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Does Modifying Personal Responsibility Moderate the Mental Contamination Effect?

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Abstract

Background and Objectives: Mental contamination is the psychological sense of internal dirtiness that arises in the absence of physical contact with a perceived contaminant. Mental contamination can be evoked through imagining perpetrating a moral transgression. This study experimentally evoked mental contamination by asking men to imagine perpetrating a non-consensual kiss. It explored whether reducing sense of personal responsibility for the kiss moderated the mental contamination effect. **Methods:** Male students (N=60) imagined giving either a consensual or non-consensual kiss. Personal responsibility for the kiss was manipulated in one of two non-consensual kiss conditions by way of the inclusion of social influence information. Feelings of mental contamination were assessed by self-report and through a behavioural index. **Results:** Mental contamination was successfully induced in the two non-consensual kiss conditions. There was evidence to support the hypothesis that reducing personal responsibility might moderate specific components of mental contamination (shame, dirtiness and urge to cleanse). The effect of responsibility modification was evident in the self-report measures, but not in the behavioural index. **Limitations:** The sample comprised male university students which limits generalizability of the findings. The behavioural assessment of mental contamination was limited to a proxy measure. **Conclusions:** Imagined moral violations are associated with increases in indices of mental contamination. Further research should investigate whether feelings of shame, dirtiness and urge to cleanse are particularly responsive to responsibility modifications.

Keywords: Mental Contamination, Perpetrators, Morality, Responsibility

Does Modifying Personal Responsibility Moderate the Mental Contamination Effect?

Introduction

Mental contamination is defined as the psychological sense of internal dirtiness. It is distinct from contact contamination as it arises in the absence of direct contact with a perceived contaminant (Rachman, 2006). A sense of internal dirtiness or pollution may be caused by either a physical or a psychological violation of human origin (Rachman, Coughtrey, Shafran & Radomsky, 2015). For example, feelings of internal dirtiness/pollution are often experienced at the time of a sexual assault, and these feelings can be re-evoked through recalling memories of the assault subsequently. Mental contamination is characterised by feelings of internal dirtiness that persist long after a violation has occurred and likely overlaps with the phenomenology of post-traumatic stress disorder (Rachman et al., 2015). Mental contamination may also arise through psychological violation such as being degraded, humiliated or betrayed by another person, and it may also arise through self-contamination (Rachman et al., 2015) such as in the experience of unwanted negative intrusions with moral themes such as self-generated blasphemous, sexual and/or violent thoughts (Elliott & Radomsky, 2012). This form of mental contamination overlaps with obsessive-compulsive disorder, although not all obsessions evoke feelings of mental contamination (Rachman et al., 2015).

Research suggests that the feeling of internal dirtiness characteristic of mental contamination is accompanied by a range of negative emotions including disgust (Fairbrother, Newth, & Rachman, 2005), anxiety (Elliott & Radomsky, 2009), guilt,

shame and anger (Rachman, Radomsky, Elliott, & Zysk, 2012). Given that mentally contaminated individuals appear visibly clean but sense dirtiness beneath their skin (Lee et al., 2013), mental contamination results in attempts to neutralise (e.g., by cleansing/washing) the sense of contamination (Jung & Steil, 2011). However, since the source of contamination is impossible to localise, attempts at cleansing are invariably ineffective (Fairbrother et al., 2005).

Much past research has attempted to induce mental contamination in non-clinical samples using the 'dirty-kiss' experiment (Fairbrother et al., 2005). In summary, this paradigm asks participants to imagine being the recipient of a non-consensual kiss. Feelings of mental contamination are measured before and after the task. Past research suggests this paradigm effectively induces a range of negative emotions and neutralising behaviours associated with mental contamination (Fairbrother et al., 2005). However, most evidence accumulated using this paradigm has recruited female undergraduate samples and has tended to focus on the recipients (i.e. 'victims') of non-consensual experiences.

Mental contamination in imagined 'perpetrators' of a moral transgression has received relatively less empirical attention. Theoretically, imagining committing such a transgression might evoke moral disgust and, as a result, feelings of contamination. Rozin, Haidt and McCauley (2000) proposed that immoral acts that are a reminder of a person's animal-nature (i.e. those involving sex) are more likely to be labelled 'disgusting' than violations that do not carry this connotation. Moreover, exposure to animal-reminder moral violations is as contaminating as

exposure to contagious illness with the function of disgust being to guard against impurity (Rozin et al., 2000).

The available evidence suggests that ‘perpetrators’ are susceptible to the mental contamination effect in a similar way to ‘victims’. Rachman, Radomsky, Elliott and Zysk (2012) found that male participants who imagined giving a non-consensual kiss to a woman reported greater feelings of state anxiety, disgust, shame, guilt and anger than participants who imagined sharing a consensual kiss with a woman. Furthermore, manipulating the perceived level of betrayal (e.g. the woman depicted was the sister of the participant’s best friend) amplified the mental contamination effect. In a later study, Waller and Boschen (2014) successfully evoked the mental contamination response in imagined female perpetrators of a non-consensual kiss on an underage boy. Interestingly, no neutralisation strategy (e.g. washing, atonement) was more effective than a control group (e.g. imagining standing on a busy street corner watching cars go past) in reducing mental contamination. Taken together, these research findings support Rachman’s (2004) assertion that imagined perpetrators experience mental contamination. However, they also raise a question as to how the mental contamination effect might be attenuated. A limited amount of research has investigated individual differences in mental contamination sensitivity (Radomsky & Elliott, 2009) or explored factors that might moderate the mental contamination effect (Berman, Wheaton, Fabricant, & Abramowitz, 2012). The current study was designed to assess whether giving the participant an opportunity to reduce their sense of personal responsibility for a violation might attenuate the mental contamination effect.

