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Analyses of mental contamination: Part I, experimental manipulations of morality

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Abstract

The fear of contamination is thought to be comprised of two separate but related fears: those pertaining to physical and mental contamination. Previous research on mental contamination involved studies in which more than one independent variable was manipulated simultaneously. In particular, an immoral act (e.g., a non-consensual kiss), had been coupled with an immoral man (e.g., the person who forces the kiss) in each manipulation. The purpose of this study was to separate manipulations of the immorality of the man from the immorality of the act. Female undergraduate students (n = 148), listened to an audio recording and imagined that they were experiencing either sharing a consensual kiss with a man described as moral or immoral, or receiving a forced, non-consensual kiss from a man described as moral or immoral. Participants indicated the presence and degree of mental contamination and then completed a behavioural task for which spontaneous washing was recorded. Results indicated that a non-consensual kiss evoked greater feelings of mental contamination than a consensual kiss. Furthermore, participants who imagined a non-consensual kiss from a man described as moral reported the greatest feelings of mental contamination, whereas participants who imagined a consensual kiss from a man described as moral reported the least. Results are discussed in terms of cognitive-behavioural conceptualizations of and treatments for contamination fears.

Analyses of mental contamination: Part I, experimental manipulations of morality

Traditionally, contamination research has involved direct physical contact with a contaminant to examine physical feelings and fears of contamination (e.g., touching a dirty animal or bodily fluids such as blood or urine) (see Dorfan & Woody, 2005). Not surprisingly, individuals who touch a contaminant feel dirty at the location of physical contact and may also experience feelings of physical disgust. More recently, however, a different type of contamination has been reported that may be experienced without physical contact (Fairbrother & Rachman, 2004; Rachman, 2004, 2006). It is a psychological sense of contamination which involves an internal, emotional feeling of dirtiness that may be evoked for example by simply imagining certain events. This phenomenon is called *mental contamination* and was first identified by Rachman (1994) when he noted that some patients with obsessive-compulsive disorder (OCD) experienced feelings of contamination in the absence of any physical contaminant. Compared to physical contamination, episodes of mental contamination may be more difficult to deal with as the contaminant is difficult to localise and not easily 'washed away' (Fairbrother, Newth, & Rachman, 2005). The failure to identify mental contamination when using the most common instruments (e.g., the Yale-Brown Obsessive Compulsive Scale; Goodman et al., 1989; and Obsessive-Compulsive Inventory; Foa et al., 1998) may provide a partial (and tentative) explanation for why up to 50% of patients drop out of treatment or decline to undertake the prevailing effective and empirically based treatment, Exposure and Response Prevention (ERP; Foa et al., 2005). Of those who do accept this treatment, only 50-60% recover (Fisher & Wells, 2005). An improved understanding of contamination fears would consequently improve our understanding of OCD and may well prove fruitful for the development of more effective treatments.

OCD is an anxiety disorder involving obsessions (i.e., unwanted intrusive thoughts, images and/or impulses) and/or compulsions (i.e., repeated actions designed to prevent some dreaded event from occurring or to reduce discomfort) (American Psychiatric Association (APA), 2000). Cleaning compulsions are the second most common type of compulsion (Rachman & Hodgson, 1980) and involve repeated, unsuccessful attempts by an individual to clean her/himself or objects perceived as contaminated. It has been estimated that roughly 50% of individuals suffering from OCD report fears of contamination (Rachman & Hodgson, 1980; Rasmussen & Eisen, 1992) that are usually found to be underlying this compulsion (Rachman, 1994). Individuals afflicted with washing compulsions will wash repeatedly yet fail to feel clean. For example, one woman who attempted to relieve herself of feelings of dirtiness by taking numerous hot showers reported, "No matter how hard I try, I can't seem to get clean!" (Rachman, 1994, p. 311). An understanding of the presence of mental contamination in these situations may help to explain why attempts of this type are unsuccessful as they fail to address the underlying problem (Rachman, 1994). The most prominent example of an (albeit literary) individual who engaged in repeated washing to rid herself of pollution and guilt was Lady Macbeth. Her attempts proved fruitless and she asked in despair, "What! Will these hands ne'er be clean?" (Shakespeare, 1623/1929, p. 74). Observing this complex and puzzling behaviour in many patients raised the question, "How is it possible to wash repeatedly and yet remain dirty?" (Rachman, 1994, p. 311).

Rachman (1994, 2004, 2006) proposed the existence of two types of contamination underlying contamination fears: physical and mental. Physical contamination may be categorized into fears of disease, dirt and/or harmful substances, and usually involves direct physical contact with a contaminant resulting in a physical feeling of dirtiness. This sense of dirtiness would be experienced by most individuals who came into contact with the soiled object, should cease after washing the point of physical contact with the contaminant, and could be objectively identified

by others (Rachman, 1994). In contrast, mental contamination may be categorized into fears of mental pollution, the focus of this study, as well as fears of self-contamination, physical violation, psychological violation and 'morphing', is not restricted to direct physical contact with a contaminant and may persist independently of such contact. An individual afflicted with mental contamination recognizes that the experience is unique to them (Rachman, 2006); that is those situations and thoughts which leave them feeling contaminated are readily recognized as not affecting others. Thoughts, words, memories or images (e.g., impulses to molest a child) may elicit these feelings (Rachman, 2004). Additionally, this sense of dirtiness is not directly observable by others as physical soiling is not required, and the location is primarily reported as diffuse and difficult to locate. This differs from other forms of contamination in that the location of the contamination is more easily identified at the point of physical contact with the contaminant. Consequently, individuals afflicted with mental contamination may report an urge to wash, but attempts to do so are ineffective (Rachman, 1994).

