatively effective treatments for OCD (Fisher & Wells, 2005), more than 50% of those who are offered the treatment either refuse, dropout, or fail to achieve significant gains (see Foa et al., 2005; Fisher & Wells, 2005). There is therefore a clear need to examine possible ways to enhance our ability to help more people struggling with this challenging disorder.

Washing and checking are the two most common forms of compulsions present among those suffering from OCD (Rachman & Hodgson, 1980). Rachman (1994, 2004, 2006) has proposed two different types of fears of contamination believed to underlie contamination concerns: physical and mental fears of contamination. Physical contamination refers to contaminants which are clear and objective (e.g., germs, dirt and harmful substances), whereas mental contamination refers to 'contaminants' which may affect the individual without any physical contact whatsoever (e.g., self-contamination and visual contamination; Rachman, 2006). There has been increasing interest in attempting to delineate mental contamination (internal, psychological feelings of dirtiness and urges to wash) from physical contamination (external, readily identifiable feelings of dirtiness and urges to wash), and much recent work has been done to elicit mental contamination through experimental provocations (e.g., Elliott & Radomsky, in press; Fairbrother & Rachman, 2004; Rachman, 2006). Much of this work has begun to increase our understanding of the situational variables necessary to evoke fears of contamination (e.g., harmful substances, immoral human sources, etc.); yet, relatively little is known regarding the

individual differences among participants' mental contamination responses to these situational and experimental characteristics.

A series of case studies has demonstrated that some individuals who develop post-traumatic stress disorder (PTSD) following a sexual assault, may also develop washing concerns consistent with the assault experience in both physical and mental forms (Gershuny, Baer, Radomsky, Wilson, & Jenike, 2003; de Silva & Marks, 1999). In both of these articles, the most common OCD symptoms in the majority of those suffering from co-morbid PTSD and OCD were contamination-related thoughts and/or washing behaviour. This appears to demonstrate some sort of functional relationship between particular traumatic experiences and mental contamination in OCD.

Previous work in the area of mental contamination has demonstrated that a sexual assault experience (Fairbrother & Rachman, 2004) as well as the *imagined* occurrence of a non-consensual kiss (Elliott & Radomsky, in press; Fairbrother, Newth, & Rachman, 2005; Herba & Rachman, 2007) are sufficient conditions to evoke both subjective reports of mental contamination in the form of feelings of dirtiness and urges to wash, and, importantly, actual washing behaviour. In Part I of the current work (Elliott & Radomsky, in press), we reported that regardless of whether or not a man was described as moral or immoral (e.g., among other moral/immoral characteristics varied across the two recordings, he was described as someone who volunteers at a homeless shelter, or he was described as someone who would go out of his way to hurt other people), there were no significant differences in feelings of mental contamination among women who imagined experiencing a *non-consensual* kiss from him. In addition, women who imagined sharing a *consensual* kiss from a man described as immoral reported feelings of mental contamination, but to a lesser degree than in the non-consensual

conditions. These results suggest that pleasant or neutral events may also evoke mental contamination if the other person involved (i.e., the source) is believed to be immoral, adding further support for Rachman's (1994, 2004, 2006) conceptualisation of mental contamination.

Although critical in explaining causal factors related to how mental contamination can be evoked, these previous studies made few claims about factors which might put someone at greater risk to experience mental contamination in response to provoking experiences and experiments. Identifying individual differences in the experience of mental contamination could have important clinical implications such as being able to identify individuals who may be at risk for this type of contamination fear, and which targets of treatment may be particularly useful. Specifically, the development of risk assessments and clinical assessments would be facilitated as would the development of targeted interventions.

One study involving mental contamination has conducted an initial evaluation of individual differences in feelings of mental contamination after experiencing an imagined non-consensual kiss. In the experimental portion of their study, Herba and Rachman (2007) asked participants to listen to an audio recording and imagine experiencing the events described. The scenarios on the recordings involved receiving either a consensual kiss (n = 20) from a man described as physically attractive (e.g., "cute"), or a forced, non-consensual kiss (n = 120) from a man described as physically dirty (e.g., "crumbs of food in the corners of his mouth"). They found that participants in the non-consensual condition reported significantly greater feelings of mental contamination (e.g., feelings of dirtiness and urges to wash) than did participants in the consensual condition. In the individual difference analysis of their study, Herba and Rachman (2007) found that scores among non-consensual participants on measures assessing physical contamination symptoms (i.e., Vancouver Obsessional Compulsive Inventory Physical

Contamination subscale (VOCI-CTN), Thordarson et al., 2004) and sensitivity to disgust (e.g., Disgust Scale (DS), Haidt, McCauley, & Rozin, 1994) could predict participants' ratings of feelings of dirtiness. In addition, there was a trend for scores on a measure of anxiety sensitivity (ASI; Reiss et al., 1986) to predict feelings of dirtiness. These researchers also found that reports of physical contamination symptoms could predict ratings of urges to wash; whereas, lower fears of negative evaluation (Fear of Negative Evaluation- Brief Version (FNEB); Leary, 1983) scores could also predict urges to wash. However, this last finding was likely due to classical statistical suppression (i.e., enhanced prediction when an included variable is not correlated with the dependent variable but is with an independent variable (Horst, 1941; Conger, 1974), given that fears of negative evaluation were not significantly correlated with urges to wash (Herba & Rachman, 2007). Finally, Herba and Rachman (2007) found that a prior non-consensual sexual encounter (PNCSE) could significantly predict washing behaviour (e.g., rinsing one's mouth during a 5-minute break), and there was also a trend for FNEB to do so.