Attribution theory (Heider, 1958) offers a potentially useful theoretical framework in considering the variability of the mental contamination effect. Drawing on attribution theory, Snyder and Higgins (1988) developed and tested an account of the ways in which individuals can maintain a positive self-image in the face of ego threat (termed making 'excuses'). Snyder and Higgins proposed that the function of making excuses is to shift the perceived location of the cause of negative acts from "sources that are relatively more central to the person's sense of self to sources that are relatively less central" (p 23). By attributing the cause of bad behaviour externally to a situational factor, threat to self is distanced and, as a result, a positive personal image is maintained. Subsequent work supports these ideas, demonstrating that when an individual attributes negative personal behaviour to internal (i.e. to the self rather than the situation), stable (where behaviour is not considered context-specific) and global (where behaviour is considered a general representation across contexts) causes, shame is more likely to be experienced (Stuewig, Tangney, Heigel, Harty, & McCloskey, 2010). Shame arises because internal, stable and global attributions made following immoral behaviour promote a sense of feeling worthless (Stuewig et al., 2010). Research suggests that the propensity to experience shame is evident in psychological difficulties in which mental contamination may be a feature (e.g. OCD, PTSD; Ferguson, Stegge, Eyre, Vollmer & Ashbaker, 2000). Extrapolating from attribution theory and Snyder and Higgins' (1998) work, shifting the causal locus externally is likely to have the effect of reducing sense of personal responsibility for the act or outcome in question.

Salkovskis' (1985) proposal that an inflated sense of personal responsibility is an important precipitating and maintaining factor in OCD has received extensive

empirical support in the literature. According to Salkovskis' (1985) model, negative intrusions of committing an immoral act (in the absence of actual immoral conduct) become problematic when appraised by the individual as having personal significance (e.g. if the individual perceives that they are responsible for the content of the intrusion). Similarly, in their cognitive model, Rachman et al. (2015) underscore the importance of appraisal of the personal significance of the perceived violation as a determinant of the mental contamination response. For example, if a perceived violation is appraised as indicating that the person is bad or dangerous, feelings of disgust, contamination and anxiety are likely to result. Taken together, the aforementioned models support the proposal that those who imagine committing a moral violation are likely to feel a greater sense of mental contamination (e.g. sense of dirtiness, disgust, shame, urge to cleanse) if they think they are solely responsible for the imagined situation compared to those who are able to diffuse their sense of responsibility in some way.

The purpose of the current study was to assess whether mental contamination can be elicited in male participants who imagine committing a moral transgression, and whether the provision of social influence information (designed to reduce sense of personal responsibility for a moral transgression) moderates the mental contamination effect. In the current study, mental contamination was assessed with self-report indices and a behavioural measure (choice of a cleansing-related or neutral free gift).

Hypotheses

1.0. Participants who imagine giving a non-consensual kiss will (a) report a greater increase in mental contamination, and (b) more often choose a cleansing-related free gift than men who imagine giving a consensual kiss.

2.0 Participants who are not provided with a potential way to reduce their personal responsibility for giving a non-consensual kiss will (a) report a greater increase in mental contamination, and (b) more often choose a cleansing-related free gift than men who are provided with a potential way to reduce their personal responsibility for giving a non-consensual kiss.

Method

Design

The design of the current study was based on that conducted by Rachman et al. (2012) although departed from this study in two main ways. Similar to Rachman et al., the general scheme of the current study involved comparing male perpetrators of a consensual versus a non-consensual kiss and utilising self-report indices of mental contamination as well as a behavioural proxy of urge to cleanse. The current study departed from Rachman et al. by including a responsibility modification element to one of the non-consensual conditions in an attempt to attenuate the mental contamination effect (as opposed to the inclusion of betrayal in Rachman et al. in an attempt to amplify the effect) as well as utilising a free gift choice paradigm as the behavioural proxy of urge to cleanse instead of the washroom breaks employed by Rachman et al.

A between-groups experimental design was employed. Participants were randomly assigned to one of three experimental conditions: a non-consensual kiss

condition, a non-consensual kiss - responsibility modification condition, and a consensual kiss condition. As compensation, participants received either lab-tokens or confectionary. The dependent variable, mental contamination, was operationalised in two ways: (i) change in self-reported indices of mental contamination (disgust, shame, guilt, anxiety, internal dirtiness, and urge to cleanse) pre to post induction; and, (ii) a behavioural proxy of urge to cleanse in the form of choice of free gift presented as a token of gratitude for participation in the study (either a miniature bottle of antibacterial hand-gel or two HB pencils). Manipulation checks were also administered to assess participants' level of engagement with the imagined act, their appraisal of responsibility, and of the appropriateness of the imagined behaviour.