Disgust and morality are two concepts closely related to mental contamination. Feelings of disgust are usually experienced alongside feelings of mental contamination. However, there are many situations in which an individual may feel disgusted but not mentally contaminated (e.g., handling dog feces) (Fairbrother & Rachman, 2004). In addition to feelings of disgust, mental contamination involves a moral quality that is not usually associated with physical contamination (e.g., feelings of self-disgust and guilt) (Fairbrother & Rachman, 2004). Events that are perceived as wrong, inappropriate or immoral may evoke symptoms of mental contamination. One example is when an individual experiences a feeling of responsibility or shame for participating in a situation deemed immoral, s/he will be more likely to experience these internal, emotionally charged feelings of dirtiness. Another example is when an individual experiences unwanted, intrusive thoughts, images and/or impulses that are incompatible with

her/his moral belief system, s/he may be at risk of developing feelings of mental contamination (Rachman, 2006). In addition, it is believed that mental contamination may be evoked by an "immoral human source" by way of physical (e.g., by touching), as well as non-physical (e.g., by sight), contact (p. 19). Similar to contamination, it has also been proposed that disgust includes physical as well as moral components (see Rozin & Fallon, 1987).

Although disgust in the context of anxiety disorders has been receiving increasing attention, some may argue that it does not account for the whole experience in OCD. For example, one study found that individuals suffering from obsessive-compulsive symptoms demonstrated a deficit in their ability to recognize facial expressions characterized by disgust (Sprengelmeyer et al., 1997), whereas another study found that only 33% demonstrated this deficit and it was related to both a greater functional impairment and a greater degree of OCD symptoms (Corcoran, Woody, & Tolin, 2008). These findings suggest that disgust may be a (partial) mechanism underlying symptoms of OCD.

Fears of contamination are not limited to individuals with OCD as they have also been reported in related problems such as hypochondriasis, disease-phobia and post-traumatic stress disorder (PTSD). This is consistent with Rachman's (1991) proposal regarding the "psychological connectedness" of anxiety (and other) disorders. In two case series exploring connections between trauma and the onset of OCD, the majority of cases in which PTSD was followed or accompanied by comorbid OCD involved contamination in physical and mental forms (Gershuny, Baer, Radomsky, Wilson, & Jenike, 2003; de Silva & Marks, 1999). Mental contamination has also been found to be prominent in female victims of sexual assault. Fairbrother and Rachman (2004) assessed post-assault feelings of mental contamination in 50 female sexual assault victims through questionnaires and an interview. They found that 68% of participants reported experiencing at least one of six indices of mental contamination, 70% of

these women reported urges to wash, and 25% reported persistent washing behaviours for one- to three-months post-assault.

Additionally, these researchers examined whether feelings of mental contamination could be evoked from deliberate recall of the assault as opposed to deliberate recall of a pleasant memory. Women who recalled their assault experience reported greater feelings of dirtiness and urges to wash than those who recalled a pleasant experience. Interestingly, nine women washed their hands and one woman also washed her face following the *recollection* of the assault. These women reported they had engaged in this washing behaviour to relieve themselves of physical sensations evoked by the memory (not because they had come into contact with a physical contaminant; Fairbrother & Rachman, 2004). These findings demonstrate that feelings of mental contamination are experienced by many female victims of sexual assault, these feelings can be evoked by thoughts, images and memories of the assault and they may be severe enough for victims to engage in washing behaviours to relieve themselves of sensations experienced in response to deliberate recall of the assault (Fairbrother & Rachman, 2004).

In order to test this phenomenon in a laboratory setting using a non-clinical population of undergraduate students, Fairbrother, Newth and Rachman (2005) devised a paradigm involving an *imagined* non-consensual sexual experience. Participants listened to an audio recording instructing them to imagine experiencing a consensual, desirable kiss from a man at a party. Participants were then randomly assigned to either the Consensual Condition (CC) in which they listened to the consensual kiss again, or one of three Non-Consensual Conditions (NCC's) in which they imagined experiencing a non-consensual, forced kiss from a man who restrained them and/or who was physically disgusting (e.g., smelly and dirty). Participants in the NCC's reported significantly greater feelings of mental contamination than participants in the CC, demonstrating that these feelings can arise in a non-clinical population in response to an imagined event.

Consistent with the female sexual assault victims interviewed by Fairbrother and Rachman (2004), nine women engaged in washing behaviours (e.g., mouth rinsing, hand washing) following the imagined event. Only one of these women was in the CC.

These findings have been replicated by Herba and Rachman (2007) using a variation of this paradigm, in which participants imagined experiencing only a consensual kiss from an attractive man or only a non-consensual kiss from an attractive but physically disgusting man (e.g., had beer breath). Herba and Rachman found participants in the NCC experienced feelings of mental contamination; they reported significantly greater feelings of dirtiness, urges to wash (2007), and negative emotions (e.g., shame and anger; Herba, 2005) than did those in the CC. Further, 27 women in the NCC engaged in neutralizing behaviours to relieve themselves of physical sensations induced by the manipulation. Specifically, 24 women rinsed their mouth, two women washed their hands and one woman did both, in response to the content of the audiotape. None of the women in the CC engaged in any of these neutralizing behaviours (Herba & Rachman, 2007).

Herba and Rachman (2006) have since conducted a follow-up study to examine whether mental contamination could be evoked from an imagined event involving a forced sexual encounter with someone morally disgusting, but physically clean. They found that participants who imagined experiencing a non-consensual kiss from a man described as attractive but also immoral reported greater feelings of mental contamination than women who imagined experiencing a consensual kiss from a man described as attractive with no additional information provided about his character (e.g., being immoral or not). In this study, six participants in the NCC and one participant in the CC engaged in neutralizing behaviours to relieve themselves of physical sensations induced by the manipulation.[1]

A limitation of these studies was that the manipulations in Fairbrother, Newth and Rachman (2005), Herba and Rachman (2007), and also in Herba and Rachman (2006), were confounded in that they simultaneously manipulated more than one relevant construct. In particular, a combination of a physically disgusting male and a morally disgusting act (e.g., he has beer breath and the kiss was non-consensual), and/or a combination of a morally disgusting male and act (e.g., he was described as clean-cut, but lies, cheats and steals and the kiss was non-consensual). The purpose of this study was to tease apart the (im)moral aspects of the man (e.g., comes to the aid of others versus lies, cheats and steals), and the act (e.g., a consensual kiss versus a non-consensual kiss), to examine whether the immorality of the male and/or act in the absence of negative information about his physical appearance (e.g., has beer breath), would be enough to evoke feelings of mental contamination from an imagined event.

