INDIVIDUAL DIFFERENCES IN PSYCHOLOGICAL FEELINGS OF CONTAMINATION

By

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Abstract

Feelings of contamination can arise without physical contact with a contaminant. This study examined individual differences in sensitivity to mental contamination. Female undergraduates at UBC (n=100) filled out a series of questionnaires and listened to an audiotape that instructed them to imagine experiencing a forced kiss by an undesirable male. Controls (n=20) imagined a consensual kiss by a desirable male. Women in the non-consensual condition reported greater feelings of dirtiness and urge to wash than those in the consensual condition. Twenty-seven women rinsed in order to alleviate physical sensations evoked by the tape. High scores on measures of physical contamination fears predicted reported dirtiness and urge to wash. Actual rinsing was associated with higher scores on fear of negative evaluation. Results are discussed in terms of methodological issues, as well as implications for future research into contamination.
Table of Contents

Abstract............................................................................................................................ii
Table of Contents.............................................................................................................iii
List of Tables.....................................................................................................................iv
List of Figures....................................................................................................................v
Acknowledgment............................................................................................................vi
Introduction......................................................................................................................1
Method.............................................................................................................................12
Results.............................................................................................................................17
Discussion.........................................................................................................................27
References.......................................................................................................................40
Appendix A.......................................................................................................................51
Appendix B.......................................................................................................................54
Appendix C.......................................................................................................................56
List of Tables

1. Sample Means and Standard Deviations on Questionnaire Data ........................................... 46
2. Mental Pollution and Associated Negative Emotions in the Consensual versus Non-Consensual Conditions ................................................................. 47
3. Pattern Matrix for Principal Components Analysis on Negative Emotion Items ........ 48
4. Correlations Between Questionnaire Data and Self-Reported Indices of Mental Pollution (Dirtiness and Urge to Wash) ................................................................. 49
List of Figures

1. Questionnaire Data in Rinsers versus Non-Rinsers........................................50
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Introduction

How is it possible to feel contaminated at the mere sight of another person, at the memory of an event we regret, or at the critical remarks of another? How can someone feel dirty and want to wash from mere thoughts, words, memories or images? This psychological sense of contamination has been termed “mental pollution” (Rachman, 1994) and refers to an internal emotional feeling of dirtiness that arises independently of any physical contact with a contaminant. The phenomenon was first noted in patients with obsessive-compulsive disorder (OCD), but has since been demonstrated in non-clinical populations as well (Fairbrother, Newth, & Rachman, 2004; Fairbrother & Rachman, 2003; Rachman, 1994).

The purpose of the present study was to gain a deeper understanding of this form of contamination, and in particular to examine factors that are associated with individual differences in one’s propensity to feel mentally polluted. This paper will begin with a brief overview of contamination, then focus more specifically on mental pollution and finally describe the present study and its implications for future research in the field.

Fears of contamination feature prominently in OCD, being reported by over 50% of patients (Rasmussen & Tsuang, 1986; Steketee, Grayson, & Foa, 1985). These individuals exhibit an excessive and/or irrational fear of being polluted, infected or endangered as a result of contact (direct or indirect) with a person, place or object that they perceive to be soiled, impure, infectious or harmful (Rachman, 2004). Feared consequences of contamination include harm to one’s physical, mental or social well-being (Rachman, 2004; Woody & Teachman, 2000). For example, individuals may worry about contracting an illness, losing emotional control, or repulsing others by their state of contamination.

Contamination concerns may be adaptive insofar as they serve to protect an organism from
harm. However, when these concerns become irrational or excessive, they can be extremely distressing, and interfere with an individual's functioning (Rachman, 2004). Common strategies used to alleviate the anxiety provoked by these concerns include excessive washing to remove the contaminant, as well as avoidance of potential triggers of contamination fear.

Most research on fears of contamination has focused on physical contaminants as a source of distress. Commonly used self-report measures of contamination fears include items such as, "I feel very dirty after touching money"; "I find it very difficult to touch garbage or garbage bins," or "I avoid using public telephones because of possible contamination" (Thordarson, Radomsky, Rachman, Shafran, & Sawchuk, 1997). Recently, however, it has been noted that feelings of contamination can arise without contact with a physical contaminant (Fairbrother, Newth, & Rachman, 2004; Fairbrother & Rachman, 2003; Rachman, 1994). Rachman (1994) observed that some patients' feelings of contamination are evoked by mere thoughts, memories, images or remarks. This form of contamination has been termed "mental pollution", and, although research on mental pollution is still in its infancy, some of its basic properties have been outlined (Rachman, 1994, 2004).

Mental pollution is a form of contamination that arises with or without physical contact with a contaminant. Thus, people may feel contaminated at the mere sight or thought of something or someone they perceive as contaminated. The feeling persists independently of physical contact. Because of its non-physical nature, people often have difficulty locating the source and bodily location of their dirtiness. Some may describe it as internal or emotional dirtiness. This property of mental pollution stands in contrast to physical contamination, where the individual is generally able to identify the source of contamination and locate its point of contact on his/her body. Not surprisingly, mental pollution can be quite
perplexing to those afflicted. In extreme cases, the individual may feel overwhelmed by the powerful intrusiveness of the experience, as well as by its incomprehensibility, and consequently develop fears of a mental breakdown (Rachman, 1994, 2004). Interestingly, mental pollution can also feel similar to ordinary dirtiness and consequently evoke an urge to wash. Washing, however, is futile, as the dirt is not physical in nature, and patients may wash repeatedly without ever feeling clean. As one patient noted, “Everything looks clean but feels dirty. I look clean but still feel dirty.” Others have said, “Dirt can be washed away but not this”, “It is like a dirty film on my skin that cannot be removed” and “It is emotional dirt” (Fairbrother, Newth, & Rachman, 2004).

Furthermore, stimuli that are deemed contaminated are not usually perceived as such because of their ability to spread disease or infection, but rather because of ideational concerns about their nature and/or what they represent. For example, one patient felt contaminated by anything or anyone associated with pornography. His fear did not involve a concern over contracting an illness, but rather anxiety over the moral implications of such contamination. Another patient felt contaminated by particular individuals from her past. Her anxiety centered on a fear of becoming more like those individuals in question (Rachman, personal communication). Thus, the anxiety associated with mental pollution is more complex than fear of disease and often contains a moral element. Patients will often equate being dirty with being a bad person, being worthless or being immoral (Rachman, personal communication). Not surprisingly, the emotions accompanying this sense of pollution are varied and include not only disgust and anxiety, but also shame, humiliation and contempt.

The necessary and sufficient conditions under which mental pollution arises have yet to be determined. However, clinical experience suggests that it occurs in situations
characterized by transgressions or events that are perceived as wrong, inappropriate or immoral. For example, one patient developed intense feelings of dirtiness after being criticized and disowned by her family for engaging in an inappropriate sexual relationship. She developed severe washing compulsions following this criticism. Her feelings of dirtiness were triggered whenever she came into contact, whether by phone or by mail, with “contaminated” relatives (Rachman, 2004). Another patient experienced feelings of contamination and associated washing whenever confronted by anyone or anything connected with his place of employment. This sense of contamination originated with a colleague for whom the patient harbored an intense dislike. The feelings of dirtiness, which at first were triggered by the colleague in question, later spread to include all stimuli associated with the man, including the people who lived next door to the office. Another patient felt contaminated by his own obsessions. These intrusive thoughts involved sexual activities which the patient considered highly inappropriate. Whenever they occurred, he felt dirty and contaminated and experienced a strong urge to clean himself (Rachman, personal communication).

One situation in which mental pollution has been documented is sexual assault. Some victims of sexual assault develop excessive contamination concerns and washing compulsions following the event. Fairbrother and Rachman (2003) examined washing behaviour in 50 female sexual assault victims. They found that 70% of participants reported an urge to wash or clean after the assault. More notably, 25% percent of these women continued to wash excessively for one to three months after the assault. These researchers also assessed characteristics of mental pollution. In particular, they inquired whether the feeling of dirtiness was internal, emotional, moral, persistent in the absence of contact with a
contaminant, not fully eliminated by washing, and whether it could be re-evoked by memories. Of the women who reported an urge to wash following the assault, 97% endorsed at least one of the six mental pollution indicators and, on average, endorsed 3.1 (SD=1.5) of these indicators. Fairbrother and Rachman (2003) also asked those participants who reported experiencing an urge to wash to deliberately recall their assault. They found that deliberate recollection of the event re-elicited feelings of mental pollution, including negative emotions (anxiety, distress), feelings of dirtiness and an urge to wash. Following recollection, one fifth of the participants actually engaged in washing.

Case studies reported by DeSilva and Marks (2000) and by Gershuny, Baer, Radomsky, Wilson, and Jenike (2003) also support a relationship between sexual assault and feelings of contamination. For example, De Silva and Marks (2000) describe the story of a 24-year-old woman who developed severe washing compulsions following a sexual assault. “After [the assault], she continued to feel dirty and said that she could not stop or resist the urge to wash repeatedly. She washed both her person and her clothes and other things in her flat; she would spend hours doing this... She had obsessional thoughts about being dirty and unclean (‘I am dirty’, ‘I am filthy’, ‘Everything is unclean’, etc.), which were all linked to the washing compulsions” (p.175).

