Does mental contamination predict treatment outcome in exposure and response prevention treatment for contamination fear?

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**Introduction**

Contamination fear is defined as having intense feelings of physiological and psychological dirtiness and persistent urges to wash when confronted with dirty stimuli. These feelings of anxiety and disgust can lead to compulsive washing and avoidance behavior (Elliott, Radomsky, 2012). Contamination fear can be separated into two categories: contact contamination and mental contamination. In contact contamination, physical contact with a contaminant (e.g. dirt, disease, and/or germs) result in feelings of dirtiness (Rachman 2004, 2006). These feelings are often accompanied with an urge to engage in washing or cleaning behavior. Mental contamination involves feelings of internal dirtiness, such as psychological or emotional contamination evoked with or without physical contact with a contaminant. This may include, but is not limited to, feelings of immorality, betrayal, or imagined dirtiness or disgust (Elliott et al., 2012; Fairbrother and Rachman, 2004; Lee, et al., 2013). According to a study done by Coughtrey, Shafran and Rachman (2014), in mental contamination, dirtiness can be transferred to other objects without degradation even if there is a lack of physical contact between the previously neutral objects and the contaminated object. Participants that experience overlap in contamination fears report compulsive washing behaviors in response to psychological or mental contaminations (Coughtrey, et al., 2012).

Contamination fear has mainly been studied as a part of Obsessive-Compulsive Disorder (OCD). Participants with contamination-based OCD report compulsive cleaning behavior generated by contamination fear (Coughtrey et al., 2012). According to the American Psychiatric Association (2013), OCD is characterized by obsessive, unwanted thoughts and repetitive
behaviors driven by anxiety. Individuals with contamination fear avoid situations where they may come into contact with dirty objects, or stimuli that may evoke feelings of dirtiness. If confronted by this type of stimuli, participants will engage in compulsive washing behavior to ease feelings of contact or mental contamination. In a study done by Coughtrey et al., on OCD (2014), 38% of patients reported compulsive cleaning behavior driven by contamination fear. Cougle, Lee, Horowitz, Wolitzky-Taylor, and Telch (2008) found results that further examine the relationship between OCD and contamination fear. In a study that examined mental pollution and OCD symptoms in healthy students, these researchers found that mental contamination was significantly positively associated with contamination fear symptoms, controlling for symptoms of depression and guilt.

Exposure and response prevention (ERP) is an effective treatment for individuals with OCD and contact contamination fear. ERP allows participants to confront a dirty object, for example a dirt mixture, until it is no longer bothersome any more (exposure). Then, by refraining from washing or cleaning behavior for a set period of time (response-prevention), participants should experience a decline in the urge to wash and/or understand that dirtiness is not harmful. The aim of the treatment is for participants to generalize this understanding and begin to lessen their avoidance behaviors, and, in turn, their washing compulsions should spontaneously decay (Coughtrey et al., 2014). Contact contamination fear is easier to control because it involves a readily identifiable source of contamination. Mental and contact contaminations have overlapping characteristics: discomfort, fear, and disgust over contamination and the resulting compulsions to wash and avoid recontamination (Coughtrey et al., p. 244, 2012). However, little is known about the effectiveness of ERP as a treatment for mixed contamination fear, or co-occurring contact and mental contamination.
Discussion over ERP as an effective treatment strategy for mental contamination has produced contrasting feedback from researchers. Some researchers feel it is not a reliable treatment strategy for mental contamination due to inconsistent results, and even if effective at treating mental contamination, ERP is a demanding treatment strategy and is at-risk for a high number of participant drop-outs (Foa, Kozak, Goodman, Hollander, Jenike, Rasmussen, 2005; Coughtrey et al., 2013). In a study done by Coughtrey, Shafran, Rachman (2013), CBT paired with ERP was effective in treating the symptoms of 50% of OCD patients.

Some researchers suspect that the contaminant used for the exposure sessions in ERP (e.g., a dirt mixture) is at risk for developing into a trigger that evokes urges to wash and sustains contamination fear rather than being an effective treatment strategy in reducing avoidance behaviors and compulsive washing (Coughtrey et al., 2012; Coughtrey et al., 2013). If a participant experiences mental contamination, confrontation of dirty objects and then refraining from washing, prolongs a participant’s urge to wash and new triggers for mental contamination may be generated, rather than exposure effectively treating the original trigger set. Although, ERP has been found to be effective in treating contamination-based OCD, these speculations bring into question the reliability of ERP as a way to treat mental contamination.