There are many theoretical reasons to expect that variables other than self-reported symptoms of OCD, anxiety sensitivity, disgust sensitivity, and fears of negative evaluation (as reported above) might prove to be valuable in predicting vulnerability to the experience of mental contamination. For the purposes of the current investigation, these were chosen based on constructs and specific interpretations identified by Rachman (2004, 2006) and others (e.g., Salkovskis, 1985, 1999) as potentially problematic for contamination and OCD concerns. Rachman (2004) has proposed that the presence of a correlation between measures assessing anxiety sensitivity and disgust sensitivity may represent an underlying "generally elevated sensitivity" such as "neuroticism perhaps?" (p. 1235), or a general sensitivity to contamination (Rachman, 2006). Rachman (2006) has also proposed that fears of mental contamination may

stem from an "immoral human source" (p. 19) as well as "perceived ill-treatment" (p. 28). Salkovskis (1999) has proposed that an inflated sense of "responsibility for harm to oneself or other people" (p. S31) may connect unwanted, intrusive thoughts (also images and/or impulses) and compulsions.

The purpose of the current study was to examine individual difference variables proposed to be involved in the experience of mental contamination fears. Our hypotheses for candidate constructs to predict mental contamination fears are based on specific (e.g., anxiety sensitivity, disgust sensitivity, and fear of negative evaluation; Herba & Rachman, 2007) and general sensitivities (e.g., neuroticism; Rachman, 2004), as well as on individuals' appraisals of the negative provoking event (e.g., perceptions of personal responsibility); it is expected that these appraisal variables will predict feelings of and behaviour associated with mental contamination above and beyond the presence of specific and general sensitivities to experience fear and disgust, as well as symptoms of physical contamination (as measured by the contamination subscale of the VOCI). We hypothesized that individual difference variables involving specific and general sensitivities in mental contamination fears (e.g., anxiety sensitivity, disgust sensitivity, fear of negative evaluation and neuroticism (Model 2 of the regression analyses, see below) would predict feelings of mental contamination (e.g., feelings of dirtiness, urges to wash, internal negative emotions (INE), external negative emotions (ENE) and actual washing behaviour in the absence of physical contact with a contaminant) over and above symptoms of physical contamination (as measured by VOCI-CTN scores; Model 1 of the regression analyses, see below). In addition, we hypothesized that negative appraisals of an imagined non-consensual kiss (Model 3 of the regression analyses, see below) would uniquely predict feelings of and behaviour associated with mental contamination above and beyond the variables involving

specific and general sensitivities to experience fear, disgust, and negative evaluation, as well as symptoms of physical contamination.

<div align="center">Method</div>

Participants

Female undergraduate students at Concordia University participated in this study. There were 70 participants (average age = 23.30, *SD* = 4.77, range = 18 to 43-years) from Part I included in this sample. Each of these participants had been randomly assigned to an imagined non-consensual (NC) kiss condition, involving receiving either moral (M) or immoral (I) pre-kiss information about the man whom they imagine to force a kiss upon them. (All Part I participants who were assigned to consensual conditions were excluded from the current study.) Participants received either course credit or an entry for a cash prize draw as compensation for their participation.

Measures

All of the measures in Part 2 were exactly the same as in Part I: Demographic & Baseline Ratings Questionnaire (DBRQ; Elliott & Radomsky, in press); Fear of Physical Contamination Subscale of the Vancouver Obsessional Compulsive Inventory (VOCI-CTN; Thordarson et al., 2004); Mental Contamination Report (MCR; Elliott & Radomsky, in press); and Break Behaviour Questionnaire (BBQ; Elliott & Radomsky, in press), except for the inclusion of the following four self-report questionnaires (see below).

Anxiety Sensitivity Index (*ASI*; Reiss et al., 1986). The ASI is a 16-item questionnaire that assesses sensitivity to and/or fear based concerns regarding negative outcomes due to physiological feelings and thoughts of an anxious nature. Items involve consequences such as illness (e.g., "When I notice that my heart is beating rapidly, I worry that I might have a heart

attack") and a loss of control (e.g., "It is important for me to stay in control of my emotions"). Participants' responses are based on a 5-point Likert scale ranging from 0 (very little) to 4 (very much). Test-retest reliability (Pearson product-moment $r = .75$) has been demonstrated for this scale in a student sample (Reiss et al., 1986).