Participants

All participants were male university students. A priori sample size calculation estimated a total sample of 60 participants (One-way ANOVA $f=.42$, alpha .05, 80% power). The calculated total sample size was comparable to that of similar published research (e.g., Rachman et al., 2012; Waller & Boschen, 2015). Participants were asked to report general demographic information such as age, ethnicity, faith, sexual orientation, relationship status, and the duration of their current relationship, if applicable.

Stimuli and Apparatus

Dirty-kiss audio-material. The audio-file used to induce mental contamination was adapted from the original 'dirty-kiss' audio material developed by Fairbrother et al. (2005). Each audio-file was approximately four minutes in duration. In contrast to Fairbrother et al. (2015) whose recording had the (female) participant as victim of a non-consensual kiss, the modified recording placed the

(male) participant in the role of perpetrator of the non-consensual kiss. Participants listened, via headphones, to an audio-file played on a computer. One voice, the narrator, described the party scene and the participant's actions within it. The other voice was of a male friend who interjects at points (e.g. to say what a great party it is, how attractive the girl is who the participant kisses). The basic party scene described was identical across the three experimental conditions and included background sounds and music. The audio began with the voice of the narrator asking the participant to make themselves comfortable in their chair, to close their eyes, relax and to imagine the scene as clearly and in as much detail as possible, doing so as if they were the man in the scenario, the events were happening now, and were seen through their own eyes. Participants listened to a description of a physically attractive woman who the participant wants to kiss. In the consensual kiss condition, the woman is described as being willing to kiss the participant. In both the non-consensual kiss conditions, the woman does not want to kiss the man and the kiss is forced upon her. The script in the non-consensual kiss - responsibility modification condition contained an additional detail in the form of the friend urging the participant on ("*Go on mate... You've got to kiss her*"). This information was introduced in an attempt to afford these participants a way to shift some of the cause of the violation externally and, therefore, reduce their sense of personal responsibility. The specific statement used was developed based on attribution theory and the work of Snyder and Higgins (1988) outlined in the Introduction section. Specifically, it was considered that this statement would allow personal responsibility for the non-consensual act to be shared with an external agent (i.e. the urging friend) and therefore reduced. The two non-consensual recordings were

piloted with four male university students. One commented “some men may think it's fine to kiss a girl if a friend is urging them on”.

Behavioural proxy. Previous studies have used washroom breaks to gain a behavioural index of urge to cleanse (e.g. Fairbrother & Rachman, 2004; Herba & Rachman, 2007; Elliott & Radomsky, 2009). In the current study, a choice of free gift was offered as a behavioural proxy for urge to cleanse. The gift choice was either a miniature (50ml) bottle of antibacterial hand-gel (the label on the bottle read “Kills 99.9% bacteria”) at a unit cost of £1, or two HB pencils costing 44 pence in total. Gifts were chosen to be gender neutral.

Measures

Self-reported mental contamination. In keeping with other mental contamination studies, participants completed a number of Visual Analogue Scales (VAS) before and after the mental contamination induction procedure. VAS measured state anger, anxiety, shame, guilt, dirtiness, disgust and urge to cleanse. Given the potential for shame and guilt to be confused, these terms were not used. Instead, guilt was assessed with “*I feel bad about something I have done*” whilst shame was assessed with “*I feel worthless, powerless*”. Participants were asked to rate how they felt in the present moment by placing a cross on a 10cm line anchored with “*Not at all*” to “*Completely*”. Each VAS item was then operationalised numerically by measuring with a ruler, in millimetres, where the cross on the line had been placed. Therefore, individual VAS item scores could range from 0 to 100.

Responsibility appraisal. To check whether the responsibility modification technique was successful, two questions were devised to assess responsibility appraisal - “*To what degree were you personally responsible for your behaviour?*”;

"To what degree was the woman responsible for what happened?". Additionally, the item *"How appropriate was your behaviour in the recording?"* utilised by Rachman et al. (2012) was included to assess the impact of the experimental manipulation. Participants provided ratings on a 7-point scale ranging from 1 (*"Not at all"*) to 7 (*"Entirely"*).

Task engagement. Three items were used to assess engagement with the imaginary situation: ease (*"To what degree were you able to imagine the scene with ease?"*); vividness (*"To what degree were you able to imagine the scene vividly and clearly?"*); and, realism (*"To what degree did the scene seem realistic?"*). These were developed following Rachman et al. (2012). Participants provided ratings on a 7-point scale ranging from 1 (*"Not at all"*) to 7 (*"Entirely"*).

Estimated cost of gift. After selecting their free gift, participants were asked to estimate the face value of each item and whether perceived value motivated their choice. This allowed assessment of whether perceived face value drove choice rather than contamination concerns.