One study found that contamination fear is transferred easily through physical contact. Mental contamination can spread in a similar manner, and shift without degradation from one object to another, particularly if the objects being contaminated are similar (Coughtrey et al., 2014). When participants with mental contamination develop a new set of contamination triggers related to exposure session in ERP, contamination fear may shift to similar stimuli resulting in a counter-treatment effect that reinforces avoidance behavior to a wider array of triggers.
Review of the literature reveals the contrasting evidence and speculation from researchers about effective treatments for mental contamination and illustrates the need for more research on the subject and on effective ways to reduce symptoms. The proposed study aimed to evaluate whether pre-treatment mental contamination predicted treatment outcome in ERP treatment of contamination fear. Participants underwent three sessions of ERP treatment over a two-week period. Pre- and post- treatment assessments included self-report and in vivo measures to assess contamination fear and mental contamination. We hypothesized that when controlling for pre-treatment contamination fear symptoms, greater pre-treatment symptoms of mental contamination would be predictive of greater contamination fear at post-treatment.

**Methods**

**Participants**

Participants were recruited from the psychology subject pool at FSU (N = 25). The sample was 64% female, had an average age of 19.40 (SD = 2.7) and was 56% White, 12% Hispanic, and 32% Black. Students who reported significant contamination fear on the mass screening were invited to complete a 5-session study. Students who completed mass screening answered (yes/no) the following three questions: 1) Are you bothered by recurrent, distressing thoughts about dirt, contamination or germs? 2) Do you wash or clean more than 60 minutes per day? 3) Do washing and cleaning behavior or thoughts about dirt or germs significantly interfere with your normal routine, your work or school, or your usual social activities or relationships? Those who answered ‘yes’ to either of the first two questions and ‘yes’ to the third question were invited to the initial assessment. Participants were screened at baseline only using the Vancouver Obsessional-Compulsive Inventory (VOCI) and needed a minimum score of 21 to qualify for the study. Participants were also administered The Mini International Neuropsychiatric Interview...
diagnostic interview to assess an OCD diagnosis with contamination concerns (not a requirement to participate), and were audio recorded for reliability check. The second qualifier in the study was a rating of 50 or higher on the mid-task questionnaire during the second behavioral assessment, the Sink Task (with Dirt Mixture).

**Behavioral Assessments**

**Dirt Mixture Contamination Fear Assessment (DMA)**

The researcher placed a container filled with a mixture of dirt, dead crickets, and human hair. First, participants completed baseline ratings. Next, they were instructed to place their hands in the container and told that their reactions to the task would be assessed afterward. Once the participant removed their hands, the researcher gave them another questionnaire that assessed peak fear and urge to wash on a 0 (none) to 100 (extreme) scale. In order to participate in the treatment phase of the study, participants had to endorse a fear of 50 or greater on this task (on a 0 to 100 scale).

**Mental Contamination Assessment**

Participants were asked to imagine a bowl of vomit for 1 minute, specifically to imagine how the vomit looked and smelt. The participants were then asked to describe the look and smell of the vomit in three words and to say how it made them feel in order to fully engage in the task. They completed ratings of fear, disgust, dirtiness inside the body, and urge to wash before and after this task (on a 0 – 10 scale). This task was taken from a recent study by Lee, Shafran, Burgess et al. (2013) and was used to screen for Mental Contamination.

**Self-Report Assessments**

Participants completed a battery of self-report measures that tapped relevant constructs. They were completed both pre- and post-treatment (sessions 1, 5). The questionnaires included
were:

*Vancouver Obsessional Compulsive Inventory (VOCI)- contamination subscale.* The VOCI assessment is a 55-item scale with 6 subscales, including the contamination scale. The VOCI has good inter-item reliability with students, and there is a very high correlation between VOCI and other measures for OCD. The test-retest reliability of the VOCI is high among participants with OCD (Radomsky et al., 2007).

*Dimensional Obsessive-Compulsive Scale (DOCS)- contamination subscale.* The DOCS contamination subscale is rated on a scale ranging from 0 (no symptom) to 4 (extreme symptoms) where participants rate their contamination severity over the past month. Each subscale was highly reliable in terms of internal consistency and stability over time (Abramowitz et al., 2010; Melli et al., 2014).

*The Obsessive-Compulsive Inventory-Revised* is an 18-item questionnaire that assesses six OCD symptom clusters (i.e., checking, washing, ordering, obsessing, hoarding, neutralizing). Participants are asked how much distress they have experienced over the past month doing particular tasks or having certain experiences using a 5-point Likert scale from 0 (not at all) to 4 (extremely). The OCI-R has been found to have good internal consistency, test-retest reliability, and is a psychometrically sound self-report measure of obsessive-compulsive symptoms (Foa et al., 2002; Hajcak, et al., 2004). Only the washing subscale was used in this study.

*Vancouver Obsessional Compulsive Inventory (VOCI)- mental contamination (MC) subscale.* The VOCI-MC subscale is a 27-item scale used to assess mental contamination. Each item (e.g. ‘I often feel the need to cleanse my mind’ and ‘Having an unpleasant image or
memory can make me feel dirty inside) is rated on a five-point scale: 0 (no symptom) to 4 (extreme symptoms). The subscale has good psychometric properties with good construct validity, internal consistency, and test-retest reliability (Carraresi et al., 2014).