Disgust Scale (DS; Haidt, McCauley, & Rozin, 1994). The DS is a 32-item questionnaire that assesses sensitivity to disgust. Items involve seven disgust domains including food (e.g., "You are about to drink a glass of milk when you smell that it is spoiled"), and body products (e.g., "If I see someone vomit, it makes me sick to my stomach"). Participants' responses are based on a true and false scale for the first set of 16 questions, and based on a 3-point Likert scale ranging from 0 (not disgusting) to 1 (very disgusting) for the second set of 16 questions. This scale has been found to demonstrate internal consistency across four samples ($\alpha = .84$), as well as divergent and some convergent validities (Haidt, McCauley, & Rozin, 1994).

Fear of Negative Evaluation- Brief Version (FNEB; Leary, 1983). The FNEB is a 12-item questionnaire that assesses the degree to which individuals fear being negatively evaluated by others. Items involve concern about what other people are thinking and that the person may act inappropriately (e.g., "Sometimes I think I am too concerned with what other people think of me", and "I often worry that I will say or do the wrong things"). Responses are indicated on a 5-point Likert scale ranging from 1 (not at all characteristic of me) to 5 (extremely characteristic of me). Excellent 2-week test-retest reliability ($r = .94$) has been demonstrated for this scale, as have criterion and discriminant validities (Collins et al., 2005).

Big Five Inventory – Neuroticism versus Emotional Stability Subscale (BFI-N; John, Donahue, & Kentle, 1991). The BFI-N is an 8-item questionnaire subscale that assesses the personality trait of neuroticism. Items involve negative affect (e.g., "negative emotionality")

based on perceptions of self (e.g., "I see myself as someone who can be moody", and "I see myself as someone who gets nervous easily"). Participants' responses are based on a 5-point Likert scale ranging from 1 (disagree strongly) to 5 (agree strongly). Three month test-retest reliability (*r*'s range from .80 to .90) as well as convergent and divergent validities have been demonstrated for the overall scale (John & Srivastava, 1999). In addition, the average inter-item reliabilities for the subscales are above .80 (ranging from .75 to .90) in North American samples.

Mental Contamination Report (MCR) - Appraisal variables. Three appraisal variables were assessed within the context of the MCR (Elliott & Radomsky (in press), see Part I). The MCR is a 29-item questionnaire devised from questions administered by Fairbrother, Newth, and Rachman (2004) and Herba and Rachman (2007) and developed for the purposes of Parts I and II of the current work. More specifically, the appraisal variables included ratings of personal responsibility for the occurrence of the kiss, ratings of the occurrence of the kiss as a perceived violation, and ratings of post-kiss perceptions of immorality of the man's character. All three appraisal variable questions were based on a scale from 0 ("not at all") to 100 ("completely"), and were devised for the purposes of this study (In keeping with our goal of generating appraisals which would capture possibly distinct and ideographic interpretations of the recording, Cronbach's α in this sample = 0.41). We were interested in examining each of these appraisal variables as individual constructs to assess their predictive ability for feelings and behaviour associated with mental contamination. Four indices of mental contamination were also assessed by the MCR: feelings of dirtiness, urges to wash, INE and ENE (please see below for a description of how each variable was constructed).

Procedure

The procedure in Part 2 was exactly the same as in Part I, except for the inclusion of the four questionnaires mentioned above. First, participants completed the DBRQ, VOCI-CTN, ASI, DS, FNEB, and BFI-N. Next, participants listened to an audio recording involving a non-consensual kiss from a man described as either moral or immoral. Participants imagined that they were the woman described in the scenario and that the events were happening to them at that moment in the laboratory. Next, participants completed the MCR, assessing feelings of mental contamination and appraisals of the negative event. Participants were then given a five minute break. Finally, participants were asked to complete the BBQ after the break to assess for washing behaviours engaged in during the break.

<div align="center">Results</div>

Suitability of combining the two non-consensual conditions from Part I

In Part I, we reported multivariate repeated measures ANOVA's and/or ANOVA'S and follow-up contrasts (if necessary) for age, ease to imagine the scenario described on the corresponding audio recording, VOCI-CTN scores, prior non-consensual sexual encounters, as well as feelings of dirtiness, urges to wash, and negative internal and negative external emotions evoked by the manipulation. There were no significant differences between the two non-consensual conditions on any of these variables (Elliott & Radomsky, in press). In addition, these two non-consensual conditions included exactly the same number of Washers ($n = 4$ for each condition). We also assessed for group differences on the four additional measures used in part 2 and found that there were no significant differences for ASI $t (68) = -1.20$, $p = 0.23$, DS $t (68) = 0.62$, $p = 0.54$, FNEB $t (68) = .65$, $p = 0.52$, or BFI-N $t (68) = 0.10$, $p = 0.92$ scores between the two non-consensual conditions. Please see Table 1 for correlation coefficients between these four additional questionnaire variables. Given that there were no significant differences between the

two non-consensual conditions on any of the above-mentioned variables, that the regressions

below computed for the two conditions separately produced similar results, and that the

additional questionnaires in this study were administered before participants underwent the

manipulation, we combined these two non-consensual conditions to form one sample for this

study ($n = 70$). However, we did control for condition (e.g., moral vs. immoral pre-kiss

information) using dummy coding in each regression analyses (see below). Please see Table 2

for means and standard deviations of questionnaire variables.