Ethics and Procedure

The study protocol was reviewed and granted approval by the authors' institutional ethics review board. All participants provided consent to take part. Given that some participants may have found the imagined situation upsetting, the information and consent process reminded them that they could withdraw their participation without prejudice. Moreover, all participants were debriefed at the end of the study and were reminded that, given the situation was imaginary, it did not reflect their actual behaviour. Following reading the information sheet and providing

written consent, participants completed the demographic questions and pre-induction mental contamination VAS. Participants were then randomly assigned to one of three experimental conditions: non-consensual kiss condition, non-consensual kiss - responsibility modification condition, or consensual kiss condition. Participants were asked to listen to the corresponding audio-file. The investigator testing participants was blind to the experimental condition assigned to each participant. Each audio-file had previously been assigned a letter (A, B or C). The investigator then randomly drew a letter from an envelope and loaded the corresponding audio-file. Given the participant wore headphones, the investigator was unable to hear the assigned recording. After listening to the audio-file, participants completed the six task engagement questions followed by the mental contamination VAS. Next, participants were offered a free gift for their participation – either a miniature (50ml) bottle of anti-bacterial hand-gel or two HB pencils. After participants made their choice of gift, they were asked to estimate its face value and to indicate if this motivated their choice. Participants were then debriefed, thanked, given the opportunity to ask questions, and were offered lab tokens or confectionary. Participants were advised they could keep the free gift.

Results

Sample Characteristics

Table 1 presents the socio-demographic characteristics of the sample along with the results of between condition statistical comparisons. The non-parametric Kruskal-Wallis test was used to compare age and relationship duration between

conditions given marked positive skew. Analysis indicated no differences between experimental conditions in any of the socio-demographic variables.

INSERT TABLE 1 ABOUT HERE

Assessment of Experimental Manipulations

The measures of appraisal of personal responsibility, woman's responsibility and appropriateness of behaviour demonstrated skew within conditions. This was expected given that the experimental manipulations were likely to result in low ratings of appropriateness and appraisal of the woman's responsibility in the non-consensual conditions but high ratings of these in the consensual condition. Given evidence of skew, as well as the use of 7-point single item measures, the non-parametric Kruskal-Wallis test was used to assess differences between conditions (Table 2). Significant omnibus tests were followed up with Mann-Whitney U tests with adjusted comparison level ($p = .0167$).

As expected, participants in the non-consensual kiss - responsibility modification condition rated themselves as less responsible than those in the other two conditions. Follow-up tests indicated that participants in the non-consensual responsibility modification condition rated their personal responsibility as significantly lower than those in the non-consensual condition, with a medium effect size. Also, as expected, participants in the two non-consensual kiss conditions attributed significantly less responsibility for the kiss to the woman than those in the consensual condition, with large effect sizes. Again, as expected, participants in both non-consensual kiss conditions rated their imagined behaviour as significantly less appropriate than participants in the consensual kiss condition, with large effect sizes.

Taken together, these findings suggest the experimental manipulations were successful.

INSERT TABLE 2 ABOUT HERE

Baseline Equivalence

Task Engagement Indices. The measures of ease, vividness and realism of the visualisation task were negatively skewed in all conditions indicating that participants found it easy to imagine the scenario and that it was vivid and realistic. Given evidence of skew, along with the use of single item 7-point scales, the non-parametric Kruskal -Wallis test was used to compare conditions (Table 3). Follow up Mann-Whitney U tests indicated some evidence that ease and realism differed between the two non-consensual conditions, and that realism differed between the consensual and non-consensual conditions. However, comparisons did not reach the adjusted significance level ($p = .0167$).

INSERT TABLE 3 ABOUT HERE

Mental Contamination Indices. As expected, scores on mental contamination indices prior to the experimental induction procedure demonstrated positive skew. This was confirmed by inspection of histograms and skew and kurtosis values. There were no significant differences in ratings of mental contamination between the three experimental conditions prior to the induction (Table 4).

INSERT TABLE 4 ABOUT HERE

Change in Feelings of Mental Contamination

Change in self-reported mental contamination indices were calculated by subtracting post-induction VAS scores from the pre-induction VAS scores. This meant that the greater the change score obtained, the greater the increase in participants' self-reported mental contamination. Initial inspection of change scores suggested that the assumptions for parametric testing were violated. Specifically, the distribution of the change scores of each mental contamination index was non-normal across the three conditions. Furthermore, Levene's test indicated non-homogenous variances across the three experimental conditions. Violation of homogeneity of variance was likely due to there being less variability within the consensual kiss condition, as expected. Participants in this condition were not expected to experience the mental contamination effect. As a result of these observed violations, non-parametric Kruskal-Wallis tests with follow-up Mann-Whitney U-tests with adjusted comparison level ($p = .0167$) were performed to analyse change scores of each mental contamination index between experimental groups (Table 5). Participants in both non-consensual kiss conditions reported an overall increase in feelings of mental contamination compared to participants in the consensual kiss condition who indicated no overall change.

INSERT TABLE 5 ABOUT HERE

Follow-up analyses (Table 6) indicated that participants in the consensual condition had significantly lower change scores on all mental contamination indices than participants in both non-consensual conditions. The analysis suggested little evidence that participants in the two non-consensual kiss conditions differed in their reports of feeling bad (a guilt index), angry, or disgusted. However, there was some

evidence that these two conditions differed in feelings of worthlessness (a shame index), dirtiness and urge to cleanse. Participants in the non-consensual kiss condition reported greater increases on these VAS indices than the non-consensual kiss - responsibility modification condition, with medium effect sizes. Effect sizes between the consensual and the two non-consensual groups were large on all mental contamination indices.