Treatment

Exposure treatment sessions

In sessions 1, 2, and 3, participants experienced 42 minutes (seven six-minute trials) of exposure to a mixture of dirt, dead insects, and human hair, followed by process ratings (trials 1, 3, 5, and 7). Following the period of exposure, participants were urged to avoid washing their hands for at least one hour.

Procedure

Baseline assessment

First, participants were screened using a Vancouver Obsessional-Compulsive Inventory (VOCI) and needed a minimum score of 21 to qualify for the study. During their first session, participants completed a contamination fear assessment, a mental contamination assessment, and filled out self-report measures. Participants were then provided with a description of Exposure and Response Prevention therapy as an effective treatment for contamination fear and compulsive washing. Then, they were exposed to a mixture of dirt, dead insects, and human hair for a period of 42 minutes and completed process ratings throughout the exposure session. Afterwards, they were urged to avoid washing their hands for at least one hour.

Treatment sessions

During sessions 1-3 participants underwent 42 minutes of exposure to the mixture of dirt, dead insects, and human hair, and completed process ratings. At the end of the task, they were urged to avoid washing their hands for at least an hour each time. The duration they waited after
each exposure session was self-reported at the beginning of sessions 2, 3, and 4, and was noted in the data log by the experimenter.

**Post-treatment sessions**

The post-treatment sessions 4 and 5 involved in and out of lab assessments. In session 4, two weeks following session 1, participants repeated the behavioral and self-report assessments from session 1: Contamination Fear Task and the Mental Contamination Assessment (see above for descriptions). In session 5, two weeks following session 4, participants completed self-report assessments through a survey administered online.

**Results**

I examined study questions by conducting partial correlation analyses. While controlling for pre-treatment contamination fear symptoms, I examined whether pre-treatment mental contamination (self-report and behavioral assessments) was associated with post-treatment contamination fear symptom outcomes.

Descriptive data and correlations for mental contamination and the self-report measures are presented in Table 1. The data showed that greater VOCI mental contamination scores were associated with significantly greater DOCS contamination scores at post-treatment \( (r = .80, \quad .001) \). Partial correlational analyses of the DOCS contamination subscale and the OCI-R washing subscale also showed that greater baseline VOCI mental contamination scores correlated with greater DOCS contamination fear \( (r = .60, \quad p < .01) \) and OCI-R compulsive washing symptoms \( (r = .44, \quad p < .05) \) at post-treatment, when controlling for contamination fear and washing symptoms at baseline.

Descriptive data and correlations for the in vivo measures are presented in Table 2. I ran analyses for the Mental Contamination Assessment at pre-treatment with the Dirt Mixture
Assessment at post-treatment, controlling for the pre-treatment assessment. We focused on disgust and urge to wash immediately following the mental contamination induction at pre-treatment as it correlates to fear and urge to wash immediately after participants put their hands in the dirt mixture at post-treatment. Disgust and urge to wash in response to imagining vomit did not correlate with DMA-related fear at post-treatment, when controlling for fear at baseline. However, disgust ($r = .50, p < .05$) and urge to wash ($r = .58, p < .01$) did correlate with DMA-related urge to wash when controlling for the corresponding baseline measures.

**Discussion**

We hypothesized that when controlling for pre-treatment contamination fear symptoms, greater pre-treatment symptoms of mental contamination would be predictive of greater contamination fear at post-treatment. We found that pre-treatment mental contamination was predictive of poor response to ERP treatment for contamination fear. These effects were found for both the self-report and the behavioral measures. These consistent findings are indicative that mental contamination may be important to address separately in treatment strategies for OCD.

According to recent studies, mental contamination and contact contamination have similar characteristics: discomfort, fear, and disgust over contamination and resulting compulsive washing and avoidance behavior (Coughtrey, et al. p. 244, 2012). While ERP has been found to be an effective treatment for contamination fear, there is contradicting research on its effectiveness for mental contamination symptoms. The purpose of the ERP treatment in this study was to lessen participants’ avoidance behaviors and to eliminate their washing compulsions in concern to contamination fear (Coughtrey, et al., 2014). However, researchers speculate that if participants experience mental contamination, contaminants used for exposure
sessions in ERP treatment could develop into triggers that exacerbate compulsions and avoidance behavior (Coughtrey et al., 2012; Coughtrey et al., 2013).

The strengths of the study include the use of self-report and behavioral assessments of mental contamination and contamination fear. Additionally, most studies in this area have not examined the role of mental contamination in a treatment context. The mental visualization task and self-report assessments for mental contamination provide both behavioral and questionnaire data to analyze.