Feelings of mental contamination

To examine which variables predicted feelings of mental contamination, we assessed

feelings of dirtiness, urges to wash, internal negative emotions (INE; e.g., shame), external

negative emotions (ENE; e.g., anger), and actual washing behaviour. Feelings of dirtiness scores

were based on responses to one question on the MCR (Elliott & Radomsky, in press). Urges to

wash scores were based on the average of an aggregate measure of five items on the MCR: rinse

mouth/spit/drink something, brush teeth/use mouthwash, wash face, wash hands and take a

shower (Cronbach's $\alpha = 0.88$ in this study). INE scores were based on an aggregate measure of

seven items on the MCR: feelings of being ashamed, guilty, humiliated, afraid, sad, cheap and

sleazy (Cronbach's $\alpha = 0.89$ in this study). ENE scores were based on an aggregate measure of

five items on the MCR: feelings of being anxious, distressed, angry, disgusted by the man's

physical appearance and by the man's behaviour (Cronbach's $\alpha = 0.82$ in this study). All ratings

were based on a scale from 0 ("not at all") to 100 ("completely"). Washing behaviour was

assessed by two questions on the BBQ (Elliott & Radomsky, in press) categorizing participants

as 'Washers' or 'Non-washers'. Similar to results reported in Part I, ratings of feelings of

dirtiness, urges to wash, INE and ENE were significantly correlated (one-tailed) with each other

(all r's $\geq$ .45; all p's < .001), but not with washing behaviour (all r's < .13; all p's > .05). Please see Table 3 for means and standard deviations of each index of mental contamination and Table 4 for correlation coefficients between indices of mental contamination and questionnaire variables.

Appraisal variables

In addition to previously mentioned questionnaire-based variables (e.g., VOCI-CTN, ASI, DS, FNEB, BFI-N), we also assessed various appraisals of the man and the act as possible predictors of feelings of mental contamination. These appraisal variables included: Ratings of personal responsibility for the occurrence of the kiss, ratings of the occurrence of the kiss as a perceived violation and ratings of post-kiss perceptions of immorality of the man's character. Ratings of personal responsibility for the occurrence of the kiss were not significantly correlated (one-tailed) with post-kiss perceptions of immorality of the man's character (r = .11; p = .18); there was a trend, however, for ratings of personal responsibility for the occurrence of the kiss to be correlated with ratings of the occurrence of the kiss as a perceived violation (r = .18; p = .07). Ratings of the occurrence of the kiss as a perceived violation and post-kiss perceptions of immorality of the man's character were significantly correlated with each other (r = .36; p = .001). Please see Table 3 for means and standard deviations of appraisal variables and Table 4 for correlation coefficients between indices of mental contamination and appraisal variables.

Hierarchical regression analyses structure

In each of the following hierarchical regression analyses, variables in Model 1 included VOCI-CTN scores, participants' age, and whether or not participants had previously experienced a non-consensual sexual encounter (PNCSE) such as a kiss. In addition, dummy coding for pre-kiss (im)moral information was included in Model 1 to control for condition (e.g., moral vs.

immoral). Variables entered into Model 2 included: ASI, DS, FNEB, and BFI-N scores. We also

conducted separate hierarchical regression analyses for each variable in Model 2, to assess

whether any of these variables had predictive power when the other variables were not included

in the model, given the inter-correlations among some of these items. The one variable which

emerged with a trend to be a significant predictor when the other variables in Model 2 were

excluded from the analysis is noted below (see urges to wash). Variables entered into Model 3

included: appraisal ratings of personal responsibility for the occurrence of the kiss, the

occurrence of the kiss as a perceived violation, and post-kiss perceptions of immorality of the

man's character.

Feelings of dirtiness

Results from a hierarchical regression analysis revealed that VOCI-CTN ($\beta = 1.20$, $t =$

2.57, $p = .01$) scores predicted feelings of dirtiness in Model 1 ($R^2 = .12$, $R^2 \Delta = .12$, $F \Delta (4, 65)$

$= 2.19$, $p = .08$), but Age, PNCSE, and Condition did not. ASI, DS, FNEB and BFI-N scores did

not account for unique variance in Model 2 ($R^2 = .14$, $R^2 \Delta = .02$, $F \Delta (4, 61) = 0.30$, $p = .88$).

Responsibility ($\beta = .50$, $t = 2.23$, $p = .03$), and violation ($\beta = .41$, $t = 2.35$, $p = .02$) appraisal

scores did account for unique variance in feelings of dirtiness, and there was a trend for post-kiss

immoral ($\beta = .69$, $t = 1.90$, $p = .06$) appraisal scores to do so in Model 3 ($R^2 = .37$, $R^2 \Delta = .23$, F

$\Delta (3, 58) = 7.35$, $p < .001$).