INSERT TABLE 6 ABOUT HERE

Behavioural Proxy of Feelings of Contamination

Chi-square analysis indicated that gift choice was not independent of experimental group (Table 7). Men in the consensual condition most often chose HB pencils over antibacterial gel whereas the reverse was the case for men in both non-consensual conditions. The hypothesis that men in the non-consensual condition would select the cleansing-related free gift more often than men in the non-consensual responsibility modification condition was not supported.

INSERT TABLE 7 ABOUT HERE

To check whether perceived cost might be an explanation for the difference between consensual and non-consensual conditions in choice of gift, Kruskal-Wallis tests were used to compare the estimated cost of each free gift between the three experimental conditions. A non-parametric test was used because estimated cost was skewed within conditions. There was no significant difference between conditions in the estimated cost of the antibacterial hand gel: $H(2, N = 60) = .466, p = .792$; or the two HB pencils: $H(2, N = 60) = .708, p = .702$.

Discussion

Relative to men who imagined a consensual kiss, men who imagined a non-consensual kiss demonstrated increases in feelings of dirtiness and urge to cleanse as well as feelings that are theorised to accompany mental contamination. Scores on self-report indices of self-conscious (guilt, shame) and basic emotions (disgust, anger, anxiety) increased after men imagined committing a moral violation. The findings were further strengthened by the inclusion of a behavioural proxy of mental contamination in addition to self-report indices. Participants in the two non-consensual conditions most often chose antibacterial gel over pencils whilst the reverse was true for those in the consensual condition. The current findings support previous research employing the ‘dirty kiss’ paradigm to induce mental contamination in non-clinical samples (Fairbrother et al., 2005; Herba & Rachman, 2007; Elliott & Radomsky, 2009; Elliott & Radomsky, 2012; Ishikawa, Kobori, & Shimizu, 2014) and specifically in ‘perpetrators’ of a violation (Rachman et al., 2012; Waller & Boschen, 2015). The finding that participants in both non-consensual kiss conditions reported an increase in urge to cleanse, and that they more often chose antibacterial hand-gel than pencils as a free gift, supports existing findings that imagining carrying out a moral violation elicits (often futile) urges to cleanse (Jung & Steil, 2011; Fairbrother et al., 2005; Rachman et al., 2012).

In the current study, an experimental manipulation was utilised that was designed to enable some men to externalise part of the cause of the perceived moral violation to another party (a best friend encouraging the non-consensual kiss). It was reasoned that this manipulation might impact on sense of personal responsibility such

that feelings of mental contamination might not be as strong as when there was no possibility of reducing sense of personal responsibility. It was therefore hypothesised that men in the non-consensual conditions might show greater increases in mental contamination self-report indices, and that they might also choose the cleanse-based free gift (a behavioural proxy for urge to cleanse) more often than men in the non-consensual responsibility modification condition.

The study findings demonstrated that the social influence manipulation produced the desired effect on appraisal of personal responsibility. In comparison to the other experimental conditions, men in the responsibility modification condition perceived their personal responsibility as lower. Moreover, the study provided some evidence to support the hypothesis that modifying sense of personal responsibility might moderate the mental contamination effect, specifically feelings of worthlessness (shame), dirtiness and urge to cleanse. Contra to hypothesis, the potential effect of responsibility modification did not seem to extend to the behavioural proxy of urge to cleanse; men in both non-consensual conditions most often chose antibacterial gel. It may be that self-report indices have greater sensitivity in detecting more subtle differences in mental contamination as a function of perceived responsibility. The behavioural measure employed in the current study had only two measurement levels – hand gel or pencils. Previous research has utilised observation of bathroom breaks or self-reported activity during breaks to assess urge to cleanse/duration of cleansing (Fairbrother et al., 2005; Rachman et al., 2012; Ishikawa et al., 2014). In the current study, practical constraints meant that it was necessary to limit the behavioural index of urge to cleanse to a more circumscribed method. However, importantly, the current study did show that the

free gift paradigm differentiated those men in the non-consensual compared to the consensual condition. As such, this paradigm might be useful in circumstances where the operationalisation of urge to cleanse is constrained. Of course, it is unknown whether the men in this study used the antibacterial gel but, at the least, analysis of gift choice by condition supports the contention that feeling dirty may be a consequence of exposure to a perceived moral violation.

The evidence that reducing sense of personal responsibility for an imagined negative outcome might attenuate negative self-appraisals characteristic of shame (i.e. feeling worthless) is consistent with Salkovskis' (1985) proposition that negative intrusions, including images, become distressing when appraised as personally significant. Perhaps of most interest in this regard, the current findings indicate that the mental contamination index used to measure shame (feeling worthless) and associated phenomena (sense of dirtiness and urge to cleanse) responded more to the modification of personal responsibility than the indices of basic emotions (anger, disgust and anxiety) which showed less evidence of being affected by the attempted modification of personal responsibility. Why might differences exist in the potential effects of reduced responsibility on mental contamination? Tracy and Robbins (2006) point out that whilst self-evaluative processes are critical to the experience of self-conscious emotions such as shame, these processes need not be involved in basic emotions such as disgust, anger and anxiety. As a result, it is possible that the mechanism provided to some men in the current study to externalise some of the cause of the imagined violation (i.e. to appraise their responsibility for the act as shared with their 'friend') is effective in ameliorating the self-conscious components of mental contamination and associated processes (feeling dirty, needing to cleanse),

as opposed to other, non-self-conscious components which do not require self-evaluative processes. However, this does not explain why the two non-consensual groups did not differ in guilt, a self-conscious emotion. It is possible that the VAS used to measure guilt – feeling bad about something done – might not have successfully operationalized this emotion. Alternatively, the findings raise the interesting possibility that modification of responsibility impacts differentially on the mental contamination response. Further studies are required to address this possibility.

