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Eww vs. Taboo: The Effect of Physical Contamination and Moral Transgressions on Feelings of Mental Contamination

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Abstract

Mental contamination is a concept that has gained empirical support over the last few years. Feelings of dirtiness have arisen from not only being the victim of unwanted contact, but also being the imagined perpetrator of it, which threatens one's own morality. No studies have explored if moral transgressions alone can provoke feelings of mental contamination. The aim of this study is to explore if both physical contamination and moral transgressions can evoke symptoms of mental contamination. Additionally, the study tried to identify if a relationship between Obsessive-Compulsive Disorder (OCD) symptom severity and feelings of mental contamination existed. Participants read one of three vignettes: physical contact with a disgusting object, being the perpetrator of an immoral act, or a neutral walk around the neighborhood. Feelings of contamination were assessed at baseline and after reading the vignettes in an online sample of adults (N = 112). Use of neutralization strategies were reported to see if a non-clinical sample would counteract aversive material. The results indicated that physical contamination is more effective than moral transgression at evoking feelings of mental contamination. In addition, there was no relationship between OCD severity and greater feelings of mental contamination. Physical sensations such as cleanliness and dirtiness seemed to be more affected by the physical contamination condition while emotional states such as disgust were able to be influenced by a moral transgression. Additionally, it appears that mental contamination may not exclusively affect those who show greater intensity of OCD symptoms.

Keywords: mental contamination, physical contamination, morality, obsessive-compulsive disorder, vignette

Introduction

Obsessive-Compulsive Disorder

Obsessive-Compulsive Disorder (OCD) is a psychiatric condition with two main features that cause excessive distress and interference to an individual's daily life in the form of obsessions and compulsions (American Psychiatric Association [APA], 2013). The most current *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-5*) defines obsessions as recurring and persistent unwanted thoughts or images that can be disturbing, intrusive, and marked by anxiety or distress. Compulsions, on the other hand, are repetitive behaviors or mental acts completed in order to prevent or reduce distress or a dreaded situation (APA, 2013). Engaging in these behaviors and having the obsessive thoughts themselves are considered time consuming and cause impairment in social, occupational, or everyday functioning. The most current edition of the *DSM* has separated OCD from its previous categorization as an anxiety order to its own complete category entitled "Obsessive-Compulsive and Related Disorders" (OCRD). This category includes OCD, body dysmorphic disorder (BDD), trichotillomania (TDD; hair-pulling disorder), hoarding disorder, and excoriation (skin-picking) disorder (APA, 2013; Amerigan, Patterson & Simpson, 2014).

In the most recent National Comorbidity Survey (Revised), the prevalence of OCD was 1.0% of U.S. adults in any given year (Kessler, Chiu, Demler, & Walters, 2005). This means that about one in every 100 people over the age of 18 in the U.S. experience symptoms of OCD, and this statistic does not include the domain of childhood OCD, which is still being fully understood today. Lifetime prevalence is higher at 2.3% (Ruscio, Stein, Chui, & Kessler, 2010). The mean age of onset is 19.5 years old, but this differs depending on sex as women are more likely to develop OCD, and this usually occurs in adolescence, but there is an early onset group that

develops OCD in childhood, and this is primarily boys (Ruscio et al., 2010). Despite age, OCD is equally likely in the sexes.

The pathogenesis of OCD is a combination of genetics, neurobiology, and environmental factors. Originally, dysfunction relating to the serotonin system was the leading concern in OCD pathogenesis. However, further investigation has found that OCD can be familial as certain gene variants increase risk of having OCD, can enhance the effect of environmental risk factors, and affect gene expression to serotonin, glutamate, and dopamine systems, which consequently interferes with brain circuitry and functioning (Pauls, Abramovitch, Rauch & Geller, 2014). As with many disorders, the pathogenesis is still unclear and needs more research to establish which brain areas and systems are directly impacting the severity of OCD.