Urges to wash

Results from a hierarchical regression analysis revealed that VOCI-CTN ($\beta = .99$, $t =$

2.16, $p = .035$) scores predicted urges to wash in Model 1 ($R^2 = .08$, $R^2 \Delta = .08$, $F \Delta (4, 65) =$

1.36, $p = .26$), but Age, PNCSE, and Condition did not. BFI-N ($\beta = 1.45$, $t = 2.35$, $p = .02$)

scores accounted for unique variance in Model 2 ($R^2 = .20$, $R^2 \Delta = .12$, $F \Delta (4, 61) = 2.42$, $p =$

.06), but ASI, DS[1], and FNEB scores did not account for unique variance. Responsibility (β = .60, t = 2.90, p = .005), and post-kiss immoral (β = .84, t = 2.47, p = .016) appraisal scores did account for unique variance in Model 3 (R^2 = .42, $R^2 \Delta$ = .22, $F \Delta$ (3, 58) = 7.23, p < .001), but violation appraisals scores did not.

Internal negative emotions (INE)

Results from a hierarchical regression analysis revealed that VOCI-CTN (β = .92, t = 2.50, p = .015) scores did predict INE, and there was a trend for Age (β = -1.26, t = -1.90, p = .06), to do so in Model 1 (R^2 = .16, $R^2 \Delta$ = .16, $F \Delta$ (4, 65) = 2.99, p = .03), but PNCSE and Condition could not predict INE. ASI, DS, FNEB and BFI-N scores did not account for unique variance in INE in Model 2 (R^2 = .18, $R^2 \Delta$ = .02, $F \Delta$ (4, 61) = 0.48, p = .75). Responsibility (β = .78, t = 5.22, p < .001), and violation (β = .37, t = 3.14, p = .003) appraisal scores did account for unique variance in Model 3 (R^2 = .56, $R^2 \Delta$ = .38, $F \Delta$ (3, 58) = 16.56, p < .001), but post-kiss immoral appraisal scores did not account for unique variance in INE.

External negative emotions

Results from a hierarchical regression analysis revealed that VOCI-CTN (β = .71, t = 2.20, p = .03) scores did predict ENE in Model 1 (R^2 = .08, $R^2 \Delta$ = .08, $F \Delta$ (4, 65) = 1.41, p = .24), but Age, PNCSE, and Condition did not. ASI (β = .66, t = 2.13, p = .037) and DS (β = 1.54, t = 2.96, p = .004), scores did account for unique variance in Model 2 (R^2 = .27, $R^2 \Delta$ = .19, $F \Delta$ (4, 61) = 4.08, p = .005; recall that one of the five items used to construct this variable is based on ratings of anxiety and two are based on ratings of disgust), but FNEB and BFI-N scores did not. Violation (β = .23, t = 2.01, p = .049) appraisal scores did account for unique variance in ENE in Model 3 (R^2 = .38, $R^2 \Delta$ = .11, $F \Delta$ (3, 58) = 3.38, p = .024), but responsibility and post-kiss immoral appraisal scores did not account for unique variance in ENE.

Actual washing behaviour

Washing behaviour was not significantly correlated (one-tailed) with feelings of dirtiness, urges to wash, INE, ENE, or any of the specific or general sensitivity individual difference measures or appraisal scores (all r's < .13; all p's > .05). Washing behaviour was also not significantly correlated with self-reports of a previous non-consensual sexual encounter (n = 31 in this study; r = .13; p = .14). A hierarchical logistic regression revealed that there was a trend for lower BFI-N (β = -.12, odds ratio = .88, 95% CI: 0.77-1.02, p = .09) scores to account for unique variance in washing behaviour in Model 2 after accounting for VOCI-CTN scores, Age, PNCSE and Condition in Model 1. In Model 3, there was a trend for responsibility (β = .05, odds ratio = 1.05, 95% CI: 0.99-1.12, p = .09) appraisals to contribute unique variance in washing behaviour. There were no other significant predictors of washing behaviour. However, these results are likely due to classical statistical suppression of irrelevant variance given that neither BFI-N or responsibility appraisal scores were significantly correlated with washing behaviour (Horst, 1941; Conger, 1974; the former finding is unlikely to be a case of negative suppression because the negative regression weight is not opposite in sign as expected, as evidenced by the non-significant correlation between BFI-N scores and washing behaviour in the negative direction).

We decided to conduct a *post hoc* analysis to assess if washing behaviour was correlated with any of the individual internal (e.g., shame) or external (e.g., anger) negative emotions. We found that washing behaviour was significantly correlated with ratings of feelings of shame (r = .20; p = .047) and guilt (r = .21; p = .04), but was not significantly correlated with any other individual INE or ENE. A *post hoc* hierarchical logistic regression analysis revealed that VOCI-CTN, Age, PNCSE and Condition were unable to predict washing behaviour in Model 1, and

feelings of guilt and shame were unable to account for unique variance in Model 2 (none of the other variables were included in this analysis). However; feelings of guilt and shame were highly significantly correlated (one-tailed) with each other ($r = .80$; $p < .001$). When these variables were entered individually in Model 2 in two separate logistic regressions, there was a tendency for feelings of guilt ($\beta = .03$, odds ratio = 1.03, 95% CI: 1.00-1.06, $p = .057$) and shame ($\beta = .03$, odds ratio = 1.03, 95% CI: 1.00-1.06, $p = .055$) to predict washing behaviour which was not evident when they were included in the same model of the same hierarchical logistic regression. Results for the other variables remained non-significant. These findings suggest that those individuals who feel a greater degree of guilt or shame after the imagined experience of a forced, non-consensual kiss *may* be more likely to wash.