This study possesses a few limitations. Because we did not include a control group, we could not establish that ERP was actually effective in reducing contamination fear in this study, as pre- to post-treatment changes could be attributable to the passage of time. However, the fact that ERP is a well-established and effective treatment for OCD gives us confidence that these effects are meaningful. The study relied on correlational analyses and did not involve random assignment to specific treatments. Additionally, the study did not include a clinical OCD group. It is not known that these effects would be present in a clinical OCD sample. Further, we addressed study aims using a limited number of treatment sessions (only three), though ERP typically consists of greater than 15 sessions plus homework (Foa et al., 2005). Future research should examine the moderating role of mental contamination in standard ERP for OCD.

The goal of this study was to assess whether pre-treatment mental contamination would predict poor response to ERP treatment. The findings of this study are promising and suggest that a specific focus on the treatment of mental contamination may improve treatment outcome for individuals with OCD. Results may suggest new treatment strategies would be beneficial for contamination fear, mental contamination, and OCD.
References


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Table 1

Descriptive statistics and correlational analyses of self-report measures of mental contamination and contamination fear.

<table>
<thead>
<tr>
<th>Measure</th>
<th>M (SD)</th>
<th>VOCIMC</th>
<th>VOCI Pre</th>
<th>VOCI Post</th>
<th>DOCS Pre</th>
<th>DOCS Post</th>
<th>OCI Pre</th>
<th>OCI Post</th>
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<tbody>
<tr>
<td>VOCI_MC</td>
<td>49.04</td>
<td>16.48</td>
<td></td>
<td></td>
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<tr>
<td>VOCI_Pre</td>
<td>41.13</td>
<td>7.10</td>
<td>.81***</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>VOCI_Post</td>
<td>29.21</td>
<td>9.64</td>
<td>.65***</td>
<td>.61***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DOCS_Pre</td>
<td>10.63</td>
<td>3.41</td>
<td>.74***</td>
<td>.63***</td>
<td>.45*</td>
<td></td>
<td>.39</td>
<td></td>
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<tr>
<td>DOCS_Post</td>
<td>7.88</td>
<td>3.05</td>
<td>.80***</td>
<td>.48*</td>
<td>.74***</td>
<td>.69***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OCI_Pre</td>
<td>9.33</td>
<td>2.06</td>
<td>.61***</td>
<td>.77***</td>
<td>.35</td>
<td>.47*</td>
<td>.39</td>
<td></td>
</tr>
<tr>
<td>OCI_Post</td>
<td>7.63</td>
<td>2.37</td>
<td>.56***</td>
<td>.58**</td>
<td>.84***</td>
<td>.36</td>
<td>.57**</td>
<td>.39</td>
</tr>
</tbody>
</table>

Note: VOCI_MC = Vancouver Obsessional Compulsive Inventory, mental contamination subscale; VOCI = Vancouver Obsessional Compulsive Inventory; DOCS = Dimensional Obsessive-Compulsive Scale, contamination subscale; OCI = Obsessive-Compulsive Inventory Revised, washing subscale; VOCI_MC = Vancouver Obsessional Compulsive Inventory, mental contamination subscale; OCI-R = Obsessive-Compulsive Inventory Revised, washing subscale.

(100 > d***: 10 > d**: 5 > d*)
Table 2

Descriptive statistics and correlational analyses of in vivo assessments of mental contamination and contamination fear.

<table>
<thead>
<tr>
<th></th>
<th>Pre-Tx MC</th>
<th>Post-Tx DMA</th>
<th>Pre-Tx DMA</th>
<th>Post-Tx DMA</th>
<th>Pre-Tx DMA</th>
<th>Post-Tx DMA</th>
<th>SD</th>
<th>Pre-Tx DMA</th>
<th>Post-Tx DMA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disgust (M)</td>
<td>0.28(0.42)</td>
<td>0.27(0.43)</td>
<td>0.25(0.43)</td>
<td>0.27(0.42)</td>
<td>0.26(0.41)</td>
<td>0.27(0.42)</td>
<td></td>
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<tr>
<td>Urge to wash</td>
<td>9.50(1.18)</td>
<td>7.58(1.59)</td>
<td>7.58(1.59)</td>
<td>7.37(1.16)</td>
<td>7.37(1.16)</td>
<td>7.37(1.20)</td>
<td></td>
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</tr>
<tr>
<td>Peak fear</td>
<td>7.39(1.59)</td>
<td>6.97(1.24)</td>
<td>6.97(1.24)</td>
<td>6.97(1.24)</td>
<td>6.97(1.24)</td>
<td>6.97(1.24)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: MC = Vancouver Obsessive Compulsive Inventory, mental contamination scale; DMA = Dirt Mixture Contamination Fear Assessment

- p < 0.05
- *p < 0.01
- **p < 0.001

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