Drawing on the association between sexual assault and mental pollution, Fairbrother, Newth and Rachman (2004) created a paradigm for studying mental pollution in the laboratory in a non-clinical population. Specifically, female undergraduates listened to an audiotape describing a scenario at a party where a woman is kissed by a man. Participants were instructed to imagine themselves as vividly as possible as the woman in the scenario. In the experimental or “non-consensual” group, the kiss was forced upon the woman by an
undesirable man. In the control condition, the scenario involved a consensual kiss. Subsequent to the manipulation, participants in the non-consensual condition reported feeling internally dirty, wanting to wash and experiencing a range of negative emotions (such as being upset, anxious, angry, ashamed, immoral and sleazy). Eight of the 91 participants in the non-consensual condition actually rinsed their mouth or washed their hands in order to counteract these feelings. These results again demonstrate that feelings of contamination can arise without physical contact with a contaminant and that the phenomenon can be studied in an analogue population of undergraduate students.

The above studies thus demonstrate that internal, emotional feelings of dirtiness can arise in victims of sexual assault and, furthermore, that this phenomenon can be simulated through an imaginal experience in the lab. One might wonder, however, why not all sexual assault victims develop feelings of mental pollution following the event. What factors render some individuals more likely to feel psychologically contaminated by an image or memory? Insight into individuals may be achieved if one considers mental pollution within the context of contamination fear and examines variables that have been associated with contamination fear and anxiety disorders more generally.

Two emotions that feature prominently in fear of contamination are disgust and fear/anxiety. Disgust has been conceptualized as an adaptive emotion, serving to protect an organism from harm. Matchett and Davey (1991) suggest that the function of disgust is to promote avoidance of contaminated material. Although support for this theory is still equivocal (Woody & Teachman, 2000), some research has supported a relationship between state disgust and avoidance (Woody & Tolin, 2002). Fear and anxiety are both responses to perceived threat. Various theories have been put forth to distinguish these two emotions,
some focusing on the imminence of the threat, others on the emotional processing involved. For the present purposes, fear is viewed as “a basic emotion in response to the perception of an immediate threat”, while anxiety is thought to involve “more complex cognitive processing related to anticipation of future threat” (Woody & Teachman, 2000). In anxiety disorders, such as OCD, both fear and anxiety play important roles, with fear being a specific response to a perceived threat and anxiety a more looming sense of future danger. Their key overlapping feature is that they are both responses to perceived threat. Fear of contamination has been described as the intersection between disgust and fear. Woody and Teachman (2000) hold that, although individuals may feel disgusted by a range of stimuli, they only become anxious or afraid when they perceive a threat of contamination. Thus disgust, along with fear and anxiety, appear integral to contamination fear.

Previous research found mental pollution to be associated with feelings of anxiety and distress (Fairbrother & Rachman, 2003) in addition to feelings of anger and shame (Fairbrother, Newth, & Rachman, 2004). Although these studies did not ask participants whether they felt disgusted, disgust is one of the emotions included in the original conceptualization of mental pollution (Rachman, 1994, 2000). It is interesting to consider disgust in the context of mental pollution given the types of situations in which it seems to arise. While early research on disgust tended to focus on its role as a food-related emotion, more recent research has begun to elucidate its complexity. Specifically, it has been noted that anything that reminds humans of our animal nature (such as sexual deviance, body-envelope violations, poor hygiene or death) has the potential to evoke disgust, as do violations of important social and moral codes. Thus, individuals may feel disgusted by racism, hypocrisy, selfishness or lack of empathy (Haidt, McCauley, & Rozin, 1994; Haidt,
Rozin, McCauley, & Imada, 1997). Furthermore, Rozin and Nemeroff (1990) have described the phenomenon of interpersonal contamination, whereby an object is considered disgusting based on its association with a particular person. For instance, when asked, individuals are much less likely to wear a laundered sweater or use a thoroughly cleaned hairbrush if it was previously owned by someone they dislike than if it belonged to a close friend (Rozin & Nemeroff, 1990). This broadened view of disgust is interesting in the context of mental pollution because it suggests that people can feel disgusted by stimuli which, although objectively clean, are considered disgusting because they are perceived as socially or morally tainted. In mental pollution, people may fear contamination from such stimuli. The present study examined the array of negative emotions associated with mental pollution, including disgust, fear and anxiety.

Disgust sensitivity is an individual’s tendency to respond with disgust to a variety of stimuli. Numerous studies have supported a relationship between disgust sensitivity and contamination fear, as individuals who are more likely to experience disgust are also more likely to fear contamination (Mancini, Gragnani, & D’Olimpio, 2001; Olatunji, Sawchuk, Arrindell, & Lohr, 2005; Olatunji, Sawchuk, Lohr, & de Jong, 2004; Thorpe, Patel, & Simonds, 2003; Tsao & McKay, 2004). It was hypothesized that individuals high in disgust sensitivity would be more sensitive to feeling mentally polluted.

Anxiety sensitivity is an individual’s tendency to become anxious in response to his/her own anxiety sensations. It is conceptualized as a trait arising from the belief that anxiety sensations have harmful physical, psychological and/or social consequences (Reiss, Peterson, Garsky, & McNally, 1986). Anxiety sensitivity is thought to amplify an individual’s anxiety in response to threatening stimuli and has been associated with a number
of anxiety disorders, including panic, PTSD, social phobia, generalized anxiety disorder and obsessions (Cox, Fuentes, Borger, & Taylor, 2001; Taylor, 1999). Olatunji et al. (2005) found anxiety sensitivity to be a significant predictor of contamination fear. The present study examined whether individuals who have a tendency to misinterpret and catastrophize their physical sensations of anxiety would be more likely to feel dirty and want to wash in response to an upsetting mental image. Anxiety sensitivity was expected to be positively associated with mental pollution.

In examining predictors of mental pollution, the question inevitably arises as to whether traditional forms of contamination fear (i.e., fear of contamination by physical contact with a contaminant) also predicts mental pollution. Thus, are some individuals more sensitive to contamination, regardless of whether this contamination arises through direct physical contact or through mental imagery? The present study therefore examined whether physical contamination fears would be positively associated with mental pollution.

Another variable relevant to the context of contamination fear is fear of negative evaluation. Fear of negative evaluation refers to an individual’s apprehension at the prospect of being evaluated by others, especially negatively, as well as an individual’s avoidance of evaluative situations and expectations that he/she would be evaluated negatively by others (Watson and Friend, 1969). Fear of negative evaluation has been associated with a number of fears, including social phobia, blood-injury fears, as well as with trait anxiety (Taylor, 1993). Although no studies have examined the relationship between fear of negative evaluation and OCD, it may be an interesting variable to consider. Rachman (2004) observed that some patients with contamination fear develop intense social anxiety because they fear that if they become contaminated, others will evaluate them negatively or be repulsed by them.
It was therefore hypothesized that individuals who are high in fear of negative evaluation would become more distressed if contaminated and would have a stronger urge to rid themselves of this contamination (i.e., a stronger urge to wash).

In order to examine the association between the above-mentioned variables and mental pollution, the paradigm created by Fairbrother, Newth, & Rachman (2004), in which women imagined themselves experiencing a forced kiss by an undesirable man, was used to evoke feelings of mental pollution in the laboratory. Given this context, the role of sexual attitudes and prior experience with unwanted sexual contact were also assessed as possible predictors of contamination. As noted earlier, mental pollution often contains a moral element. Although all women likely consider the imagined event unpleasant, they may differ in the degree to which they consider the behaviour inappropriate or immoral. Thus, it is possible that women who hold more conservative sexual attitudes would consider the event a greater transgression against their value system and therefore feel more contaminated by it. This hypothesis was examined both by participants’ ratings of the inappropriateness of the man’s behaviour, as well as by a measure of conservative-versus-liberal sexual attitudes. Furthermore, given evidence of cultural differences in sexual attitudes (Kennedy & Gorzalka, 2002; Meston, Trapnell, & Gorzalka, 1998), ethnicity was examined as a possible predictor of mental pollution.

Because Fairbrother and Rachman (2003) found that deliberate recollection of an assault re-elicited feelings of dirtiness and urge to wash, prior experience with unwanted sexual contact was also examined. It was hypothesized that women with previous unwanted sexual experience might imagine the scenario more vividly, and therefore feel more contaminated by the imagined assault. The present study therefore examined whether women
who reported previous experience with unwanted sexual contact would exhibit stronger feelings of mental pollution than women without such experience.