Discussion

We examined individual differences among women who were subjected to a provocation (an imagined non-consensual kiss) associated with mental contamination. We hypothesized that symptoms of physical contamination fears would emerge as an initial predictor of indices of mental contamination, but that specific (i.e., ASI, DS, FNEB) and general (i.e., Neuroticism) underlying sensitivities would predict mental contamination over and above physical contamination symptoms. Finally, it was hypothesized that appraisals of personal responsibility for the occurrence of the kiss, of the occurrence of the kiss as a perceived violation, and of post-kiss perceptions of immorality of the man's character would uniquely predict mental contamination indices above and beyond previous predictor variables. These hypotheses were generally supported by our findings, though nuances in these findings are discussed below.

Symptoms of physical contamination fears

Consistent with findings previously reported by Herba and Rachman (2007), we found that symptoms of physical contamination fears (e.g., VOCI-CTN scores) could predict feelings of dirtiness and urges to wash. In addition, we found symptoms of physical contamination fears could predict internal (e.g., shame, guilt) and external (e.g., anxiety and disgust) negative emotions. These findings lend support to Rachman's (2004, 2006) conceptualization of an underlying sensitivity to contamination (whether specific to contamination or a general elevated sensitivity). It is interesting that in the context of a manipulation meant to evoke mental contamination, emotions which are more self- or other-focused are more likely to be predicted by physical contamination concerns. This finding speaks to the interrelatedness of mental and physical contamination, and to the notion that concerns about external contaminants might be exacerbated by internally- and externally-focused emotional states. It would be interesting to examine if other types of mental contamination (e.g., psychological violation) which do not involve any physical contact (real or imagined), could be predicted by symptoms of physical contamination. Even though this study employed an *imagined* event, the scenario did involve imagined physical contact. Women who experience a non-consensual sexual encounter may fear contracting a sexually transmitted or other disease from their assailant. Perhaps a victim of emotional abuse or betrayal (other potential triggers of mental contamination, according to Rachman (2004)) would not have similar physical contamination concerns?

Factors which emerged as predictors after variance attributable to symptoms of physical contamination was accounted for may represent more specificity in determining the individual difference factors associated with *mental* contamination. A *proneness* to experience anxiety or disgust sensitivity, or possessing a "neurotic" disposition may not be as important as the *actual* interpretation(s) one generates during a threatening situation when considering individual

difference factors in mental contamination. It is possible that these interpretations stem from a more specific sensitivity to contamination.

Specific and general sensitivities to contamination

Contrary to our predictions, we found that anxiety sensitivity, disgust sensitivity, fears of negative evaluation and neuroticism could not consistently predict feelings of mental contamination after controlling for symptoms of physical contamination fears. In particular, we found only that neuroticism could predict urges to wash and that anxiety sensitivity and disgust sensitivity could predict ENE's over and above symptoms of physical contamination. It is important to note that our ENE construct included one rating (out of five) which assessed feelings of anxiety and two ratings which assessed feelings of disgust in response to the manipulation. Recall that Herba and Rachman (2007) found disgust sensitivity and a trend for anxiety sensitivity to predict feelings of dirtiness (with VOCI-CTN scores in the same model). In our study, neither anxiety sensitivity nor disgust sensitivity could predict feelings of dirtiness over and above symptoms of physical contamination, and disgust sensitivity was not significantly correlated with feelings of dirtiness. One explanation may be that the manipulation in the Herba and Rachman (2007) study involved a description of the man as physically dirty; whereas, the manipulation in this study involved descriptions of the man as clean, but as having either a moral or immoral character. These results suggest that although some specific sensitivities already identified as being present in contamination concerns (e.g., ASI, DS, FNEB) and a generally elevated sensitivity (e.g., neuroticism) may play some role, there seem to be other factors at play which may indicate the possibility of specific risks for experiencing feelings of mental contamination.

Appraisals of a mental contamination evoking event

Consistent with our predictions, we found that participants' appraisals of the negative event could consistently significantly predict feelings of mental contamination above and beyond symptoms of physical contamination fears, as well as specific and general sensitivities. In particular, we found that appraisals of personal responsibility for the occurrence of the kiss predicted feelings of dirtiness, urges to wash, and INE but not ENE; appraisals of the occurrence of the kiss as a perceived violation predicted feelings of dirtiness, INE and ENE, but not urges to wash; and appraisals of post-kiss perceptions of immorality of the man's character demonstrated a trend to predict feelings of dirtiness, and did predict urges to wash, but did not predict INE or ENE. The finding that appraisal ratings of the occurrence of the kiss as a perceived violation were unable to predict urges to wash was surprising. It is unclear whether or not this may be accounted for by the nature of this undergraduate sample and/or the content of the audio recording. The use of a truly violating provocation would of course be unethical so this remains an empirical question. In terms of appraisals of post-kiss perceptions of immorality of the man's character, the mean score was high at 92.86 (out of 100), suggesting the range of participants' responses may have been restricted, potentially interfering with the accurate prediction of mental contamination indices. These overall findings provide support for Rachman's (1997, 1998, 2004, 2006) and Salkovskis' (1985, 1999) conceptualisations regarding the importance of interpretations and appraisals regarding symptoms of OCD in general, and of physical and/or mental contamination fears specifically. These results suggest that although some individual differences in the experience of mental contamination may be accounted for by underlying physical contamination fears, disgust sensitivity, etc., it seems to be more critical as to how individuals interpret or appraise events and situations to determine the degree to which they will be affected. An alternative explanation for this relatively robust finding is that feelings of mental