There were four main predictions: First, women in the NCC's would report greater feelings of mental contamination and associated characteristics (e.g., feelings of dirtiness, urges to wash, internal negative emotions such as shame, and external negative emotions such as anger), than those in the CC's. Second, women in the Immoral Conditions (IC's) would report greater feelings of mental contamination than those in the Moral Conditions (MC's). Third, that those in the Non-consensual Immoral (NCI) Condition would report higher ratings of mental contamination than those in the other three conditions. Fourth, women in the NCC's would be more likely to engage in washing behaviours (e.g., mouth rinsing, hand washing), in response to the audio recordings than women in the CC's.

Method

Participants

Female undergraduate students (n = 148; average age = 22.86, SD = 4.46, range = 17 to 48-years) at Concordia University participated in this study. (Only women were permitted to participate as the paradigm was designed to test the phenomenon of mental contamination specifically in women). The sexual orientation of the participants was assessed using a Kinsey-type likert scale (Kinsey, Pomeroy, & Martin, 1948), given that they were later asked to imagine experiencing a kiss from a man. There were no women who reported they were predominantly homosexual, only incidentally heterosexual or exclusively homosexual; as such, all were considered appropriate for the study. Participants were randomly assigned to one of four conditions: one of two conditions of (im)morality of the man (Moral (M) versus Immoral (I)) nested within one of two conditions of desirability of the kiss (Consensual (C) versus Non-consensual (NC)), such that they were assigned to either the CM, CI, NCM or NCI Condition. Seven additional women participated in this study but were excluded from the final sample due to technical error in that either their questionnaire responses were not retrievable from the on-line system (n = 6), or the questionnaire assessing mental contamination was not completed (n = 1). Participants received course credit or had their name entered into a draw for a cash prize as compensation for their participation.

Measures

Demographic & Baseline Ratings Questionnaire (DBRQ): The DBRQ is an 11-item questionnaire developed for the purposes of this study. It was adapted from oral questions asked by Fairbrother, Newth, and Rachman (2004), and contained several new items. Participants were asked to report general demographic information (e.g., age, ethnicity), as well as their sexual orientation based on ratings from 0 to 6 for which 0 represented “exclusively heterosexual” and 6 represented “exclusively homosexual” (Kinsey et al., 1948). Participants were also asked to report baseline ratings of anxiety, disgust and feelings of dirtiness based on subjective units of

distress (SUDS) ratings from 0 to 100 for which 0 represented "not at all" and 100 represented "completely." Several items were used as distracters in an attempt to disguise the items of interest (e.g., participants were asked to provide ratings of happiness in addition to anxiety).

Beck Depression Inventory - 2 (BDI-II; Beck, Steer, & Brown, 1996). The BDI-II a 21-item questionnaire that assesses symptoms of depression (e.g., feelings of sadness, loss of pleasure), including suicidal ideation, that have occurred during the past two weeks. Participants' responses are based on a 4-point likert scale ranging from 0 to 3. Internal consistency has been demonstrated among both outpatients ($\alpha = .92$), and undergraduate students ($\alpha = .93$). Convergent and divergent validity have also been demonstrated (Beck, Steer, & Brown, 1996).

Beck Anxiety Inventory (BAI; Beck & Steer, 1990). The BAI is a 21-item questionnaire that assesses symptoms of anxiety (e.g., heart racing, fear of worst happening), that have occurred during the past week. Participants' responses are based on a 4-point likert scale ranging from 0 to 3. Internal consistency ($\alpha = .92$) has been demonstrated and this scale has been found to be more highly related to a measure of anxiety ($r = 0.48$), than depression ($r = 0.25$), in a clinical population (Beck, Epstein, Brown, & Steer, 1988). Most items on this scale involve somatic indicators of anxiety.

Contamination Subscale of the Vancouver Obsessional Compulsive Inventory (VOCI-CTN; Thordarson et al., 2004). The VOCI-CTN is a 12-item subscale of the VOCI questionnaire that assesses a fear of physical contamination. Items involve direct physical contact with a contaminant, (e.g., I feel very dirty after touching money), amount of time spent removing physical contaminants (e.g., I spend far too much time washing my hands), and concerns about germs and disease (e.g., I am afraid to use even well kept public toilets because I am so concerned about germs). Excellent internal consistency ($\alpha = .96$) and convergent and divergent validity have been demonstrated for the overall VOCI scale (Radomsky et al., 2006). In addition,

internal consistency (α = .87; α = 0.87 for this study as well), convergent and divergent validity (Thordarson et al., 2004), and test-retest reliability (*r* = 0.90; Radomsky et al., 2006) have been demonstrated for the contamination subscale in a student sample.

Mental Contamination Report (MCR): The MCR is a 29-item questionnaire also developed for the purposes of this study. It is a modification of the oral questions asked by Fairbrother, Newth, and Rachman (2004) and the Mental Contamination Report administered by Herba and Rachman (2007). The questions were devised using the indices of mental contamination and findings from previous research. The questionnaire assesses participants' ratings of ease to imagine the scenario, the desirability of the kiss, the man's (im)morality before and after the kiss, and SUDS of feelings of dirtiness, urges to wash, and negative emotions such as shame, anger and disgust. All ratings are based on a scale from 0 to 100 for which 0 represented "not at all" and 100 represented "completely."

Break Behaviour Questionnaire (BBQ): The BBQ is a 3-item questionnaire that is also a modification of oral questions previously asked by Fairbrother and Rachman (2004). The questionnaire assesses whether participants drink any fluids and/or wash their hands or face before or during the break and the *reasons* for engaging in this washing behaviour (e.g., they were thirsty, they attempted to remove physical sensations or they didn't know why).

Procedure

Participants were tested individually in the laboratory upon the provision of informed consent. The procedure was exactly the same for all four conditions except for the content of the audio recording. First, participants were offered a glass of water (from a bottle of water in a plastic cup). Next, participants were asked to complete the DBRQ, BDI-II, BAI and VOCI-CTN. Participants were then randomly assigned to one of the four conditions: CM, CI, NCM, or NCI. Participants were asked to listen to an audio recording that described a scenario at a party. They

were instructed to imagine themselves as vividly as possible as the woman in the scenario. The experimenter was blind to the condition of each participant as a unique audio recording track number was assigned to each participant. The experimenter played the corresponding track number and the participants wore headphones that prevented the experimenter from hearing the recording.