Finally, a measure of neuroticism was included. Given that most of the predictor variables included in this study represented sensitivities to various stimuli, their co-occurrence may simply indicate the presence of an underlying sensitivity, such as neuroticism or trait anxiety, that more parsimoniously accounts for the relationship between the factors and mental pollution. For example, previous research has noted significant correlations between disgust sensitivity, anxiety sensitivity and neuroticism (Haidt et al., 1994; John & Srivasta, 1999). This association has led some theorists to speculate that the co-occurrence of disgust sensitivity and anxiety sensitivity may indicate an underlying sensitivity to respond negatively to a range of stimuli. In this view, contamination fears would be more accurately predicted from neuroticism or trait anxiety than disgust sensitivity and anxiety sensitivity. Support for this theory is still equivocal (Olatunji et al., 2005; Tsao & McKay, 2004; Woody & Teachman, 2000). Nevertheless, in order to account for this possibility, a measure of neuroticism was included.

The purpose of the present study was therefore to identify variables associated with individual differences in sensitivity to mental pollution. First, this study sought to replicate the Fairbrother, Newth, and Rachman (2004) experiment demonstrating that feelings of contamination could be elicited without physical contact with a contaminant. Second, this study assessed the relative strength of the above-noted variables in predicting individual differences in mental pollution.
Method

Participants

One hundred and twenty female undergraduate students at the University of British Columbia (UBC) participated in this study. They received one course credit for their participation. Only female students were included because the paradigm used to elicit feelings of mental pollution was designed specifically for women.

Materials

Mental Pollution Questionnaire: This questionnaire was developed by the author for the purposes of this study. Questions were formulated based on previous research in the area and on theoretical conceptualizations of mental pollution. The questionnaire assessed participants’ ability to imagine the scenario, feelings of dirtiness and urge to wash, negative emotions, and past experience with similar situations. For a copy of the questionnaire, the reader is referred to Appendix A.

Disgust Sensitivity Scale (Haidt, McCauley, & Rozin, 1994): This 32-item self-report questionnaire measures individual differences in sensitivity to disgust. It includes items sampling seven domains of disgust: animals, body products, death, envelope violations (injuries, wounds, etc.), food, hygiene and sex, as well as an eighth subscale assessing sympathetic magic. Half the items on this scale are in true/false format, while the other half are answered on a 3-point Likert scale (0 = not disgusting at all to 2 = very disgusting). Higher scores indicate greater disgust sensitivity. It has been shown to have good internal consistency (alpha = 0.84) and test-retest reliability (r = .79). Rozin, Haidt, MacCauley, Dunlop and Ashmore (1999) found that it correlated significantly with a behavioural measure.
of disgust sensitivity ($r = -.51$). In a recent study conducted at UBC, the mean score on this scale was 17.06 (SD = 5.07) (Dorfan & Woody, in press).

**Anxiety Sensitivity Index** (Peterson & Reiss, 1992) The Anxiety Sensitivity Index is a 16-item self-report questionnaire designed to measure anxiety sensitivity. Respondents are asked to rate their agreement with each item on a 5-point Likert scale (0=very little; 4=very much). Alpha coefficients for the Anxiety Sensitivity Index range from 0.82 to 0.91, while test-retest reliability ranges from .71 to .74 (Reiss, Peterson, Gursky, & McNally, 1986). Maller & Reiss (1992) found that scores on the Anxiety Sensitivity Index predicted the likelihood of a panic attack 3 years later.

**Contamination subscale of the Vancouver Obsessional Compulsive Inventory** (VOCI; Thordarson, Radomsky, Rachman, Shafran, & Sawchuk, 1997). For the purposes of the present study, only the Contamination subscale of the VOCI was included. This subscale consists of 11 items assessing fear of contamination and washing compulsions. For example, items include: “I feel very dirty after touching money”, “I avoid using public telephones because of possible contamination”, and “I spend far too much time washing my hands”. Respondents indicate their agreement with each statement on a 5 point scale ranging from “0”=“not at all” to “4”=very much so. Within a group of students, the VOCI Contamination subscale was found to have an alpha coefficient of .87 and a test-retest reliability of 0.52. This subscale also demonstrated good convergent and discriminant validity, correlating highly with the Contamination/Washing subscales of the Padua Inventory (PI) and Maudsley Obsessional Compulsive Inventory (MOCI), and correlating more weakly with the Beck Depression Inventory, the Beck Anxiety Inventory and unrelated subscales of the PI and
MOCI. Thordarson et al. (2004) found the mean score on this subscale to be 7.31 (SD = 6.82) in a sample of students and 19.41 (SD = 12.51) in patients with OCD.

**Brief Fear of Negative Evaluation** (Leary, 1983): The Fear of Negative Evaluation scale assesses the degree to which an individual feels apprehensive at the prospect of being negatively evaluated by others. It is a self-report questionnaire consisting of 12 items for which respondents rate on a 5 point scale the degree to which each statement is characteristic of themselves (1=not at all characteristic of me, 5=extremely characteristic of me). It has been shown to have excellent internal consistency and test-retest reliability (.97 and .94 respectively) (Collins, Westra, Dozois, & Stewart, 2005), and correlates highly with the original 30-item questionnaire (r = 0.96) (Leary, 1983). Collins et al. (2005) found the mean score on this measure to be 29.3 (SD = 8.2) in a community sample and 51.5 (SD = 7.3) in a sample of patients with social phobia.

**Emotional Stability subscale of the Big Five Inventory** (BFI; John, Donahue, & Kentle, 1991) The BFI is a 44-item self-report questionnaire designed to measure five major facets of personality: extraversion, agreeableness, conscientiousness, emotional stability and openness to experience. Respondents rate their agreement with each item on a 5-point Likert scale. The BFI has been shown to have adequate internal consistency (coefficient alpha=.83) as well as convergent and discriminant validity with other measures of the Big Five, namely the Trait Descriptive Adjectives and NEO Five Factor Inventory (John & Srivasta, 1999). For the purposes of the present study, only the 8 items pertaining to the trait of emotional stability (the opposite of neuroticism) were included. Items are scored in such a way that high scores on this measure indicate greater neuroticism.
Sexual Attitudes subscale of the Derogatis Sexual Functioning Inventory (DSFI; Derogatis, 1978). The Sexual Attitudes subscale of the DSFI assesses conservative versus liberal attitudes toward sexual issues, such as premarital and extramarital sex, various sexual practices, homosexuality, pornography and sexual morality. It is a self-report questionnaire consisting of 30 statement items. Respondents rate their degree of agreement with each statement on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). Higher scores indicate more conservative attitudes. It has been shown to have good internal consistency (alpha ranging from .81 to .86) and test-retest reliability (r = 0.96) (Derogatis & Melisaratos, 1979). This measure has been reported to be sensitive to cultural and gender differences in sexual attitudes among students at UBC (Kennedy & Gorzalka, 2002; Meston, Trapnell, & Gorzalka, 1998). Kennedy and Gorzalka (2002) found that the mean score on this subscale was 76.61 for Non-Asian women and 86.66 for Asian women.

Procedure

On arrival at the laboratory, participants received a brief introduction to the study and were given the consent form to read and sign. Participants then sat in a quiet room by themselves. The procedure consisted of two components, the order of which was counterbalanced across participants. One component was the questionnaire package, which consisted of demographic information, the Disgust Sensitivity Scale, the Anxiety Sensitivity Index, the Fear of Negative Evaluation scale, the Contamination subscale of the VOCI, the neuroticism measure and the Sexual Attitudes scale. Questionnaires were randomly ordered to control for possible order effects. The only exception to this rule was the demographics questionnaire, which consistently appeared first. To ensure participants' privacy, all were provided with a sealable envelope in which to place their completed questionnaires.
The second component of this study consisted of the mental pollution manipulation. First, participants rated their baseline level of anxiety. They then listened to the mental pollution audiotape developed by Fairbrother, Newth, & Rachman (2004). This tape describes 2 scenarios that occur at a party. One involves a consensual kiss between the protagonist and a man, the second a non-consensual kiss. The non-consensual kiss is the stimulus meant to elicit feelings of mental pollution. Copies of the tape scripts are included in Appendix B. Participants were asked to imagine themselves as vividly as possible as the protagonist in the scenario. They then completed the Mental Pollution Questionnaire.

Women were randomly assigned to either the consensual (n = 20) or non-consensual (n = 100) condition. After completing the Mental Pollution Questionnaire, participants were given a 5-minute break. They were invited to help themselves to some water (which was left in the laboratory) and were given directions to the washroom. After the break, participants filled out a form that asked them whether they drank anything or washed, and, if so, why. A copy of this form is available in Appendix C.

Following completion of both components of the study, participants were debriefed and were given the opportunity to ask questions about the study.
Results

The study involved two groups: women in the consensual condition and those in the non-consensual condition. Dependent variables included the 3 indices of mental pollution (dirtiness, urge to wash and rinsing), as well as negative emotions. Predictor variables were scores on the Anxiety Sensitivity Index, the Disgust Sensitivity Scale, the Contamination subscale of the VOCI, the Fear of Negative Evaluation scale, the Sexual Attitudes subscale of the DSFI and neuroticism. Prior experience with unwanted sexual contact and ethnicity also served as predictor variables.

Sample Characteristics

Women who participated in this study were, on average, 20.73 years old (SD = 4.73). One hundred and fifteen participants described themselves as heterosexual, 4 as bisexual and 1 as lesbian. Sixty-one women reported that they were currently involved in a romantic relationship, and the mean duration of this relationship was 2.37 years (SD = 4.56).