While the development of OCD is still being understood, researchers have a better understanding of what to do with OCD once diagnosed as it is a chronic disorder that often needs treatment. Clinically diagnosed individuals tend to report significant impairment from OCD in their daily lives. In people with moderate to severe OCD, 73% reported significant impairments in their everyday lives (Rusio et al., 2010). Additionally, there is high comorbidity as 90% of individuals meet criteria for at least one other mental disorder over a lifetime. Anxiety disorders are the most commonly comorbid, with social anxiety disorder and post-traumatic stress disorder being seen in many cases. Major depressive disorder, phobias, and substance use disorders are also common (Rusio et al., 2010). About half (49%) of individuals diagnosed with OCD seek treatment, and this percentage is greater with more severe expressions (93% for severe cases over a 12-month period, 25.6% for moderate cases). Over a lifetime, 72.7% of individuals diagnosed with OCD as part of the National Comorbidity Study Replication received some form of mental health treatment, but only 29.2% was specific to OCD. This being said, finding the

right treatment is important in order to subside the impairments OCD has on everyday functioning.

The most effective methods of treatment are Cognitive Behavioral Therapy (CBT) and Exposure and Ritual Prevention (ERP; Rosa-Alcazar, Sanchez-Meca, Gomez-Conesa & Marin-Martinez, 2008; Foa, 2010; Abramowitz, 2006). Specifically, exposure with response prevention and cognitive restructuring are some of the most used treatments and most effective at reducing symptoms of OCD (Alcazar et al., 2008). Exposure and response prevention (ERP) by Meyer (1966) was the first success at using these treatment ideas on OCD, which had previously been considered treatment resistant and relied solely on talk therapy (McLean, Whittal, Thordarson, Taylor, Sochting, Koch, Paterson, & Anderson, 2001). ERP focuses on exposing oneself to thoughts and images that bring on anxious feelings that would ignite an obsession and a desire to ritualize. The exposure allows an individual to face a distressing situation or object and sit with those feelings of anxiety. The ritual prevention aspect is breaking the act of ritualizing when the anxious, distressing feelings arise. ERP thus involves practice to face the obsessions and try to not engage in the behavioral acts that people with OCD use to make themselves feel safe or reduce anxiety.

The first study to put Meyer's technique into practice was in 1971 with Rachman and colleagues using 10 participants with severe OCD doing 15 sessions of ERP compared to relaxation therapy over the course of seven weeks. The relaxation control treatment had patients reflect on their health and mood each day, and then think about their obsessive worries at the end of each session. The ERP condition had participants guided through their most distressing obsessions. There was significant improvement in the ERP group compared to the relaxation control group, and this continued to be true at the 3-month follow up (Rachman, Hodgson &

Marks, 1971). Modern CBT techniques for treating OCD developed out of ERP, and there are similarities, but CBT focuses on the interpretation of the thoughts before fully diving into exposure (Foa, 2010).

As opposed to ERP, CBT has patients think about their obsessions and understand them in a way that makes the thoughts less scary and more manageable (Foa, 2010). Therefore, the anxiety surrounding the thoughts decreases, and so does the intensity of the compulsions (Foa, 2010). This therapy reworks patients' thinking about obsessions and challenges them gradually after the patient has an understanding that the thoughts they have are part of their OCD. These obsessions can gradually be provoked and dealt with accordingly. CBT is regarded as being highly effective; while ERP is effective for most OCD patients who receive this treatment, about 25% to 30% of patients who begin ERP drop out of therapy prematurely. Among those who remain in treatment, about 80% respond well, yet 20% or more do not (Abramowitz, 2006). Therefore a big gap remains in those who are seeking treatment for OCD, but are not finding the right fit. Each individual with OCD has their own unique expression of it, and therefore the symptoms of OCD are a different arrangement and frequency within each person. Perhaps therapies need to be more specified to the subtypes of OCD the patient has.