The audio recordings used in this study were new, with content adapted from the mental pollution audiotapes developed by Fairbrother, Newth, & Rachman (2004); a full text of the recordings used in the current study can be obtained from the second author. Participants in the CC's listened to a description of a physically attractive male and a consensual kiss (e.g., the woman desires to kiss the man). Participants in the NCC's also listened to a description of a physically attractive male; however, the kiss was described as non-consensual (e.g., the woman does not desire to kiss the man and the kiss is forced upon her). Further, participants in the MC's received additional information about the man's moral character (e.g., really nice guy, comes to the aid of strangers); whereas, participants in the IC's received additional information about the man's immoral character (e.g., he lies, cheats and steals).

After listening to the audio recording, participants were asked to complete the MCR and then seal the questionnaire in an envelope (to prevent the experimenter from seeing their responses). Participants were offered a glass of water from a bottle of water and a plastic cup and given directions to the washroom before taking a five-minute break. This behavioural task was administered but the purpose (i.e., to examine spontaneous washing behaviour) was not disclosed to participants. After the break, all participants were asked to complete the BBQ and then were debriefed.

Results

Outliers

The raw data was examined to identify potential outliers by calculating *z*-scores for each of the dependent variables except washing behaviour. One participant in the CMC was identified as having *z*-scores of more than 3 standard deviations above the mean of this condition for urges to wash, internal and external negative emotions. This participant was removed from the analyses. All other participants had *z*-scores less than three standard deviations from the mean of their condition for each of the dependent variables.

Sample characteristics

Randomized assignment of participants to the conditions was then assessed in respect to demographic and baseline characteristics, and ease to imagine the scenario ratings. There were no group differences in age F (3, 136) = 1.12, p = 0.34, η^2 = 0.02, ratings of anxiety, disgust or feelings of dirtiness before listening to the audio recording, all F's < 1.0. There were also no group differences on ease to imagine the scenario described on the corresponding audio recording F (3, 136) = 1.99, p = 0.12, η^2 = 0.04, or for BDI-II F (3, 136) = 1.08, p = 0.36, η^2 = 0.02, BAI F < 1.0, or VOCI-CTN F (3, 136) = 1.51, p = 0.21, η^2 = 0.0, scores. In addition, the overall sample means of BDI-II, BAI and VOCI-CTN scores were assessed (mean = 10.74, *SD* = 8.08; mean = 13.23, *SD* = 9.30; mean = 6.26, *SD* = 7.49, respectively), to confirm the non-clinical nature of this sample. Please see Table 1 for means and standard deviations of the above-mentioned variables.

In this sample, 43.6% (n = 61) of the women reported that they had experienced a prior non-consensual sexual encounter. Of the women who reported a prior incident, 41% (n = 25) reported the incident had occurred at a party, whereas 59% (n = 36) reported the incident had not occurred at a party. There were no group differences for the experience of a prior unwanted

sexual encounter ($\chi^2 = 4.31$; $p = 0.64$) between the CM, CI, NCM or NCI conditions ($n = 16$; $n = 14$; $n = 14$; and $n = 17$; respectively).

Manipulation checks

1. Perceived desirability of the kiss.

There were group differences on how desirable participants considered the kiss to be F (3, 136) = 52.81, $p < 0.001$, $\eta^2 = 0.54$. Participants in the CM Condition rated the kiss significantly more desirable than did women in the NCM Condition ($p < 0.001$), as did participants in the CI Condition compared to the NCI Condition ($p < 0.001$). Further, participants in the CM Condition rated the kiss as significantly more desirable than participants in the CI Condition ($p = 0.01$), whereas, the two NCC's did not differ significantly from each other ($p = 0.84$). These results suggest that desirability of the kiss is low when the kiss is non-consensual or when pre-kiss immoral information is provided. Please see Table 2 for means and standard deviations of all manipulation check variables.

2. Pre-kiss perceived immorality of the man.

There were group differences on how immoral participants considered the man to be *before* experiencing the kiss F (3, 136) = 66.32, $p < 0.001$, $\eta^2 = 0.59$. The two conditions for which the man was described as moral before the kiss did not differ significantly from each other ($p = 0.92$). Similarly, the two conditions for which the man was described as immoral before the kiss did not differ significantly from each other ($p = 0.90$). In contrast, participants in the CI and NCI Conditions rated the man significantly more immoral than participants in both the CM and NCM Conditions. In particular, participants in the CI Condition rated the man significantly more immoral than participants in the CM Condition ($p < 0.001$), as did those in the NCI Condition compared to the NCM Condition ($p < 0.001$). These results suggest that participants based their

pre-kiss (im)morality ratings on the pre-kiss (im)moral information they were provided with, regardless of the desirability of the kiss.

3. Post-kiss perceived immorality of the man.

There were also group differences on how immoral participants considered the man to be *after* experiencing the kiss F (3, 136) = 86.86, $p < 0.001$, $\eta^2 = 0.66$. Participants in the NCM condition rated the man significantly more immoral than participants in the CM Condition ($p < 0.001$). Additionally, the participants in the NCI condition rated the man as significantly more immoral than participants in the CI Condition ($p < 0.001$). Further, participants in the CI Condition rated the man significantly more immoral than women in the CM condition ($p < 0.001$), whereas, participants' in the two NCC's did not differ significantly from each other on post-kiss immorality ratings of the man ($p = 0.17$). These results suggest that participants in the NCC's based their post-kiss immorality ratings of the man on the situation, whereas participants in the CI Condition appeared to base their ratings on the pre-kiss immoral information.