In order to assess whether randomization was attained in assigning participants to either condition, ANOVAs were performed with condition as the fixed factor and questionnaire data as the dependent variables. The homogeneity of variance assumption was assessed using Levene's test. This test calculates the likelihood that differences in variance between 2 or more groups occurred by chance. P values less than .05 indicate that there is a less than 5% probability that these differences occurred by chance and imply that the groups' variances differ significantly from one another. If there are equal numbers of participants in each group, the F test is robust with respect to violations of the homogeneity of variance assumption. If, however, groups differ in size, unequal variances can systematically bias the F-test. If the larger group has the larger variance, the F-test is conservatively biased, leading
to an increased likelihood of Type II error. If the smaller group has the larger variance, the F-test is liberally biased, leading to an increased likelihood of Type I error. Bias can be corrected by calculating the F statistic using Welch’s procedure, a formula which adjusts the degrees of freedom and power of the F-test. In the following analyses, F tests calculated with Welch’s procedure are indicated by F’.

One-way ANOVAs revealed that women in the consensual group did not differ from those in the non-consensual group on anxiety sensitivity (F (1, 118) = 0.20, p = .65, d = 0.11), disgust sensitivity (F’ (1, 16.83) = 1.68, p > .10, d = 0.41), contamination fear (F (1, 118) = 1.12, p = .29, d = 0.26) or sexual attitudes (F (1, 118) = 2.34, p = .13, d = 0.37). However, participants in the non-consensual group scored higher than those in the consensual group on neuroticism (F (1, 118) = 4.43, p = .04, d = 0.52) and fear of negative evaluation (F (1, 118) = 5.98, p = .02, d = 0.60). Means and standard deviations are presented in Table 1. To control for group differences on these measures, neuroticism and fear of negative evaluation were entered as covariates in subsequent analyses performed between the conditions.

Another ANOVA revealed that baseline anxiety did not differ across conditions (F (1, 118) = 0.40, p = .53, d = 0.07). Means and standard deviations are presented in Table 2.

The vividness with which participants imagined the scenario was also assessed. Vividness ratings were calculated by averaging participants’ scores on the following 3 questions: “How easy was it to imagine the scenario in your mind”, “How clear/vivid was the imagined scenario” and “How realistic was the imagined scenario”. Coefficient alpha for these 3 items was good at 0.76, and most participants reported imagining the event quite
vividly (mean = 3.88, SD = 0.71). Vividness ratings did not differ across conditions (F (1, 116) = .003, p = .95).

Manipulation check: eliciting feelings of mental pollution

The ability of the audiotape manipulation to evoke feelings of mental pollution was then examined. Firstly, an ANOVA was performed with participants’ rating of dirtiness (item #2 on the Mental Pollution Questionnaire) as the dependent variable, condition as the fixed factor and neuroticism and fear of negative evaluation as covariates. The non-consensual group reported significantly stronger feelings of dirtiness than the consensual group (F (1, 116) = 57.31, p < .01, d = 2.00). The means and standard deviations are presented in Table 2.

Secondly, urge to wash ratings were assessed across conditions. The Mental Pollution Questionnaire included 5 items tapping this construct (the first 5 options in item #4 on this questionnaire). To determine whether a more reliable indicator of urge to wash could be calculated by aggregating item scores, the interitem reliability coefficient was calculated. Coefficient alpha for the 5 washing items was high at 0.89, suggesting that the most reliable indicator of urge to wash was the aggregate of these items. A composite was therefore created by averaging participants’ responses across the 5 washing items.

To assess the effect of the manipulation on urge to wash, an ANOVA was performed with urge to wash as the dependent variable, condition as the fixed factor and neuroticism and fear of negative evaluation as covariates. Women in the non-consensual condition reported a stronger urge to wash than those in the consensual condition (F' (1, 10.42) = 140.18, p < .01, d = 2.14). The means and standard deviations are presented in Table 2.

Finally, in order to examine the effect of the manipulation on actual rinsing, I divided participants into two groups: “rinsers” and “non-rinsers”. “Rinsers” consisted of participants
who drank something in order to reduce physical sensations in their mouth (n = 25) (on the rinsing questionnaire in Appendix C, they responded “yes” to 1.a and checked the first box of 1.b). and/or washed in order to get rid of feelings of dirtiness (n = 3) (on the rinsing questionnaire, they responded “yes” to at least one of the items in 2.a and checked the second box of 2.b). “Non-riners” consisted of participants who did not drink anything (n = 49), drank because they were thirsty (n = 35), drank but did not know why (n = 12), and people who did not wash (n = 94), washed because they had just used the washroom (n = 21) or washed but did not know why (n = 1). Twenty-seven women were categorized as rinsers and 93 as non-riners. Riners were only found within the non-consensual condition.

The results show that the manipulation had a powerful effect on participants. Women in the non-consensual group reported stronger feelings of dirtiness and urge to wash than those in the consensual group, and 27 women in the non-consensual condition rinsed after listening to the tape.

*Relationships among indices of mental pollution*

In order to explore how well the indices of mental pollution held together, relationships among these 3 variables (dirtiness, urge to wash and rinsing) were examined. Dirtiness and urge to wash were significantly correlated with one another (r = .69, p < .01 in the whole sample; r = .49, p < .01 in the non-consensual condition). All rinsers reported at least some feelings of mental pollution, scoring at least 2.00 on dirtiness and 1.60 on urge to wash, and were only found in the non-consensual condition. However, within the non-consensual condition, ANOVAs revealed that rinsers did not differ from non-riners on self-reported dirtiness (F (1, 98) = 0.90, p = .34, d = 0.22) or urge to wash (F (1, 98) = 0.30, p = .59, d = 0.12).
Negative emotions associated with mental pollution

The array of negative emotions associated with mental pollution was then examined. Negative emotion items were significantly correlated with one another (0.22 < r’s < .85, p’s < .01). To determine whether participants’ emotional experiences could be summarized into a smaller number of more reliable indices, a principal components analysis with oblique rotation was performed. All 9 negative emotion items were entered as variables. Two components emerged, and the eigenvalues for the rotated solution were 4.03 and 3.93. Component loadings and communalities are displayed in Table 3. As can be seen, “distressed/anxious”, “disgusted by the man’s physical attributes”, “disgusted by the man’s behaviour” and “angry” loaded onto one component. This component was termed “Disgust/Anger” and seems to represent more externally-focused emotions. “Ashamed/guilty”, “humiliated”, “afraid”, “sad” and “cheap/sleazy” loaded onto a second component. This component was termed “Shame/Sadness” and seems to represent more self-focused emotions. Coefficient alpha for Disgust/Anger was .90 and for Shame/Sadness was .87, while the correlation between the 2 components was .43. This pattern of correlations indicates that the 2-component solution had good convergent and divergent validity. For purposes of analyses, participants’ scores on the negative emotion items were averaged across items within each factor. Thus, each participant received two negative emotions scores: their average score on the 4 items within Disgust/Anger and their average score on the 5 items within Shame/Sadness.

To examine the effect of the audiotape manipulation on participants’ emotions, ANOVAs were performed with condition as the grouping variable and with neuroticism and fear of negative evaluation as covariates. The non-consensual group scored significantly
higher than the consensual group on Disgust/Anger (F’(1, 1.86) = 435.24, p < .01, d = 4.49) and Shame/Sadness (F’(1, 3.37) = 37.16, p < .01, d = 1.17). Means are displayed in Table 2. These results demonstrate that the manipulation evoked an array of negative emotions, including disgust, anger, shame and sadness.

The relationship between negative emotions and mental pollution was also examined. Within the non-consensual condition, Disgust/Anger and Shame/Sadness were both significantly correlated with feelings of dirtiness (n = 100, r = .429, r = .470, p < .01 respectively) and urge to wash (n = 100, r = .349, r = .287, p < .01, respectively). Furthermore, ANOVAs conducted within the non-consensual condition revealed that rinsers scored significantly higher than non-rinsers on Shame/Sadness (F(1, 98) = 5.15, p = .03, d = 0.52), but not on Disgust/Anger (F(1, 98) = 0.71, p = .40, d = 0.20). The latter null finding is likely due to a ceiling effect, as participants in the non-consensual condition scored on average 4.09 (SD = .70) on Disgust/Anger. Overall these results suggest that feelings of mental pollution were associated with an array of negative emotions, including Disgust/Anger and Shame/Sadness.

**Predicting Individual Differences: Traits Associated With Mental Pollution**

Predictors of individual differences in mental pollution were then examined within the non-consensual condition. First, correlations were performed between questionnaire data and both dirtiness and urge to wash ratings. The correlation matrix is presented in Table 4. As shown, dirtiness correlated significantly with anxiety sensitivity (r = .28, p < .01 one-tailed), disgust sensitivity (r = .29, p < .01 one-tailed), contamination fear (r = .33, p < .01 one-tailed) and neuroticism (r = .17, p = .05). These four measures were then entered into a multiple regression analysis with dirtiness as the dependent variable. The model explained
16.7% of the variance in dirtiness (n = 100, $R^2 = .17$, $R^2_{adj} = .13$, $F (4, 95) = 4.77$, $p < .01$).