Some limitations should be noted. Questionnaires assessing propensity to experience mental contamination, anxiety and obsessive-compulsiveness were not taken at baseline. Whilst random assignment might have reduced the likelihood that the three groups differed on these variables, measurement of these variables would have allowed such differences to be ruled out as a competing explanation of the findings. In the current study, whilst clear effects were detected in relation to the impact of perceived moral violation on all mental contamination indices, the evidence was weaker, although still positive, in regards to modification of personal responsibility. It might be that less subtle or different procedures to those used in the current study might generate stronger effects. Additionally, studies with larger samples might generate stronger evidence of effects. Moreover, whilst participants were asked to estimate their own responsibility for the kiss, participants in the responsibility modification condition were not asked to estimate the perceived culpability of the 'friend'. That is, participants were not asked to explicitly indicate the extent to which they considered their friend to have played a part in causing the moral violation. Future studies addressing the potential role of personal

responsibility on feelings of mental contamination would benefit from exploring the extent to which participants feel culpable for a wrongdoing, as well as exploring the extent to which other people involved in an imagined scene are responsible. Research here may further clarify the potential effect of perceived responsibility on mental contamination.

Declaration of interest

The authors of this manuscript have no declaration of interest and no conflict of interest pertaining to this study.

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References

- Berman, N. C., Wheaton, M. G., Fabricant, L. E., & Abramowitz, J. S. (2012). Predictors of mental pollution: The contribution of religion, parenting strategies, and childhood trauma. *Journal of Obsessive–Compulsive and Related Disorders*, 1, 153–158. doi: 10.1016/j.jocrd.2012.03.005
- Elliott, C., & Radomsky, A. (2009). Analyses of mental contamination: part I, experimental manipulations of morality. *Behaviour Research and Therapy*, 47, 995-1003. doi:10.1016/j.brat.2009.03.004
- Elliott, C., & Radomsky A. (2012). Mental contamination: the effects of imagined physical dirt on immoral behaviour. *Behaviour Research and Therapy*, 50, 22-427. doi: doi:10.1016/j.brat.2012.03.007

- Fairbrother, N., Newth, S., & Rachman, S. (2005). Mental pollution: Feelings of dirtiness without physical contact. *Behaviour Research and Therapy*, 43, 121-130. doi: 10.1016/j.brat.2003.12.005
- Ferguson, T., Stegge, H., Eyre, H., Vollmer, R., & Ashbaker, M. (2000). Context effects and the (mal)adaptive nature of guilt and shame in children. *Genetic, Social, and General Psychology Monographs*, 12, 319-345. Retrieved from: <http://web.a.ebscohost.com>
- Heider, F. (1958). *The psychology of interpersonal relationships*. New York: John Wiley and Sons.
- Herba, J. K., & Rachman, S. (2007). Vulnerability to mental contamination. *Behaviour Research and Therapy*, 45, 2804-2812. doi:10.1016/j.brat.2007.07.010
- Ishikawa, R., Kobori, O., & Shimizu, E. (2014). Unwanted sexual experiences and cognitive appraisals that evoke mental contamination. *Behavioural and Cognitive Psychotherapy*, 7, 1-15. doi: 10.1017/S1352465813000684
- Jung, K., & Steil, R. (2011). The feeling of being contaminated in adult survivors of childhood sexual abuse and its treatment via a two-session program of cognitive restructuring and imagery modification: a case study. *Behaviour Modification*, 36, 67-85. doi: 10.1177/0145445511421436
- Lee, M., Shafran, R., Burgess, C., Carpenter, J., Millard, E., & Thorpe, S. (2013). The induction of mental and contact contamination. *Clinical Psychologist*, 12, 9-16. doi: 10.1111/cp.12003
- Rachman, S. (2004). Fear of contamination. *Behaviour Research and Therapy*, 42, 1227-1255. doi: 10.1016/j.brat.2003.10.009