4. Changes in perceived immorality over time.

To examine this further, we assessed difference scores for the CM, CI, NCM, and NCI Conditions from post- to pre-kiss ratings of immorality of the man (mean = 14.54, SD = 24.76; mean = -0.26, *SD* = 26.23; mean = 80.00, SD = 20.76; and mean = 27.71, SD = 32.26, respectively). Results indicated that the pre- and post-kiss ratings of immorality were significantly different for the CM t (34) = 3.48, $p = 0.001$, NCM t (34) = 22.80, $p < 0.001$, and NCI t (34) = 5.08, $p < 0.001$ Conditions, but not significantly different for the CI Condition t (34) = -0.06, $p = 0.95$, suggesting the participants in this condition did indeed base their post-kiss ratings of immorality of the man on the information they received prior to experiencing the kiss, whereas participants in the other conditions appear to base their ratings of post-kiss immorality

on the degree of desirability of the kiss. In general, participants who were provided with pre-kiss moral information about the man retrospectively rated him as such *before* imagining either a consensual or non-consensual kiss. Whereas, participants who were provided with pre-kiss immoral information about the man also rated him accordingly before the kiss (e.g., they believed him to be immoral before experiencing the kiss).

Feelings of mental contamination

To examine whether and to what degree mental contamination had been evoked by the content of the audio recordings, we assessed four indices of mental contamination: Feelings of dirtiness, urges to wash, negative internal emotions (e.g., shame), and negative external emotions (e.g., anger). The average of an aggregate measure of five items (e.g., rinse mouth/spit/drink something, brush teeth/use mouthwash, wash face, wash hands and take a shower), was used (coefficient $\alpha = 0.91$ in this study), to assess participants' ratings of urge to wash. Following the work of Herba (2005), ratings of negative emotions were based on two components: internal (e.g., feelings of being ashamed, guilty, humiliated, afraid, sad, cheap and sleazy), and external (e.g., feelings of being anxious, distressed, angry, disgusted by the man's physical appearance and disgusted by the man's behaviour), negative emotions. The average of the aggregate measures were used to assess participants' ratings of internal (coefficient $\alpha = 0.91$ in this study), and external (coefficient $\alpha = 0.90$ in this study), negative emotions. Please see Table 3 for means and standard deviations of indices of mental contamination (excluding washing behaviours).

To examine how well the indices of mental contamination were related to each other, correlation coefficients (one-tailed) were calculated. All four of the measures of mental contamination were significantly interrelated (all r's > 0.59; all p's < 0.01). A multivariate repeated measures ANOVA was then conducted to assess the impact of the desirability of the kiss, the (im)morality of the man and their interaction on the dependent variables (Bonferroni

corrected confidence intervals were used to provide a conservative estimate but with $\alpha = 0.05$ as these tests were planned before the manipulation). Mauchly's test of Sphericity was significant ($p < 0.001$), so the Greenhouse-Geisser F-value was used. Results indicated that there was a main effect of desirability of the kiss F (1, 136) = 71.42, $p < 0.001$, $\eta^2 = 0.34$, such that the less desirable the kiss, the greater the presence of mental contamination; a main effect of (im)morality of the man F (1, 136) = 5.09, $p = 0.026$, $\eta^2 = 0.04$, such that pre-kiss immoral information led to feelings of mental contamination; and an interaction between them F (1, 136) = 10.69, $p = 0.001$, $\eta^2 = 0.07$, such that women in the NCM Condition reported the greatest feelings of mental contamination, whereas women in the CM Condition reported the least.

Results indicated there were group differences on feelings of dirtiness F (1, 136) = 15.65, $p < 0.001$, $\eta^2 = 0.26$, such that participants in the NCM and NCI Conditions did not differ from each other ($p = 0.15$), but they did report significantly greater feelings of dirtiness than participants in the CI Condition, who reported significantly greater feelings of dirtiness than women in the CM Condition (all p's ≤ 0.034). In addition, more participants in the NCC's identified the location of dirtiness as being their mouth ($\chi^2 = 29.35$; $p < 0.001$), tongue ($\chi^2 = 21.18$; $p < 0.001$), face ($\chi^2 = 8.32$; $p < 0.01$), stomach ($\chi^2 = 4.93$; $p = 0.03$), and/or diffuse ($\chi^2 = 9.26$; $p < 0.01$), and there was a tendency for more of these participants to report the location of dirtiness as being internal ($\chi^2 = 3.21$; $p = 0.07$), than participants in the CC's. Please see Figure 1 for frequency of location of dirtiness for the Consensual and NCC's.

There were also group differences for urges to wash F (1, 136) = 20.90, $p < 0.001$, $\eta^2 = 0.32$. In particular, participants in the NCM and NCI Conditions did not differ significantly from each other ($p = 0.53$); however, they reported significantly greater urges to wash than participants in the CI Condition, who reported significantly greater urges to wash than participants in the CM

Condition (both p's < 0.01). In addition, more participants in the NCC's indicated that the reason they had this urge to wash was to feel less anxious ($\chi^2 = 10.68$; $p < 0.001$), to prevent themselves from becoming sick ($\chi^2 = 9.12$; $p < 0.01$), and/or to stop thinking about the imagined event ($\chi^2 = 15.06$; $p < 0.001$), than participants did in the CC's. Please see Figure 2 for frequency of reasons for urge to wash in the Consensual and NCC's.

There were also group differences for internal negative emotions F (1, 136) = 11.19, $p < 0.001$, $\eta^2 = 0.20$. In particular, participants in the CM Condition reported significantly less internal negative emotions than participants in the CI, NCM and NCI Conditions (all p's < 0.001), who did not differ from each other (all p's > 0.28).

Finally, there were group differences for external negative emotions F (1, 136) = 50.76, $p < 0.001$, $\eta^2 = 0.53$, such that participants in the NCM and NCI Conditions did not differ from each other ($p = 0.58$), but they reported significantly greater external negative emotions than participants in the CI Condition who in turn reported significantly greater external negative emotions than participants in the CM Condition (all p's ≤ 0.001).

Subsequent washing behaviours

Assessment of whether participants in the NCC's engaged in washing behaviours such as rinsing their mouth and/or washing their hands and/or face to relieve themselves of physical sensations evoked by the audio recordings at a greater rate than those in the Consensual conditions was then conducted. Participants were categorized as "Washers" or "Non-washers" across all four conditions. "Washers" ($n = 11$) were defined as having rinsed their mouth and/or washed their hands and/or face during the break to relieve themselves of physical sensations and not because they were thirsty, had just used the washroom or didn't know why they had engaged in these behaviours. "Non-washers" ($n = 129$) were defined as having rinsed their mouth and/or

washed their hands and/or face during the break for reasons other than to relieve themselves of physical sensations, or having not engaged in any of these behaviours. There were no participants who washed their face in response to the audio recording, and no participants rinsed their mouth *and* washed their hands.