Within the context of these intercorrelated variables, contamination fear was the strongest predictor of dirtiness (Beta = 0.27, $t (95) = 2.31$, $p = .02$), followed by disgust sensitivity (Beta = 0.190, $t (95) = 1.76$, $p = .08$). Anxiety sensitivity and neuroticism did not provide unique variance in predicting dirtiness within this equation (Beta = .16, $t (95) = 1.43$, $p = .16$, and Beta = - 0.01, $t (95) = - 0.05$, $p = .70$, respectively). Urge to wash was correlated only with contamination fear (n = 100, $r = .36$, $p < .01$). These results suggest that contamination fear is the strongest predictor of self-reported dirtiness and urge to wash.

Predictors of rinsing were then examined. ANOVAs were performed with rinsing as the grouping variable and questionnaire data as the dependent variables. As displayed in Figure 1, rinsers scored significantly higher on fear of negative evaluation ($F' (1, 5.55) = 10.77$, $p < .025$, $d = 0.61$) than non-riners. There were also trends for rinsers to score higher on neuroticism ($F (1, 98) = 3.29$, $p = .07$, $d = 0.41$) and anxiety sensitivity ($F (1, 98) = 3.55$, $p = .06$, $d = 0.43$). There were no significant differences on disgust sensitivity ($F' (1, 22.23) = 1.62$, $p > .05$, $d = 0.25$), contamination fear ($F (1, 98) = 0.10$, $p = .76$, $d = 0.07$) or sexual attitudes ($F (1, 98) = 0.003$, $p = .96$, $d = .01$). Means are displayed graphically in Figure 1.

*Previous experience with unwanted sexual encounter*

The impact of previous experience with unwanted sexual contact on mental pollution was also examined. I divided participants into two groups based on whether they had "previously experienced an unwanted sexual encounter, such as a kiss", or not (item #11 on the Mental Pollution Questionnaire). Within the entire sample, 59 women reported such an experience, 47 of which fell into the non-consensual condition. Sixty-one women reported no previous unwanted sexual contact. Within the non-consensual condition, one-way ANOVAs
revealed that women with previous unwanted sexual contact (PUSC) imagined the scenario more vividly ($F(1, 98) = 14.73, p = .00, d = 0.77$), but did not report stronger feelings of dirtiness ($F(1, 98) = 0.01, p = .91, d = 0.02$), urge to wash ($F(1, 98) = 1.14, p = .29, d = 0.21$) or negative emotions (Disgust/Anger: $F(1, 98) = 1.21, p = .27, d = 0.23$ and Shame/Sadness: $F(1, 98) = .04, p = .85, d = 0.04$). They did, however, have a stronger tendency to rinse than individuals without PUSC ($\chi^2 = 3.78, p = .05$). Within the non-consensual condition, 17 of 47 women (36.17%) with PUSC rinsed, whereas only 10 of 53 women (18.87%) without PUSC rinsed. This finding was not due to differences in fear of negative evaluation, as women with PUSC scored no differently from women without PUSC on fear of negative evaluation ($F(1, 118) = 0.00, p = .99, d = 0.00$). Furthermore, the increased vividness with which women with PUSC imagined the scenario did not account for their increased likelihood of rinsing, as rinsers did not imagine the scenario more vividly than non-riners ($F(1, 98) = 1.06, p = .31, d = 0.24$).

**Inappropriateness ratings**

The association between participants' ratings of the inappropriateness of the man's behaviour and mental pollution were also examined. Analyses were performed within the non-consensual condition. Inappropriateness ratings did not correlate significantly with dirtiness ($n = 100, r = .10, p = .35$) or urge to wash ($n = 100, r = .03, p = .75$). Furthermore, rinsers did not rate the man's behaviour as more inappropriate than non-riners ($F(1, 98) = 0.02, p = .89, d = 0.03$). However, inappropriateness ratings were positively correlated with negative emotions (Disgust/Anger: $n = 100, r = .46, p < .01$; and Shame/Sadness: $n = 100, r = .21, p = .04$). These results suggest that, although the degree to which participants judged the
man’s behaviour to be inappropriate was not associated with indices of mental pollution, this rating was associated with negative emotions.

Cultural differences in mental pollution

The role of ethnicity in mental pollution was also examined. Fifty-eight women reported their ethnicity as Caucasian, 49 as East or Southeast Asian, 4 as mixed Asian and Caucasian, 7 as Indian, 1 as Pakistani and 1 as African. Because the number of participants in the last 4 categories was small, only differences between Caucasian and East or Southeast Asian (hereon simply referred to as “Asian”) participants were examined. This decision was also in keeping with previous research at UBC which found differences in sexual attitudes between Non-Asian and East or Southeast Asian students (Meston, Trapnell, & Gorzalka, 1998; Kennedy & Gorzalka, 2002).

To assess the effect of ethnicity on mental pollution, ANOVAs were performed within the non-consensual condition with ethnicity as the fixed factor and dirtiness and urge to wash as dependent variables. This analysis was restricted to the non-consensual condition, as this was the condition meant to evoke feelings of mental pollution. Although it may also be interesting to examine cultural differences in response to the consensual condition, the number of participants was too small in this condition to permit such an analysis (there were 4 Asians and 14 Caucasians in this condition). ANOVAs within the non-consensual condition revealed that there was no effect of ethnicity on dirtiness ($F(1, 88) = 1.07, p = .31, d = 0.22$), but that there was a trend for Asians to report a stronger urge to wash than Caucasians ($F(1, 88) = 3.60, p = .06, d = 0.39$). In terms of rinsing, a chi squared test revealed that Asians were no more likely to rinse than Caucasians ($\chi^2(1) = 0.00, p = 1.00$). Thus, ethnicity was not a significant predictor of individual differences in mental
pollution. Furthermore, there was also no significant effect of ethnicity on negative emotions. One-way ANOVAs revealed that there were no cultural differences on Disgust/Anger (F (1, 88) = 2.10, p = .15, d = 0.30), although that there was a trend for Asians to score higher on Shame/Sadness than Caucasians (F (1, 88) = 2.77, p = .10, d = 0.38).

Cultural differences on questionnaire data were also explored. ANOVAs were performed with ethnicity as the fixed factor and questionnaire scores as dependent variables. These analyses revealed that Asians scored significantly higher than Caucasians on all questionnaire measures (neuroticism (F (1, 104) = 10.51, p < .01, d = 0.63), Anxiety Sensitivity Index (F (1, 104) = 8.31, p < .01, d = 0.74), Disgust Sensitivity Scale (F (1, 104) = 13.79, p < .01, d = 0.72), Contamination subscale of the VOCI (F (1, 104) = 12.68, p < .01, d = 0.69), Fear of Negative Evaluation (F’ (1, 102.71) = 4.18, p < 0.5, d = 0.39) and Sexual Attitudes subscale of the DSFI (F (1, 104) = 16.49, p < .01, d = 0.79).
Discussion

Previous research demonstrated that feelings of contamination could be evoked without physical contact with a contaminant. This study replicated and extended this finding by identifying individual difference variables associated with an increased propensity to feel mentally polluted. Discussion will focus on the study’s major findings, including relevant methodological issues and implications for future research.

Firstly, this study revealed that self-reported dirtiness and urge to wash were best predicted by the Contamination subscale of the VOCI, a measure of physical contamination fears. This association suggests that people who fear one type of contaminant also tend to fear other types of contaminants. This finding would be consistent with the hypothesis that some people may possess an underlying sensitivity to contamination. If confirmed, this sensitivity would likely be revealed by a tendency to avoid, and become anxious in response to, a range of potential sources of contamination (both physical and mental). Some of the cognitions associated with such a sensitivity may include a tendency to overestimate the likelihood of becoming contaminated and the negative consequences associated with contamination. Broader traits that might contribute to contamination sensitivity include disgust sensitivity and anxiety sensitivity. Future research should explore these possibilities.

Results also indicated that rinsing was most strongly associated with fear of negative evaluation. This finding suggests that, in individuals who feel mentally polluted, those who are also concerned about others’ evaluations of them are more likely to rinse to try to get rid of that contamination than those who do not have such social concerns. This finding would be consistent with the hypothesis that there is social component to rinsing, although more research would be necessary to confirm this hypothesis. For example, an experimental study
assessing whether individuals who feel contaminated are more likely to wash if they feel that they are in, or about to enter, a socially evaluative situation may prove enlightening.

Methodological issues must also be considered when interpreting the relationship between fear of negative evaluation and rinsing. It is possible, for instance, that individuals who fear negative evaluation from others may feel more pressure to respond in socially desirable ways. In the present study, a socially desirable response may be to report drinking in order to reduce physical sensations evoked by a disturbing tape rather than simply because one is thirsty. This study tried to reduce this possibility by having participants fill out a form of whether and why they rinsed rather than having the experimenter ask them. Furthermore, if this association were simply the result of socially desirable responding then one might expect fear of negative evaluation to also be correlated with self-reported dirtiness and urge to wash, which it was not. More experimental research, such as studies that vary the social context and the potential for negative evaluation, may further elucidate the social component of rinsing.