The current study will measure symptom type and severity in order to get a better understanding of the type of people prone to mental contamination. Although it is known that this concept exists in individuals with OCD, it would be too broad to say that every individual is affected by this concept and would have similar feelings of contamination. This being said, therapies are relatively comprehensive to affect as many people as possible, but may not be focused enough on specific properties of their experience.

Obsessive-Compulsive Symptoms

Research into the themes of OCD have developed into five basic categories that represent the most common symptoms of OCD: 1) contamination/washing obsessions, which is cleansing rituals and washing behaviors; 2) harm/checking obsessions, being concerned about causing harm and reassurance seeking to prevent such harm; 3) symmetry obsessions concerning order and usually counting rituals; 4) hoarding, obsessions about keeping objects and collecting compulsions; 5) repugnant obsessions, having thoughts concerning violence, sex, and religion (Abramowitz, Taylor & McKay, 2009). These themes have been adopted from analyses of the Obsessive Compulsive Inventory (OCI) and Yale-Brown Obsessive Compulsive Scale, which are self-report measures of the frequency of obsessive symptoms (Leckman, Grice, Boardman & Zhang, 1997; Foa, Salkovskis, Kozak & Coles, 1998). Research on these scales have identified which symptoms are most strongly associated with other symptoms, and therefore which symptoms tend to occur together. For example, studies have paired harm obsessions with checking obsessions.

Less severe symptoms of OCD are also found in the general population (Gibbs, 1996). OCD samples most often see obsessions about contamination fears, fear of harming the self and others, and pathological doubt. In non-clinical samples, these are also the most common obsessions. In a 1988 study of 5,596 high school students who had not been previously been diagnosed with OCD, 35% met criteria for OCD, and of this group, 35% had obsessions about contamination, and 35% had obsessions about fear of harming self or others (Flament, Whitaker, Rapoport, Davies, Berg & Shaffer, 1988). Another study with an undiagnosed population of 497 adults found that the most common OCD compulsive symptom was checking (1.6%), followed by a category made up of repeating and counting (1.0%), and lastly washing (0.8%) (Henderson & Pollard, 1988). This finding is supported by a study conducted on 488 subclinical adolescents

in which the most common compulsive symptoms were arranging (56%), counting (41%), collecting (38%), and washing (17%) (Valleni-Basile, Garrison, Jackson, Waller, McKeown, Addy, & Cuffe, 1994). Which obsessive-compulsive symptom is most common needs to be further explored, however it seems that non-clinical and clinical samples alike experience similar types of symptoms.

Furthermore, most of the population (90%) experiences intrusive thoughts (Rachman & de Silva, 1978). In this study, clinical and non-clinical clients wrote out their current obsessions on a card. These cards were then given to psychologists and psychiatrists, who could not differentiate who had diagnosed OCD and who did not based on the content of the obsessions. The differences in these groups lie in that diagnosed participants' obsessions were longer, more frequent, and more distressing than their counterparts. In an empirical review article by Julien and colleagues (2007), researchers examined whether non-clinical samples have intrusive thoughts similar to obsessions within clinical samples. Ultimately, they found that intrusive thoughts are found commonly and extensively in non-clinical samples (Julien, O'Connor & Aardeema, 2007). Out of the thirteen studies reviewed, an average of 93% of non-clinical individuals had experienced intrusive thoughts. The form of these intrusions were in thoughts, images, and impulses.

Despite this consistency in findings, Julien and colleagues (2007) see limitations in these results, given that intrusive thoughts have no set definition. Labels in the reviewed studies ranged from "cognitive intrusions" to "normal obsessions". Each label had a definition about repetitive, unwanted actions; yet they all varied depending on the content of the study. Furthermore, the measures of intrusive thoughts vary widely. Writing about intrusions in a diary is a common way to collect data, yet there is no standardized way to judge these entries. Therefore, the internal

validity is challenged by the lack of standards and measures to identify intrusive thoughts. As for external validity, the populations are largely white, women undergraduates (Julien et al., 2007). As with many areas of psychology, better representation is needed in these samples, both non-clinical and clinical. The important takeaway here is that it seems that more people than not have experienced an intrusive thought. This is key in understanding how a universal trait becomes a symptom of a mental disorder.