There were three Washers in the CI Condition and eight Washers across the NCC's (no participants washed in the CM Condition). There were no significant differences between the Consensual and NCC's for washing behaviours ($\chi^2 = 2.47$; $p = 0.12$).

Discussion

We examined women's responses to an imagined sexual encounter involving varying degrees of desirability (i.e., consensual vs. non-consensual), and a man who was described as physically attractive but whose character involved varying degrees of (im)morality (i.e., moral vs. immoral), to assess whether mental contamination could be evoked in this context, and whether women would engage in rinsing behaviours such as rinsing their mouth and/or washing their hands in response to the manipulation.

Feelings of mental contamination

In general, the results from this study are highly consistent with previous studies conducted involving mental contamination. Results indicated that the imagined occurrence of a non-consensual kiss was sufficient to evoke significant feelings of mental contamination, regardless of whether the pre-kiss information the women received about the man's character was moral or immoral. In addition, the imagined occurrence of a consensual kiss was also sufficient to evoke mental contamination, but only when the women received pre-kiss information as to the man's immoral character. Women in the NCC's felt more internally dirty, had greater urges to wash and experienced external negative emotions to a greater degree than women did in the CC's. In addition, women in the CM Condition for which participants were provided with pre-

kiss moral information about the man's character reported internal negative emotions to a lesser degree than women in the three other conditions, who did not differ significantly from each other.

Interestingly, fewer women in this study engaged in washing behaviours to relieve themselves of physical sensations evoked by the audio recording. Recall that Herba and Rachman (2007) found 27 women (out of 100), who listened to only one version of the audio recording including an extensive physical disgust component, displayed these behaviours. Perhaps these women were morally affected, but it is likely that disgust played a greater role because when we removed the physical description component, women did not wash at a near equivalent rate. These results are consistent, however, with findings reported by Fairbrother, Newth and Rachman (2005), when only 8 women (out of 91) who listened to an audio recording involving a non-consensual kiss engaged in such behaviour – roughly 30 women imagined a scenario involving the physical disgust component (the researchers did not report the exact number of participants who listened to each of the three different non-consensual audio recordings used in this study, nor the exact number of participants who washed following the recording in each of the three NCC's of this study as the final results were collapsed across the three NCC's). These results are also consistent with Herba and Rachman (2006) in that six out of 63 women engaged in washing behaviours to in response to the audio recording. In the current study, three women (out of 70) in the CC's, and 8 women (out of 70) across the two NCC's, engaged in washing behaviour.

Situational versus character immorality

In the context of a woman being kissed by a man, findings from this study suggest that when the desirability of the kiss is low (e.g., non-consensual), the immorality of the man will be high after experiencing the kiss, irrespective of receiving prior information that he is moral. Additionally, these findings also suggest that when the desirability of the kiss is high (e.g.,

consensual), the rating of immorality of the man post-kiss will be reflective of prior information received as to his immorality, but this rating of immorality is not as great as when the desirability of the kiss is low. In other words, the immoral act appears to override the moral information, yet the seemingly moral act appears not to override the immoral information. This phenomenon is akin to the asymmetrical relationship present between 'contaminated' substances and 'non-contaminated' substances. For example, a drop of blood could 'contaminate' a glass of purified water; however, a drop of purified water could not 'de-contaminate' a glass of blood, S.J. Rachman (personal communication, 1998).

It is interesting that the women in the CM Condition reported a significant increase in their pre- to post-kiss immorality ratings of the man. One explanation may be that some of the women in this condition indicated during debriefing that they felt the man had 'used' them because he walks away at the end of the recording without a 'proper good-bye'. Results suggest that receiving a consensual kiss from a man thought to be moral is more desirable than receiving a consensual kiss from a man thought to be immoral; however, both of these situations are more desirable than receiving a non-consensual kiss from a man thought to be either moral or immoral (before the kiss). These findings are consistent with the fundamental attribution error (Ross, 1977) theory stating that individuals' behaviour in a particular situation is more likely to be judged as stemming from their disposition rather than the situation, due to an underestimation of the situational factors that may have led to their behaviour and an overestimation of their dispositional characteristics.

Several limitations of this study should be noted. First, it is possible that the results from this study may have been influenced by demand characteristics. However, measures were implemented in an attempt to decrease these in this experiment. One such measure involved using a control condition involving an imagined consensual kiss from a man described as moral. No

participants in the control condition engaged in any washing behaviours to reduce feelings of mental contamination evoked by the imagined scenario. Other measures utilized involved asking the women to complete a questionnaire rather than allowing the experimenter to ask them directly about washing behaviour(s) they may have engaged in during the break, and the development of a blind design. In this study, the experimenter was not aware to which condition each participant had been randomly assigned. Therefore, when the experimenter administered the audio recording and questionnaires, she provided each participant with exactly the same instructions, as she did not know to which condition they belonged. Second, the nature of the non-clinical sample of young, female undergraduate students used in this study limits the generalizability of the findings. Third, the manipulation relies heavily on participants' ability to imagine they are experiencing the situation described on the audio recording at that moment in the laboratory. Although no group differences were present between conditions for ease to imagine the scenario ratings, it may have been difficult for participants to fully experience the situation described. Fourth, only physical washing behaviours during the break were assessed. It is possible that women engaged in other cognitive and physical behaviours in response to the manipulation. For example, two participants reported after the experiment that they had smoked a cigarette during the break, and one participant reported she had chewed gum, to decrease feelings of anxiety that had been evoked from the audio recording.

Clinical implications

These internal feelings of dirtiness assume an important role in sexual assault victims who experience feelings of mental contamination, as well as in individuals with OCD in that they are similarly not treatable at a substantial rate through response prevention techniques (Fairbrother & Rachman, 2004). Identifying predictor variables of those who may feel mentally contaminated and individual differences of those who may engage in washing behaviours may aid therapists

when dealing with this resistant sense of dirtiness in cases of sexual assault and reduce treatment failures in cases of OCD. In other words, methods to identify mental contamination and treat such feelings of internal dirtiness should "facilitate recovery" from sexual assault (Fairbrother & Rachman, 2004, p. 174) and OCD. Therapists should be aware of the existence of these feelings in women who have undergone a sexual assault, as well as individuals suffering from OCD.