It is interesting that, although rinsers were only found within the non-consensual condition, they did not differ from non-rinsers on reported dirtiness or urge to wash. This lack of relationship may be due to a ceiling effect, as individuals in the non-consensual condition generally reported rather strong feelings of dirtiness and urge to wash. A second possibility is that it may indicate a threshold effect, whereby as long as individuals feel somewhat dirty and want to wash, then other variables, such as the social context and their concern about others evaluation of them, come into play to predict rinsing. Thirdly, this lack of relationship may simply highlight the natural distinction between an individual's subjective feelings of distress and how he/she chooses to respond to those feelings. Some
women may have felt contaminated, but chosen not to respond to those feelings. Others may have cleansed themselves in ways other than rinsing, such as chewing gum or engaging in some cognitive form of neutralization. Still others may have rinsed without being aware that they were rinsing. For instance, how might we understand the behaviour of an individual who suddenly becomes thirsty and drinks after listening to the tape, but does not perceive the two events as connected?

Furthermore, contamination fear was not associated with rinsing, despite its association with dirtiness and urge to wash. This discrepancy may be due to a method effect; the self-reported measure of contamination fear was correlated with self-reported measures of mental pollution, but not with the behavioural measure of mental pollution (rinsing). One difficulty in this interpretation is that rinsing could be construed as self-reported because participants were categorized as rinsers based on their self-reported reasons for drinking or washing. Furthermore, rinsing was predicted by a different self-report measure: that of fear of negative evaluation. A second possibility is that physical contamination fears are simply not strong predictors of mental pollution. Although the contamination fear was the strongest predictor of self-reported dirtiness and urge to wash, it accounted for a relatively small amount of the variance in these indices. The fact that contamination fear was not associated with rinsing may simply highlight the discrepancy between physical and mental contamination fears. A third possibility is that some participants may have felt somewhat torn during the behavioural test of mental pollution. In the behavioural test, participants were provided with a jug of water, some disposable cups, and were given directions to the public washroom. Women with contamination fears may have been reluctant to clean themselves with such supplies, preferring instead to wait until the experiment was over to rinse or wash.
If so, these contamination concerns may explain why contamination fear was not associated with rinsing in this study.

If future research confirms the association between fear of negative evaluation and rinsing, important insights into the cognitions associated with excessive washing may be gained. Firstly, it would suggest that one of the feared consequences of mental pollution is negative social evaluation. Knowing this underlying fear would allow for better prediction of washing behaviour and for more accurate targeting of fears during treatment. It would also be consistent with Rachman’s (1994) conceptualization of mental pollution. Rachman (1994) proposed that, unlike physical forms of contamination in which individuals may fear contracting a disease, mental pollution seldom involves fears that are “life-threatening”. This is because mental pollution does not involve physical germs. Rather, the source of the contamination is human and the dirtiness has a social and/or moral quality. Rachman (1994) suggested that one of the fears associated with mental pollution is that of a mental breakdown and linked this to the “powerful intrusiveness” and “incomprehensibility” of the experience.

In the present study, participants only experienced mental dirtiness on one occasion, making it unlikely that they would develop such concerns. Fears of a mental breakdown likely only develop in individuals with recurrent and persistent experiences of mental pollution. Whether fear of negative social evaluation is a central fear in mental pollution is a question that must be left to future research. It may be interesting to consider whether a relationship exists between the specific source of mental contamination and the consequences that the individual fears. For example, it is possible that mental pollution triggered by memories of a sexual assault is associated with a different set of fears than that triggered by the sight of a disliked
other or by one’s own obsessions. More research is needed before such questions can be answered.

Secondly, the relationship between fear of negative evaluation and rinsing would suggest that these individuals believe that others can tell if they feel contaminated. This is interesting within the context of mental pollution, because the contamination is not physical in nature and therefore not visible to anyone. Why would these individuals believe that others can see their internal dirtiness? This belief may be related to a phenomenon found in social anxiety, whereby individuals use internal cues to infer how others view them. For example, social phobics have been found to use somatic sensations, such as body temperature or heart rate, to infer how anxious they appear to others (see Clark, 2001 for a brief review). A similar process may occur in mental pollution, whereby socially anxious individuals use internal sensations, such as how dirty they “feel”, to infer how dirty they appear to others. An alternative possibility is that the belief relates to thought-action fusion (TAF), a phenomenon found in OCD. TAF refers to the tendency for some individuals to fuse thoughts with actions. For example, a person may believe that having a thought about an event increases the likelihood of that event occurring, or that having a thought about doing something is the moral equivalent to actually performing that action (for a review, see Shafran & Rachman, 2004). In the present context, some people may believe that having a thought about contamination is the equivalent to being contaminated. Future research should assess these possibilities.

Thirdly, a relationship between fear of negative evaluation and rinsing would suggest that rinsers believe that others will evaluate them negatively if they become contaminated. This implies a belief that there is something socially unacceptable about being contaminated.
The specific meanings individuals attach to contamination are likely varied and may be idiosyncratic. What is likely consistent is a belief that being contaminated reveals something meaningful and important about oneself. This type of appraisal has been implicated in the development and maintenance of obsessional thinking (Rachman, 1997, 1998). In the context of mental pollution, the belief that being contaminated reveals something important about oneself may increase emotional distress and lead to greater washing compulsions. An exploration of the meanings individuals attach to their contamination and the outcomes associated with various appraisals may prove enlightening.

It is interesting to consider the finding that rinsers were more likely to report feelings of Shame/Sadness than non-rinners, and that these feelings were correlated with self-reported dirtiness and urge to wash. One possibility is that women reporting these emotions were shouldering part of the responsibility for the assault. If so, this would suggest that people who accept blame for an assault and feel negatively about themselves as a result, may be more likely to feel mentally polluted by it. Including a question about participants’ judgments of their own behaviour in this scenario may shed light on this hypothesis. An alternative possibility is that these women felt ashamed and cheap simply because of their association with a despicable character. As Rozin and Nemeroff’s (1990) research on interpersonal contamination has shown, people can feel contaminated by things, which, although objectively clean, are perceived as contaminated based on their association with particular people. Women in this study may have felt negatively about themselves because they felt that contact with this man (although only imaginal), somehow tarnished them and rendered them the object of disgust. This self-disgust would then lead to feelings of shame and sadness. A third possibility is that depressive symptoms account for the relationship between mental
pollution and feelings of Shame/Sadness. Women who are depressed may be more likely to feel ashamed and sad, as well as be more likely to develop feelings of contamination and to engage in compulsive behaviour, such as washing. Previous research has found a strong relationship between OCD and depression (Crino & Andrews, 1996; Nestadt et al., 2001; Ricciardi & McNally, 1995; Sanderson, DiNardo, Rapee, & Barlow, 1990). Ricciardi and McNally (1995) found that although most patients seemed to become depressed after the onset of their OCD, others developed depression at the same time or before the onset of their OCD. Salkovskis (1985) proposed that negative mood may facilitate the development of OC symptoms by increasing the accessibility of negative automatic thoughts and increasing discomfort. Future research on mental pollution should include a measure of depressive symptoms.

This study also showed that individuals who reported a previous unwanted sexual experience were more likely to rinse than individuals who did not report such an experience. These women also tended to imagine the scenario more vividly, although this factor did not seem to moderate this relationship. It is possible that listening to the tape re-elicited memories of their previous unwanted experience, which in turn triggered their rinsing. Future research may wish to ask participants whether listening to the tape re-evoked these memories. In the present study, participants were only asked about past unwanted experience after listening to the tape, thus reducing the potential priming effect such a question may have had. Another factor that may be interesting to consider is the type of previous unwanted sexual contact. In the current study, participants were simply asked whether they had “experienced an unwanted sexual encounter, such as a kiss”. The question was posed broadly in order to capture the range of experiences that participants might report and to reduce
potential labelling effects. However, it is not known whether the specific type of unwanted contact, or the severity of the assault, played a role in whether participants rinsed.

Participants’ rating of the inappropriateness of the man’s behaviour was not associated with any of the indices of mental pollution. This null finding is likely due to a ceiling effect, as participants in the non-consensual condition generally agreed that the behaviour was highly inappropriate. Furthermore, there was no relationship between sexual attitudes and mental pollution, although conservative sexual attitudes were correlated with feelings of Shame/Sadness. This finding suggests that although sexual attitudes may predict the degree to which individuals experience negative self-focused emotions in response to the imagined assault, these attitudes do not predict the extent to which an individual feels contaminated it. This finding may indicate that feelings of mental pollution are unrelated to an individual’s value system. However, given that nearly everyone considered the behaviour inappropriate, this theory is difficult to assess in the present study. In order to examine this hypothesis, greater variability would need to be introduced into participants’ ratings of the man’s behaviour. For instance, behaviours that are less clear violations of social norms may better elucidate the role of moral values in predicting individual differences in mental pollution.