Another review article came to a similar conclusion. Examining prevalence of intrusive thoughts in the general population, researchers found in highly regarded studies that anywhere from 41-100% of nonclinical participants have experienced an intrusive thought (Berry & Laskey, 2012). Here, the researchers propose that the definition of an "intrusive thought" varies significantly. Not only does each study use its own definition which fluctuates in specificity, but instruments used to measure intrusive thoughts vary as well. For example, the Obsessional Intrusions Inventory (OII) asks participants to recall thoughts and images that are upsetting or unwanted; or impulses that are irrational, unrealistic, and foreign to one's character (Purdon & Clark, 1993). The Cognitive Intrusions Questionnaire (CIQ) assess cognitions about personal health, painful or embarrassing experiences, personally unacceptable sexual behavior, verbal aggression, a loved one suffering from a fatal disease, or a loved one being in an accident (Freeston, Ladoucer, Thibodeau & Gagnon, 1991). Additionally, older instruments such as the Cognition Checklist (CCL; Hollon & Kendall, 1980) and Automatic Thoughts Questionnaire (Beck, Brown, Steer, Eidelson & Riskand, 1987) asked questions about failure, inabilities, and thoughts that were related to depression rather than obsessions. Although research on OCD has moved away from the latter two instruments, there is still variation in how current instruments ask about intrusive thoughts as the subject of these intrusions differ.

Berry and Laskey (2012) believe this non-standardization could be central to the wide range in the nonclinical population reporting intrusive thoughts. As for the clinical population, the researchers argue that the continuum theory (Clark & Rhyno, 2005), which states that there is a degree of infrequent, intrusive thoughts to clinical obsessions, needs to be revised for the sake of clinical populations (Berry & Laskey, 2012). The review refutes the previously-accepted idea that intrusive thoughts are similar to clinical obsessions, just to a lesser degree. The authors claim that clinical obsessions are more frequent, being that the obsessions are re-experienced more. Additionally, clinical obsessions are more violent, aggressive, bizarre, and spontaneous than non-clinical intrusive thoughts (Berry & Laskey, 2012). They suggest that it is possible that people with OCD appraise their intrusive thoughts differently, and thus obsessions are formed because of the personal stake these individuals feel about those thoughts rather than, say, distracting themselves from the thought. Obvious overlaps between intrusive thoughts and clinical obsessions are present. However, more severe obsessions, which occur in the clinical population, may facilitate negative appraisals, aversive strategies to avoid the obsession, and greater distress to the individual. Despite the variety in definitions and measures, the non-clinical population shares the experience of having intrusive thoughts with the clinical population. This factor allows a greater number of studies to be conducted and compared. Additionally, this similarity is a gateway to understanding how a typical phenomenon turns into a clinical symptom.

Dysfunctional Beliefs

Dysfunctional beliefs have been theorized to develop from normal intrusive thoughts into clinical obsessions (Salkovskis, 1985; Rachman, 1978). This “Model of Obsessions” states that intrusive thoughts occur in most people, but usually these thoughts are seen as irrational and the