Further, OCD characterized by primary obsessions (PO) is of interest as it pertains to washing compulsions. PO involves unwanted, intrusive thoughts, primarily characterized by three main categories: sexual (e.g., inappropriate sexual thoughts about children), violent (e.g., thoughts about harming one's spouse), and blasphemous (e.g., thoughts about calling out obscenities during a church service) (APA, 2000). Experiencing unwanted, intrusive thoughts of this nature is very distressing because these situations are often labelled by the individual as wrong, inappropriate or immoral. The presence of compulsions with this form of the disorder, or lack thereof, is of interest when assessing why some patients present with compulsive symptoms, while others do not. Mental contamination in OCD, PO and/or PTSD may present an obstacle to traditional therapeutic strategies (e.g., ERP), as it may be difficult to expose individuals suffering from these disorders to the thing(s) that they fear. This is in addition to the obstacle of the high percentage of patients who either refuse, or drop out of this type of treatment. One proposed solution may be to implement cognitive therapy strategies as a supplement to or even a reconstrual of ERP (Rachman, 2006). This solution seems viable, given that mental contamination is primarily a cognitive problem.

Conclusions

In sum, the findings from this study serve to correct limitations/confounds present in previous studies examining the evocation of mental contamination from an imagined non-consensual kiss. In particular, these findings suggest that mental contamination may be evoked

by an imagined event involving an attractive man who is described as moral or immoral before forcing a non-consensual kiss upon a woman, as well as an attractive man who is described as immoral before sharing a consensual kiss with a woman, but to a lesser degree than when the kiss is described as non-consensual. These results are consistent with the results reported in previous studies in that an imagined non-consensual kiss is a sufficient condition to evoke mental contamination. These findings also expand on previous findings in that woman perceived the man as immoral regardless of the type of pre-kiss information they received about the man (e.g., moral or immoral character), and that pre-kiss immoral information about the man may be a sufficient condition to evoke mental contamination in the context of a consensual kiss, but to a lesser extent. Future studies should further explore cognitive and other mechanisms underlying the evocation of mental contamination.

Additionally, to allow for a more comprehensive picture of mental contamination, experimental paradigms should be designed to enable researchers to examine this phenomenon with men as both victims and perpetrators of sexual assault as well as involve different negative imagined events to examine whether feelings of mental contamination may be evoked in other negative situations (for men and women). Although not the focus of this paper, future research should also examine individual differences associated with the evocation of mental contamination (e.g., anxiety sensitivity, disgust sensitivity, etc.), and washing behaviour. Future research in this area may have a positive impact on clinical strategies aimed at the treatment of OCD, PTSD, and recovery from sexual assault, in that it may aid researchers and clinicians to better identify and target mental contamination.

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Notes

1. The participant in the consensual condition indicated that she had rinsed her mouth because she felt as if she had been unfaithful to her boyfriend by imagining a consensual kiss with another man. In other words, this sense of betrayal had evoked physical sensations of dirtiness which she desired to wash away.

Table 1

Mean Scores and Standard Deviations on Demographic and Baseline Ratings, Questionnaire Scores and Ease to Imagine Scenario Ratings for each Condition

Variable	Condition							
	CM		CI		NCM		NCI	
	M	SD	M	SD	M	SD	M	SD
Age	22.74	3.41	22.09	4.76	22.63	4.29	23.97	5.18
Baseline Anxiety	25.06	24.74	23.17	28.11	21.37	28.28	18.31	22.23
Baseline Disgust	2.86	13.56	5.00	12.95	3.06	9.55	4.09	9.74
Baseline Dirtiness	8.09	13.47	6.86	13.18	10.66	17.81	10.57	20.89
Ease to Imagine Scenario	77.10	16.77	78.08	17.18	75.70	18.17	84.47	12.41
BDI-II	12.31	8.91	9.11	7.28	10.09	6.60	11.43	9.21
BAI	12.97	8.29	11.74	8.53	14.14	10.45	14.06	9.96
VOCI-CTN	5.26	5.76	5.54	6.05	8.57	10.21	5.69	6.91

n = 35 for each condition. Demographic and Baseline ratings are based on ratings from 0 (“not at all”) to 100 (“completely”). BDI-II = Beck Depression Inventory-2; items from 0 to 3 (indicating the degree of each symptom if present). BAI = Beck Anxiety Inventory; items from 0 (“not at all”) to 3 (“severely, I could barely stand it”). VOCI-CTN = Contamination Subscale of the Vancouver Obsessional Compulsive Inventory; items from 0 (“not at all”) to 4 (“very much”).

Table 2

Mean Scores and Standard Deviations on Manipulation Checks Ratings for each Condition

Variable	Condition							
	CM		CI		NCM		NCI	
	M	SD	M	SD	M	SD	M	SD
Kiss Desirability	80.00[a]	19.55	64.00[b]	28.36	18.20[c]	25.31	19.43[c]	28.04
Man Immoral Before	10.03[a]	14.69	67.80[b]	31.64	9.43[a]	11.30	68.57[b]	32.56
Man Immoral After	24.57[a]	27.85	67.54[b]	26.11	89.43[c]	13.76	96.29[c]	6.23

n = 35 for each condition. Variable scores are based on ratings from 0 ("not at all") to 100 ("completely"). For each row, values which share the same superscript are not significantly different from each other at the $p < .05$ level.