It may also be important to consider participants’ attitudes toward non-consensual sexual behaviour. In this study, women’s sexual attitudes were assessed with respect to consensual activities whereas the tape described a non-consensual act. It may be interesting to examine the relationship between post-assault feelings of contamination and attitudes toward non-consensual sexual activities. For example, acceptance of rape myths has been shown to predict the amount of blame individuals attribute to victims of sexual assault.
(Mason, Riger, & Foley, 2004). It may be that individuals who endorse rape myths are more likely to accept responsibility for an assault, and are therefore, more likely to feel mentally contaminated by it. An assessment of attitudes toward non-consensual sexual activities, coupled with ratings of self-blame, may prove enlightening in this respect.

Previous research has found cultural differences in sexual attitudes (Meston, Trapnell, & Gorzalka, 1998; Kennedy & Gorzalka, 2002). The present study replicated this finding, and, in addition, found cultural differences in fear of negative evaluation, contamination fear, disgust sensitivity, anxiety sensitivity and neuroticism. There were no cultural differences in mental pollution, except for a trend for Asian participants to report a stronger urge to wash than Caucasians. This increased urge to wash may be explained by Asian participants’ elevated scores on contamination fear, although it is not clear why there were no parallel group differences in ratings of dirtiness. As research in this area grows, a clearer picture of the potential mechanisms through which culture may influence mental pollution will likely emerge. The results of this study suggest that future research should continue to examine culture as a potential contributing factor to individual differences in contamination fears.

It is interesting that in addition to scoring more conservatively on sexual attitudes, Asians also scored higher than Caucasians on all other questionnaire measures included in this study. Some researchers have reported similar cultural differences in self-reported disgust sensitivity (Haidt, McCauley, & Rozin, 1994), anxiety sensitivity (Weems, Hayward, Killen, & Taylor, 2002) and fear of negative evaluation (Sue, Ino, & Sue, 1983; Sue, Sue, & Ino, 1990). As far as I am aware, no studies have examined differences between Asians and Caucasians on self-report measures of contamination fear. Chan (1989) assessed scores on the MOCI among medical students in Hong Kong and compared these values to those
obtained in a previous study conducted in England by Hodgson and Rachman in 1977. Scores were reported for each of the four subscales of the MOCI: checking, cleaning, slowness and doubting. On the cleaning subscale (which, although not synonymous with contamination fear, is often related to it) Chinese students scored lower (mean = 2.79) than English OCD patients (mean = 5.55), but similarly to English anxious controls (mean = 2.38). Unfortunately, no comparisons were made between Chinese students and a matched sample of English students.

The broader question of whether there are cultural differences in the prevalence of OCD has been examined. The Cross National Collaborative Group (1994) assessed the prevalence rates of OCD in community samples of adults in 7 countries (the United States, Canada, Puerto Rico, Germany, Taiwan, Korea and New Zealand). Similar prevalence rates were found across these countries, with annual prevalence rates ranging from 1.1% to 1.8%, and lifetime prevalence rates ranging from 1.9% to 2.5%. The only exception to this finding was Taiwan, which had significantly lower annual (0.4%) and lifetime (0.7%) prevalence rates of OCD. Another study by Chen, Wong, Lee, Chan-Ho, Lau and Fung (1993) examined the prevalence rate of various psychiatric conditions in a community sample of adults in Hong Kong. The lifetime prevalence rate of OCD was 1.22% among women and 0.87% among men, figures similar to, or lower than, those reported by the Cross National Collaborative group. These findings fail to support the hypothesis that there is an increased incidence of OCD symptoms among Asians as compared to Caucasians.

The question of why Caucasians and Asians differed on all questionnaire measures is beyond the scope of the present study and an entire area of inquiry in itself. Numerous possibilities exist. One possibility is that actual cultural differences exist on these constructs.
If so, one might wish to explore the beliefs and social forces within a culture that contribute to these differences. This explanation might accurately account for cultural differences on some variables, such as sexual attitudes, which are strongly influenced by cultural and family values. However, the explanation becomes less compelling when one considers the fact that systematic differences were found on all standardized measures included in this study, including those assessing broad personality traits such as neuroticism. An alternative (but not mutually exclusive) explanation for the observed cultural differences is that people might differ in how they respond to self-report questionnaires. For example, there may be cultural differences in the importance placed on socially desirable responding, or on the types of behaviours and traits that are considered socially desirable. Furthermore, people may use different norms when rating their own behaviour, some comparing themselves to their peers, others to their perception of the dominant culture. Understanding the mechanisms that account for cultural differences on these measures will be an important step in assessing whether these measures retain their validity across cultures, a premise that is perhaps too often simply assumed.

The present study contributes to a growing body of literature demonstrating that feelings of contamination can be evoked without physical contact with a contaminant. This line of research suggests that our understanding of contamination fear should be expanded beyond physical contact with contaminants to include non-physical stimuli and/or non-physical contact with stimuli as potential sources of distress. This study, more specifically, suggests that individuals who are sensitive to physical contaminants and who fear negative evaluation from others may possess an increased vulnerability to mental pollution. Future
research should explore the possibility of a sensitivity to contamination, as well as investigate the social aspects of washing.

One of the strengths of this study is that it examined several predictors simultaneously, allowing for an analysis of their relative influence on mental pollution. Bringing these variables together, a preliminary model of their relationship to mental pollution can be drawn. As noted above, contamination fear predicts subjective feelings of mental pollution (dirtiness and urge to wash). Disgust sensitivity and anxiety sensitivity, in turn, contribute to contamination fear. Among people who feel mentally polluted, fear of negative evaluation then predicts rinsing. Finally, neuroticism can be viewed as a broad personality trait that contributes to each of the sensitivities serving as predictor variables.

Future research should confirm and expand upon the components of this model. Other variables to explore include aspects of the situation (such as the social context), as well as within-person variables (such as sensitivity to contamination or depressive symptoms). The paradigm used in this study to elicit feelings of mental pollution was clearly a very powerful manipulation. However, developing other paradigms, such as those that would be appropriate for use among men, would provide us with a greater understanding of the necessary and sufficient conditions under which mental pollution arises.

This research may also contribute importantly to the clinical domain. Although great strides have been made in treatments for OCD, lower success rates for individuals with contamination fear (Coelho & Whittal, 2001) suggests that continued research is necessary. If sensitivity to contamination emerges as a significant vulnerability factor for contamination fears, treatment should target this trait. Furthermore, understanding and addressing
underlying fears, such as fear of negative evaluation, is likely to improve treatment outcome for contamination fearful patients.
References


Table 1

Sample Means and Standard Deviations on Questionnaire Data

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<thead>
<tr>
<th>Questionnaire Measure</th>
<th>Mean</th>
<th>SD</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neuroticism subscale of the BFI</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consensual</td>
<td>21.35</td>
<td>6.26</td>
<td>20</td>
</tr>
<tr>
<td>Non-Consensual</td>
<td>24.59</td>
<td>6.29</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>24.05</td>
<td>6.38</td>
<td>120</td>
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<tr>
<td>Anxiety Sensitivity Index</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Consensual</td>
<td>18.90</td>
<td>10.60</td>
<td>20</td>
</tr>
<tr>
<td>Non-Consensual</td>
<td>19.89</td>
<td>8.59</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>19.73</td>
<td>8.91</td>
<td>120</td>
</tr>
<tr>
<td>Disgust Sensitivity Scale</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consensual</td>
<td>16.40</td>
<td>6.67</td>
<td>20</td>
</tr>
<tr>
<td>Non-Consensual</td>
<td>18.42</td>
<td>4.48</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>18.08</td>
<td>4.94</td>
<td>120</td>
</tr>
<tr>
<td>Contamination subscale of the VOCI</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consensual</td>
<td>7.15</td>
<td>6.75</td>
<td>20</td>
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<tr>
<td>Non-Consensual</td>
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<td>6.25</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>8.52</td>
<td>6.34</td>
<td>120</td>
</tr>
<tr>
<td>Fear of Negative Evaluation scale</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Consensual</td>
<td>33.95</td>
<td>10.26</td>
<td>20</td>
</tr>
<tr>
<td>Non-Consensual</td>
<td>40.03</td>
<td>10.14</td>
<td>100</td>
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<tr>
<td>Total</td>
<td>39.02</td>
<td>10.37</td>
<td>120</td>
</tr>
<tr>
<td>Sexual Attitudes subscale of the DSFI</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consensual</td>
<td>70.10</td>
<td>18.26</td>
<td>20</td>
</tr>
<tr>
<td>Non-Consensual</td>
<td>76.41</td>
<td>16.55</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>75.36</td>
<td>16.93</td>
<td>120</td>
</tr>
</tbody>
</table>
Table 2

*Mental pollution and associated negative emotions in the Consensual versus Non-Consensual Conditions.*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Consensual (n=20)</th>
<th>Non-Consensual (n=100)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>S.D.</td>
</tr>
<tr>
<td>Dirtiness</td>
<td>1.65</td>
<td>0.88</td>
</tr>
<tr>
<td>Urge to wash</td>
<td>1.54</td>
<td>0.65</td>
</tr>
<tr>
<td>Baseline anxiety</td>
<td>1.65</td>
<td>0.75</td>
</tr>
<tr>
<td>Disgust/Anger</td>
<td>1.38</td>
<td>0.49</td>
</tr>
<tr>
<td>Shame/Sadness</td>
<td>1.48</td>
<td>0.54</td>
</tr>
</tbody>
</table>