- Rachman, S. (2006). *The Fear of Contamination: Assessment and Treatment*. Oxford: Oxford University Press.
- Rachman, S., Coughtrey, A., Shafran, R. & Radomsky, A. (2015). *Oxford Guide to the Treatment of Mental Contamination*. Oxford: Oxford University Press.
- Rachman, S., Radomsky, A., Elliott, C., & Zysk, E. (2012). Mental contamination: The perpetrator effect. *Journal of behaviour therapy and experimental psychiatry*, 43, 587-593. doi: 10.1016/j.jbtep.2011.08.002
- Radomsky, A., & Elliott, C. (2009). Analyses of mental contamination: Part II, individual differences. *Behaviour Research and Therapy*, 47, 1004-1011. doi: 10.1016/j.brat.2009.08.004
- Rozin, P., Haidt, J. & McCauley, C.R. (2000). Disgust. In M. Lewis & J.M. Haviland-Jones (Eds.). *Handbook of Emotions* (2nd ed.). New York: Guildford Press.
- Salkovskis, P.M. (1985). Obsessional-compulsive problems: a cognitive-behavioural analysis. *Behaviour Research and Therapy*, 23, 571-583.
- Snyder, C. R., & Higgins, R. L. (1988). Excuses: Their effective role in the negotiation of reality. *Psychological Bulletin*, 104, 23-45.
- Stuewig, J., Tangney, J., Heigel, C., Harty, L., & McCloskey, L. (2010). Shaming, blaming, and maiming: Functional links among the moral emotions, externalisation of blame and aggression. *Journal of Research Perspectives*, 44, 91-102. doi: 10.1016/j.jrp.2009.12.005
- Waller, K., & Boschen, M. (2014). Evoking and reducing mental contamination in female perpetrators of an imagined non-consensual kiss. *Journal of*

Behaviour Therapy and Experimental Psychiatry, 49, 195-202. doi:

10.1016/j.jbtep.2014.07.009.

Table 1

Sample characteristics (N=60) and comparison between experimental conditions

Age		
Median	20.00	$H(2, N=60) = 1.444, p = .486$
(Min-Max)	(18-40)	
Ethnic group N (%)		
White	41 (68)	$X^2(2, N=60) = .40, p = .819^A$
Black African/Caribbean	13 (22)	
Asian	6 (10)	
Sexual orientation N (%)		
Heterosexual	52 (86)	$X^2(2, N=57) = .48, p = .803$
Homosexual	4 (7)	
Bisexual	1 (2)	
Prefer not to say	3 (5)	
In a relationship currently N (%)		
Yes	16 (27)	$X^2(2, N=57) = 1.60, p = .449$
No	41 (68)	
Prefer not to say	3 (5)	
Relationship duration (months)		
Median	0	$H(2, N=60) = .939, p = .625$
(Min-Max)	(0-216)	
Faith N (%)		
Not of religious faith	30 (50)	$X^2(2, N=55) = .27, p = .873$
Of religious faith	25 (42)	
Prefer not to say	5 (8)	

Note. “Prefer not to say” not included in comparisons. ^ABlack African/Caribbean and Asian combined; ^BHomosexual and bisexual combined.

Table 2

Personal responsibility, woman's responsibility, and appropriateness comparisons between experimental conditions

Indices	Kruskal-Wallis		Mann-Whitney			
	Median (Range)	<i>H</i> (df=2)	Direction of difference in medians	<i>Z</i> Score	Effect size (<i>r</i>)	<i>P</i>
Personal Responsibility	Consensual	6.00 (3.00)				
	Non-consensual	7.00 (6.00)				
	Non-consensual-RM	5.00 (5.00)				
		9.00 <i>p</i> = .011	Consensual < Non-Consensual Consensual > Non-consensual-RM Non-Consensual > Non-consensual-RM	- 1.824 - 1.704 - 2.751	.23 .22 .35	.091 .096 .008*
Woman's Responsibility	Consensual	5.00 (4.00)				
	Non-consensual	1.00 (1.00)				
	Non-consensual-RM	1.00 (2.00)				
		45.15 <i>p</i> < .001	Consensual > Non-Consensual Consensual > Non-consensual-RM Non-Consensual = Non-consensual-RM	- 5.565 - 5.593 - .611	.72 .72 .08	< .001* < .001* .659
Appropriateness	Consensual	6.00 (4.00)				
	Non-consensual	1.00 (4.00)				
	Non-consensual-RM	1.00 (5.00)				
		41.40 <i>p</i> < .001	Consensual > Non-Consensual Consensual > Non-consensual-RM Non-Consensual = Non-consensual-RM	- 5.300 - 5.381 - 1.264	.68 .69 .16	< .001* < .001* .341

Note. RM=responsibility modification; rating scale 1 ('not at all') to 7 ('entirely'); *denotes significance at the adjusted comparison level (*p* < .0167)

Table 3

Ease, vividness and realism comparisons between experimental conditions

Indices	Kruskal-Wallis test		Mann-Whitney U-test			
	Median (Range)	<i>H</i>	Direction of difference in medians	Z Score	Effect size (<i>r</i>)	<i>P</i>
	N=20 per condition	(<i>df</i> =2)				
Ease	Consensual	6.00 (4.00)	Consensual < Non-Consensual	- 1.195	.15	.232
	Non-consensual	7.00 (4.00)	Consensual > Non-consensual-RM	- 1.066	.14	.287
	Non-consensual-RM	5.00 (3.00)	Non-Consensual > Non-consensual-RM	- 2.204	.28	.028
Vividness	Consensual	5.00 (4.00)	Consensual < Non-Consensual	- 1.745	.22	.081
	Non-consensual	6.00 (4.00)	Consensual < Non-consensual-RM	- 0.449	.06	.654
	Non-consensual-RM	6.50 (5.00)	Non-Consensual < Non-consensual-RM	- 1.553	.20	.120
Realism	Consensual	4.50 (4.00)	Consensual < Non-Consensual	- 2.229	.29	.026
	Non-consensual	6.50 (5.00)	Consensual < Non-consensual-RM	- 0.389	.05	.697
	Non-consensual-RM	5.00 (5.00)	Non-Consensual > Non-consensual-RM	- 2.152	.28	.031