contamination (as provoked by imagining a non-consensual kiss) led to the negative appraisals, and future research on the time sequence of negative appraisals and the experience of feelings of mental contamination are warranted.

Washing behaviour

In the context of this study involving a non-consensual kiss from a man described as either moral or immoral, we did not find that women who had previously experienced a non-consensual sexual act or reported elevated fears of negative evaluation were more likely to engage in washing behaviour. There were eight women in this study who engaged in washing behaviour during a post-recording break; five of which reported a PNCSE and three of which did not. One interpretation of these findings may be that there are other factors which would lead women to be more likely to wash after a manipulation involving a physically dirty description of a perpetrator. Another interpretation of these findings may be that such a small number of washers in this study did not generate enough power to detect individual differences between those who washed and those who did not, particularly when the manipulation did not involve a description of the assailant as physically dirty. As such, a replication with a larger sample, perhaps focused on washing behaviour, is warranted. On the other hand, we did find trends for BFI-N (negative direction) scores to predict washing behaviour once symptoms of physical contamination had been accounted for, and responsibility (positive direction) appraisal scores to contribute further unique variance in washing behaviour. However, it is difficult to interpret these results given that classical statistical suppression (Horst, 1941; Conger, 1974) seems likely to have been involved and attempts to replicate these results would be helpful to assist in elucidating these findings.

Moreover, none of the variables in this study were significantly correlated with washing behaviour, except for ratings of feelings of shame and guilt. There was a tendency for women who reported a greater degree of shame and guilt after experiencing the imagined negative event to engage in washing behaviour during the break. These findings suggest that although participants who engaged in washing behaviour may not have been more likely to appraise the negative event as a violation, they were more likely to feel ashamed and guilty. Given that there is a great body of work indicating that these emotions are often associated with (or even result from) negative appraisals (e.g., Rachman, 1997, 1998; Salkovskis, 1985, 1999; Shafran, 1997; Shafran, Watkins, & Charman, 1996), it is entirely possible that the appraisals measured in this study did not encompass the full slate of idiosyncratic negative appraisals often seen in individuals diagnosed with OCD (OCCWG, 1997, 2001). As such, future investigations may wish to include broader measures of negative appraisals in an attempt to 'map out' which ones might specifically predict washing behaviour.

Clinical implications

There are a number of clinical implications of the current work. Although the sample was a non-clinical sample, that mental contamination can be provoked in this sample (e.g., Elliott & Radomsky, in press) has important implications for understanding both the onset and exacerbation of OCD symptoms associated with feelings of dirtiness, urges to wash, INE, ENE and washing behaviour. Furthermore, the current study provides some indication of who might be at risk for the experience of mental contamination. Individuals with physical contamination concerns may be at risk; however, it seems likely that those who appraise situations involving others as a violation, in terms of responsibility, or in terms of their moral character, could well be at greater risk. Assessing for these, and other negative appraisals, particularly of intimate

contact, may be quite helpful in identifying those who could benefit from cognitive-behavioural interventions for mental contamination within the context of OCD (e.g., Rachman, 2006).

Although neither Part I of this study (Elliott & Radomsky, in press) nor the current investigation provides any information about treatment, the findings are certainly relevant to those providing cognitive-behavioural therapy for those experiencing mental contamination concerns. It seems entirely likely that addressing appraisals of responsibility, of violation and of morality, perhaps through established methods (Clark, 2004; Rachman, 2003; Freeston et al, 1997; Wilhelm & Steketee, 2006), should have a strong effect on the reduction of feelings of mental contamination. This is important because the predominant intervention for contamination-related OCD is ERP which, as stated above, has been associated with significant numbers of patients who refuse the treatment and/or drop out (Fisher & Wells, 2005; Foa et al., 2005). As such, these results may pave the way for treatments for contamination related OCD (particularly involving mental contamination) which are more cognitively-based. Of course, additional work is required to address limitations above, and also to determine whether or not cognitively-based interventions for mental contamination are feasible, but the current study does indicate that this type of approach may be promising.