Items are scored on a scale from 1 (not at all) to 5 (very much).
Table 3

**Pattern Matrix for Principal Components Analysis on Negative Emotion Items**

<table>
<thead>
<tr>
<th>Negative Emotion Item</th>
<th>Disgust/Anger</th>
<th>Shame/Sadness</th>
<th>h²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distressed/anxious</td>
<td>.62</td>
<td>.25</td>
<td>.58</td>
</tr>
<tr>
<td>Disgusted by the man’s physical attributes</td>
<td>.95</td>
<td>-.10</td>
<td>.83</td>
</tr>
<tr>
<td>Disgusted by the man’s behaviour</td>
<td>.93</td>
<td>-.00</td>
<td>.87</td>
</tr>
<tr>
<td>Angry</td>
<td>.91</td>
<td>-.00</td>
<td>.82</td>
</tr>
<tr>
<td>Ashamed/guilty</td>
<td>-.01</td>
<td>.91</td>
<td>.77</td>
</tr>
<tr>
<td>Humiliated</td>
<td>.19</td>
<td>.74</td>
<td>.71</td>
</tr>
<tr>
<td>Afraid</td>
<td>.41</td>
<td>.53</td>
<td>.64</td>
</tr>
<tr>
<td>Sad</td>
<td>.01</td>
<td>.72</td>
<td>.59</td>
</tr>
<tr>
<td>Cheap/sleazy</td>
<td>-.13</td>
<td>.92</td>
<td>.76</td>
</tr>
</tbody>
</table>

Table displays factors loadings and commonalities (h²).
Table 4

*Correlations between Questionnaire Data and Self-Reported Indices of Mental Pollution*

*(Dirtiness and Urge to Wash)*

<table>
<thead>
<tr>
<th>Questionnaire Measure</th>
<th>Dirtiness</th>
<th>Urge to Wash</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety Sensitivity Index</td>
<td>.28**</td>
<td>.15</td>
</tr>
<tr>
<td>Disgust Sensitivity Scale</td>
<td>.29**</td>
<td>.07</td>
</tr>
<tr>
<td>Contamination subscale of the VOCI</td>
<td>.33**</td>
<td>.36**</td>
</tr>
<tr>
<td>Fear of Negative Evaluation scale</td>
<td>.11</td>
<td>-.08</td>
</tr>
<tr>
<td>Sexual Attitudes subscale of the DSFI</td>
<td>.09</td>
<td>.01</td>
</tr>
<tr>
<td>Neuroticism subscale of the BFI</td>
<td>.17*</td>
<td>.01</td>
</tr>
</tbody>
</table>

*p < .05, **p < .01*
Figure 1

*Questionnaire Data in Rinsers versus Non-Rinsers*

* Rinsers versus Non-Rinsers differ at $p < .05$. 
Appendix A: Mental Pollution Questionnaire

How do you feel at this moment? Please answer the following questions using the scale below where appropriate:

<table>
<thead>
<tr>
<th>Not at all</th>
<th>Slightly</th>
<th>Fairly</th>
<th>Quite a bit</th>
<th>Very Much</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

1. On a scale from 1 to 5 (with 1-Not at all and 5-Very much), rate the extent to which you feel:

   - Distressed/anxious
   - Disgusted--by the man’s physical attributes
   - Disgusted--by the man’s behaviour
   - Angry
   - Ashamed/guilty
   - Humiliated
   - Afraid
   - Sad
   - Cheap/Sleazy

2. Do you feel dirty or unclean? Rate the extent to which you feel dirty or unclean (from 1 to 5)

3. Can you locate this feeling of dirtiness--Please check where you feel dirty:

   - [ ] Mouth
   - [ ] Tongue
   - [ ] Face
   - [ ] Hands
[ ] Arms
[ ] Stomach
[ ] Diffuse/Difficult to locate
[ ] Internal
[ ] Other ________________

4. Do you have an urge to do anything about this feeling of dirtiness? Please rate each urge on a scale from 1 to 5 (1=Not at all, 5=Very much)

- Rinse mouth/spit/drink something
- Brush teeth/use mouthwash
- Wash my face
- Wash my hands
- Take a shower
- Try to think about something else
- Do something violent
- Other (please specify) ________________

5. For the urges you endorsed in question 4, think about why you want to do this. What do you think might happen if you cannot do this? Check off the statement(s) that most apply to you:

[ ] It would prevent me from getting sick.
[ ] I am worried that, when I leave this room, other people will be able to tell that I feel dirty.
[ ] It would make me feel less distressed or anxious.
[ ] I am worried about spreading this dirtiness to other things or people.
[ ] I cannot think of a reason.
[ ] I have another reason (please specify) 

6. How inappropriate would you rate the man’s behaviour? 

7. How easy was it to imagine the scenario in your mind? 

8. How clear/vivid was this imagined scenario? 

9. How realistic was this imagined scenario? 

10. Have you ever been to a party like the one described in the tape? (Circle one) 

   Never    Rarely    Sometimes    Often 

11. Have you ever experienced a non-consensual sexual encounter, such as a kiss? Yes    No 

   If so, did it occur at a party? Yes    No 

12. Has a friend of yours ever experienced a non-consensual sexual encounter? Yes    No 

   If so, did it occur at a party? Yes    No 

13. Have you ever witnessed a non-consensual sexual encounter, such as a kiss? Yes    No 

   If so, did it occur at a party? Yes    No
Appendix B: Mental Pollution Audiotape Script

Consensual Condition

"Please take a moment to make yourself comfortable in your chair. Close your eyes, relax and take a few slow deep breaths. Slowly breathe in and out. As you exhale, allow yourself to become more and more relaxed. As I describe the scenario to you, try to imagine it as clearly and in as much detail as you are able. I will describe slowly so that you have time to fully picture it in your mind. Try to imagine that you are the woman in the scenario and that the events I am describing are happening right now.

You are at a party. [background music begins]. It is a big party and there are at least 100 people there, including some of your friends from school. You’ve come with a girlfriend who knows the host. It is a house party and you are having fun. The music is pretty loud and some people are dancing in the living room. It’s not too cold out and some people are smoking out on the back deck. The lights are low everywhere except in the kitchen. Around 11 o’clock, you end up in the hallway talking to a guy you met earlier in the evening. You are leaning against the wall and he is standing in front of you as you both make conversation. You think he is really cute. You’re having a bit of trouble concentrating on the conversation because you’re thinking of what it would be like to kiss him. Gradually you and he move closer to each other. You get the feeling he would like to kiss you too. There is a brief pause in conversation and he leans towards you and begins to kiss you on the mouth. You return his kiss and your bodies press together. As he holds you in his arms, your back presses against the wall. You feel his tongue in your mouth. You continue to kiss until someone else comes down the hallway and he stops kissing you."
Non-consensual condition

"Please take a moment to make yourself comfortable in your chair. Close your eyes, relax and take a few slow deep breaths. Slowly breathe in and out. As you exhale, allow yourself to become more and more relaxed. As I describe the scenario to you, try to imagine it as clearly and in as much detail as you are able. I will describe slowly so that you have time to fully picture it in your mind. Try to imagine that you are the woman in the scenario and that the events I am describing are happening right now.

You are at a party. [background music begins]. It is a big party and there are at least 100 people there, including some of your friends from school. You’ve come with a girlfriend who knows the host. It is a house party and you are having fun. The music is pretty loud and some people are dancing in the living room. It’s not too cold out and some people are smoking out on the back deck. The lights are low everywhere except in the kitchen.

Around 11 o’clock, you end up in the hallway talking to a guy you met earlier in the evening. You are leaning against the wall and he is standing in front of you as you both make conversation. There is a brief pause in conversation and he suddenly begins to kiss you on the mouth. You are not interested in him sexually and you begin to push him away but are unable to. He presses you against the wall and puts his tongue into your mouth. He continues to kiss you aggressively. You can’t help noticing that his mouth tastes of sour beer and his tongue feels coated. His breath also smells of stale cigarettes and as you kiss you feel crumbs of food in the corners of his mouth. There is a distinct smell of bad body odor and his face feels greasy against your skin. You are unable to get away from him but eventually someone else comes down the hallway. At this time he stops forcefully kissing you and releases you from his grip."
Appendix C

1. a) After listening to the tape, did you drink anything?   Y   N

1. b) If yes, was it:
   - [ ] To get rid of physical sensations in your mouth
   - [ ] because you were thirsty
   - [ ] I don’t know

1. c) If it was to get rid of physical sensations in your mouth, did it help?   Y   N

2. a) After listening to the tape, did you wash:   your hands?   Y   N
   - your face?   Y   N

2. b) If yes, was it because:
   - [ ] you had just used the washroom
   - [ ] to get rid of feelings of dirtiness
   - [ ] I don’t know

2. c) If it was to get rid of feelings of dirtiness, did it help?   Y   N