Note. RM=responsibility modification; rating scale 1 ('not at all') to 7 ('very well/realistic'); all paired comparisons not significant at the adjusted comparison level ($p < .0167$)

Table 4

Median (Range) Pre-Induction VAS Mental Contamination Indices by Experimental Condition

	Consensual	Non-consensual	Non-consensual - responsibility modification	Kruskal-Wallis H (df=2)	P value
Bad	.00 (65.00)	8.00 (91.00)	5.00 (25.00)	2.12	.345
Worthless	.00 (51.00)	1.65 (70.00)	4.00 (50.00)	3.29	.193
Angry	.00 (39.00)	3.00 (75.00)	1.90 (15.00)	3.47	.176
Anxious	.00 (80.00)	6.00 (79.00)	6.00 (62.00)	.47	.789
Dirty	.00 (49.00)	3.50 (50.00)	.25 (15.00)	3.49	.174
Disgust	.00 (50.00)	.20 (31.00)	.25 (15.00)	4.30	.116
Urge to Cleanse	.05 (54.00)	1.75 (51.00)	1.35 (41.00)	.32	.849

Table 5

Median (Range) Change in Participant Ratings of VAS Mental Contamination Indices by Experimental Condition

	Consensual	Non-consensual	Non-consensual - responsibility modification	Kruskal-Wallis <i>H</i> (df=2)
Bad	.50 (107.00)	59.50 (95.00)	79.55 (111.00)	24.96*
Worthless	.00 (38.00)	39.00 (108.00)	14.00 (99.00)	23.95*
Angry	.00 (40.00)	60.00 (100.00)	56.85(100.30)	30.25*
Anxious	.00 (57.00)	50.00 (87.00)	30.50 (102.00)	27.12*
Dirty	.00 (37.00)	67.50 (81.00)	45.50 (94.00)	30.63*
Disgust	.00 (36.00)	78.00 (66.00)	62.50 (100.00)	35.49*
Urge to Cleanse	.40 (46.30)	56.50 (124.00)	34.50 (101.00)	25.48*

Note. * $p < .001$

Table 6

Comparison of VAS change scores between experimental conditions

Mental Contamination Outcome Variable	Direction of difference in medians	Z Score	P Value	r
Bad	Consensual < Non-Consensual	- 4.704	< .001	.74
	Consensual < Non-consensual - resp. mod.	- 3.921	< .001	.63
	Non-Consensual < Non-consensual - resp. mod.	- 0.394	.694	.06
Worthless	Consensual < Non-Consensual	- 4.584	< .001	.72
	Consensual < Non-consensual - resp. mod.	- 3.404	< .001	.53
	Non-Consensual > Non-consensual - resp. mod.	- 1.854	.064	.30
Angry	Consensual < Non-Consensual	- 5.101	< .001	.80
	Consensual < Non-consensual - resp. mod.	- 4.402	< .001	.70
	Non-Consensual > Non-consensual - resp. mod.	- 0.596	.551	.09
Anxious	Consensual < Non-Consensual	- 4.794	< .001	.79
	Consensual < Non-consensual - resp. mod.	- 3.906	< .001	.62
	Non-Consensual > Non-consensual - resp. mod.	- 1.516	.130	.24
Dirty	Consensual < Non-Consensual	- 5.113	< .001	.80
	Consensual < Non-consensual - resp. mod.	- 4.054	< .001	.64
	Non-Consensual > Non-consensual - resp. mod.	- 1.949	.051	.31
Disgust	Consensual < Non-Consensual	- 5.492	< .001	.87
	Consensual < Non-consensual - resp. mod.	- 4.669	< .001	.74
	Non-Consensual > Non-consensual - resp. mod.	- 1.529	.126	.24
Urge to cleanse	Consensual < Non-Consensual	- 4.462	< .001	.71
	Consensual < Non-consensual - resp. mod.	- 3.933	< .001	.63
	Non-Consensual > Non-consensual - resp. mod.	- 1.840	.066	.30

Table 7

Results of Chi-square Tests and Descriptive Statistics for Gift Choice by Experimental Condition

Experimental Condition	Gift Choice	
	Antibacterial hand-gel	2 HB Pencils
Consensual ^a	8 (40%)	12 (60%)
Non-consensual ^b	16 (80%)	4 (20%)
Non-consensual-RM ^c	14 (70%)	6 (30%)

Note. Superscripts indicate groups involved in test: ^{abc}: $\chi^2 (2, N=60) = 7.64, p = .024$; ^{bc}: $\chi^2 (1, N=40) = .53, p = .465$

Does Modifying Personal Responsibility Moderate the Mental Contamination Effect?

Highlights

- Mental contamination was induced in a healthy sample of men who imagined a moral violation
- Modifying personal responsibility appeared to moderate the mental contamination effect
- Responsibility modification had the strongest effects on shame, dirtiness and urge to wash