Table 3

Mean Scores and Standard Deviations on Indices of Mental Contamination for each Condition

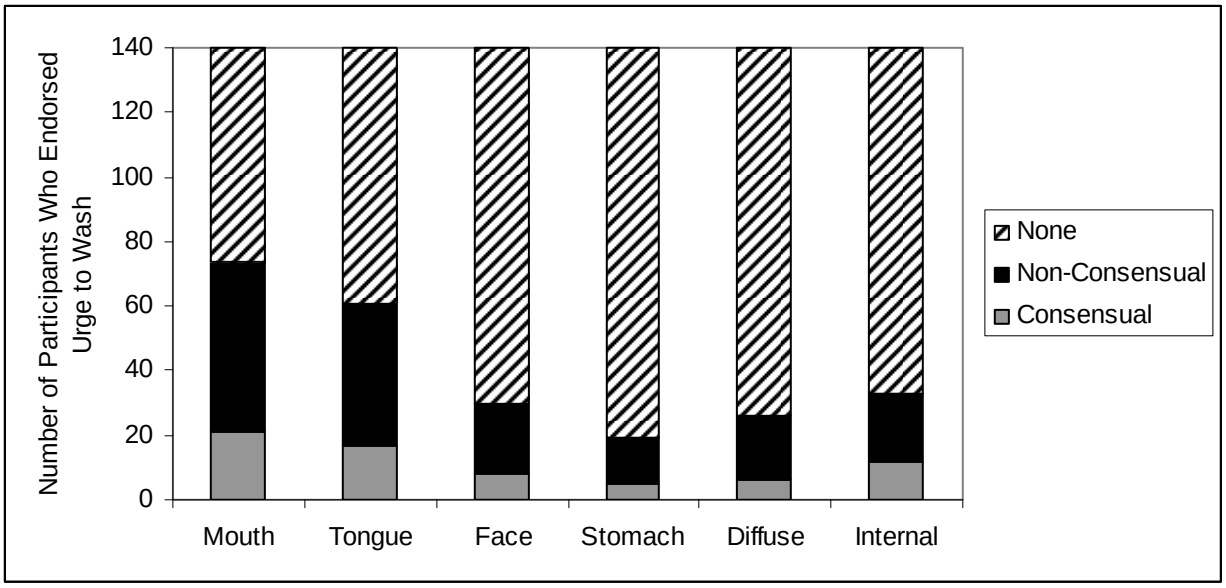
Variable	Condition							
	CM		CI		NCM		NCI	
	M	SD	M	SD	M	SD	M	SD
Feelings of Dirtiness	9.77[a]	19.49	31.03[b]	35.04	57.57[c]	38.07	46.91[c]	28.48
Urges to Wash	1.97[a]	5.45	19.37[b]	25.55	41.91[c]	32.76	45.94[c]	32.72
Internal Negative Emotions	10.74[a]	17.09	35.96[b]	26.62	42.33[b]	29.29	36.85[b]	25.12
External Negative Emotions	16.17[a]	16.58	34.27[b]	24.99	70.78[c]	25.98	67.83[c]	19.16

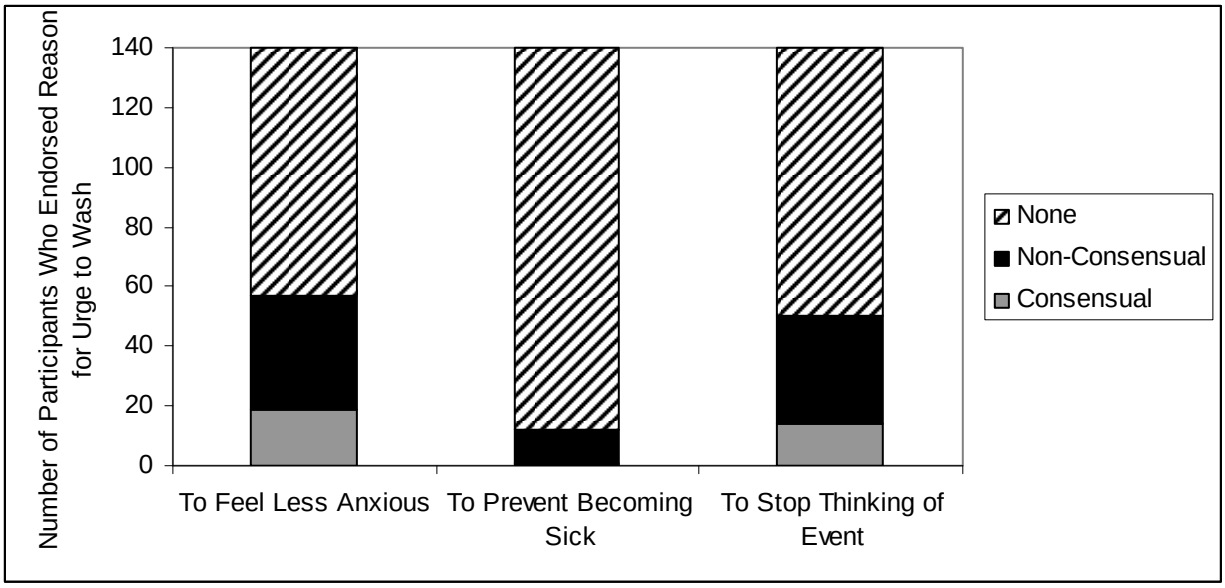
n = 35 for each condition. Variable scores are based on ratings from 0 ("not at all") to 100 ("completely"). For each row, values which share the same superscript are not significantly different from each other at the $p < .05$ level.

Figure Captions

Figure 1. Frequency of individual locations of dirtiness for the consensual and non-consensual conditions.

Figure 2. Frequency of reasons indicated for urge to wash for the consensual and non-consensual conditions.


Number of Participants Who Endorsed Urge to Wash
140
120
100
80
60
40
20
0
Mouth
Tongue
Face
Stomach
Diffuse
Internal
None
Non-Consensual
Consensual


Number of Participants Who Endorsed Reason for Urge to Wash
140
120
100
80
60
40
20
0
To Feel Less Anxious
To Prevent Becoming Sick
To Stop Thinking of Event
None
Non-Consensual
Consensual

Acknowledgements

The authors would like to acknowledge S. Rachman and Roz Shafran for their suggestions regarding the design of this study and additional thanks go to S. Rachman for his comments on an earlier version of this manuscript. We also wish to acknowledge Laura Rudy for her help with data collection. Findings of this study were presented at the 2008 Association for Behavioral and Cognitive Therapies convention in Orlando, FL. This research was supported in part by fellowship and grant support from the Canadian Institutes of Health Research.