Conclusions

In examining the individual differences among mental contamination feelings and indices in female participants who imagined receiving a non-consensual kiss from a man, it was found that although some general risk factors may be at play (e.g., symptoms of physical contamination), negative appraisals of personal responsibility for the occurrence of the kiss, of the occurrence of the kiss as a perceived violation, and of post-kiss perceptions of immorality of the man's character were highly predictive of feelings of mental contamination. These variables

were neither however significantly nor consistently correlated with washing behaviour in the current sample. One limitation of the experimental paradigm used in this study is that some participants may have found it difficult to relate to the scenario in their everyday lives as the negative event occurs at a party. For example, recall that there was a trend for the participants' ages to predict INE scores, such that younger participants had a tendency to report feelings of shame, guilt, etc. to a greater degree than older participants. It may be that older participants were not affected in the same way; however, experimental paradigms which include greater emphasis on age, sex and gender would be helpful to elucidate the broader characteristics of mental contamination. Another limitation of this study is that only a single item was used to assess feelings of dirtiness. However, ratings of feelings of dirtiness were significantly correlated with other indices of mental contamination (e.g., urges to wash, INE, and ENE) suggesting the valid nature of this item. Nonetheless, given this and other study limitations, replication is warranted.

Although the findings must be taken in the context of the current work, and are in need of replication, they point to important topics of focus in both the assessment and treatment of mental contamination in OCD, and possibly PTSD. Furthermore, they might be helpful in identifying those who might be at risk of experiencing mental contamination in response to particular events. Fortunately, these appraisal characteristics are commonly assessed and altered during treatment. As such, the current study may well offer opportunities to broaden the treatment options available to those who struggle with contamination-related symptoms and disorders.

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Footnote

1. *Post hoc* regression analyses. When ASI and FNEB scores were removed from Model 2 of this

analysis, BFI-N (β = 1.43, t = 2.48, p = .02) scores remained a significant predictor of urges

to wash and DS (β = .94, t = 1.23, p = .23) scores continued not to contribute unique

variance. However, when BFI-N scores were also removed from this analysis such that only

DS scores were included in Model 2, a trend emerged for DS (β = 1.35, t = 1.74, p = .086)

scores to contribute unique variance in urges to wash. Furthermore, when ASI scores were

reinstated into Model 2 such that ASI and DS scores were both included in the same model in

the absence of FNEB and BFI-N scores, a trend was still evident for DS (β = 1.32, t = 1.69, p

= .095) scores to contribute unique variance; ASI (β = .41, t = .95, p = .35) scores continued

not to contribute unique variance.

Table 1

Correlation Coefficients between Questionnaire Variables

	Condition		
	DS	FNEB	BFI-N
Variable			
ASI	.29**	.37**	.40**
DS	-	.001	.34**
FNEB	-	-	.29**

n = 70. **p < .01. ASI = Anxiety Sensitivity Index. DS = Disgust Scale. FNEB = Fear of

Negative Evaluation – Brief Version. BFI-N = Big Five Inventory – Neuroticism.

Table 2

Mean Scores and Standard Deviations for Questionnaire Measures

Variable	M	SD
VOCI-CTN	7.13	8.78
ASI	16.09	11.95
DS	18.62	5.46
FNEB	38.39	9.41
BFI-N	24.17	7.09

n = 70. VOCI-CTN = Contamination Subscale of the Vancouver Obsessional Compulsive

Inventory.

Table 3

Mean Scores and Standard Deviations for Indices of Mental Contamination and Appraisal

Variables

Variable	M	SD
Dirtiness	52.24	33.80
Urges to Wash	43.93	32.56
INE	39.59	27.22
ENE	69.31	22.71
Responsibility	16.44	20.30
Violation	84.51	23.20
Post-Kiss Immorality	92.86	11.15

n = 70. Dirtiness = Ratings of Feelings of Dirtiness. Urges to Wash = Ratings of Urges to Wash. INE = Ratings of Internal Negative Emotions. ENE = Ratings of External Emotions. Responsibility = Ratings of personal responsibility for Kiss Occurrence. Violation = Ratings of Kiss as Perceived Violation. Post-Kiss Immorality = Ratings of Post-Kiss Perceptions of Immorality of the man's character. All ratings were based on a scale from 0 ("not at all") to 100 ("completely").

Table 4

Correlation Coefficients (One-Tailed) between Predictor Variables and Indices of Mental

Contamination & Negative Emotions

Variable	Indices of Mental Contamination and Negative Emotions			
	Dirtiness	Urges to Wash	INE	ENE
VOCI-CTN	.32**	.25*	.33**	.26*
Age	-.09	.06	-.26*	-.07
Condition	-.16[ae]	.06[a]	-.10[a]	-.07[a]
PNCSE	-.01[a]	.08[a]	-.04[a]	-.06[a]
ASI	.17[c]	.26*	.26*	.29**
DS	.13	.28*	.23*	.43**
FNEB	.05	.05	.12	-.07
BFI-N	.22*	.39**	.25*	.16[d]
Responsibility	.39**	.37**	.55**	-.02
Violation	.41**	.31**	.44**	.37**
Post-Kiss Immorality	.28**	.36**	.24*	.31**

$n = 70$. *p < .05. **p < .01. Pearson r, except where indicated. [a]Biserial r. [b]$p = .06$. (trend). [c]$p = .08$ (trend). [d]$p = .09$ (trend). [e]$p = .10$ (trend). PNCSE = Previous Non-Consensual Sexual Experience occurrence.

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