model stops there. However, in people with OCD, the thought is perceived as being important and telling about one's character, and brings on great distress and urges to neutralize. This brings compulsions into the equation since these repetitive behaviors are employed to avoid or reduce the effects of the intrusive thoughts. A group of OCD researchers called the Obsessive Compulsive Cognitions Working Group (OCCWG) developed six types of beliefs, or cognitive contents, that assist in the development and maintenance of OCD (1997). These beliefs are 1) inflated responsibility, believing that the content of obsessions are the individual's sole responsibility, regardless if they cause the harm or fail to prevent harm; 2) importance of thoughts, the belief that having an intrusive thought influences the likelihood of the thought happening, or that having that thought is just as bad as the content of it; 3) control of thoughts, where individuals feel it is possible and essential to have complete control over their own thoughts; 4) overestimation of threat, these individuals exaggerate the likelihood and severity of the thoughts; 5) intolerance of uncertainty, difficulty with tolerating uncertainty, and may affect decision-making; 6) perfectionism, the inability to tolerate mistakes, which may include repeating an action until it is done "just right" (Tolin, Woods & Abramowitz, 2003; OCCWG, 1997).

The OCCWG created the *Obsessive Beliefs Questionnaire* (OBQ) to analyze the six domains of thinking that are important to the development of OCD. Revisions to this survey has divided domains into three subscales: 1) responsibility and threat estimation; 2) perfectionism and tolerance of uncertainty; and 3) importance and control of thoughts (OCCWG, 2005). There is currently no method that predicts what OCD symptom one may be vulnerable to. However, research has started to link dysfunctional beliefs to OCD symptom type (Freeston, Rheaume, & Ladoceur, 1996; Lee & Kwon, 2003). By identifying thought patterns before compulsive

behavior starts, it is possible that dysfunctional beliefs could be used as a predictor of the symptom type of OCD. For example, the checking subtype has a greater association to the inflated responsibility belief (Rachman, 1993). On the other hand, overestimation of threat may be a better predictor of checking when compared to washing (Sookman & Pinard, 2002). Contamination may be predicted by overestimation of threat (Rachman, 2004).

In a meta analysis by Julien et al. (2006) researchers analyzed empirical evidence of relationships between OCD symptom subtype and domains of thinking, which revealed many contradictions amongst the literature (Julien, O'Connor, Aardema, & Todorov, 2006). There was some support for linkage, with importance/control of thoughts relating more to rumination than washing subtypes. Additionally, perfectionism/uncertainty was related to checking, and importance/control of thoughts was related to higher impulse phobia scores, which was defined as intrusive thoughts that are more violent and impulsive in nature (Julien et al., 2006). This analysis includes studies before the five-factor model of symptoms commonly used today was formed. Therefore, not all of the symptoms were analyzed. Further meta analyses would need to be done with new literature to give a better understanding of definite relationships. However, it is important to add to this gradually growing evidence to understand OCD in a more specific sense down to the symptom level. This will allow for better interventions that address the symptoms of a person and the route their beliefs take to develop such an obsession. Such discoveries allow for more productive therapies, and the opportunity to catch signs of OCD earlier on.

Mental Contamination

The most common OCD symptom seen in individuals is obsessions with contamination, with about 38% of people diagnosed with OCD experiencing a fear of contamination that is usually paired with compulsive cleaning (Coughtrey, Shafran, Knibbs, & Rachman, 2012).

Physical contamination is regarded as an intense feeling of being dirty or polluted from direct or indirect contact with an object that is the perpetrator of spreading its dirtiness (Rachman, 2004; Rachman & Hodgson, 1980). Common pollutants are blood, saliva, decaying objects and food, people who are sick, hospitals, animals, and fecal matter. Mental contamination, on the other hand, arises as a concept of feeling contaminated internally with or without the presence of contact with a pollutant (Rachman, 1994). There is a great amount of overlap between physical and mental contamination as both are encompassed by feelings of discomfort and dread, the urge to wash oneself and clean, and avoidance of becoming recontaminated (Coughtrey et al., 2012). Where they differ is that mental contamination can be caused by both physical contact with an undesirable object and indirect contact through intrusive, repugnant thoughts, memories, and mental images. Traditional (physical) contamination results primarily from direct contact with a pollutant, but can indirectly contaminate if specific objects hold enough significance in similarity to an actual pollutant, and therefore the contamination is carried on through the laws of contagion or similarity (Rozin & Fallon, 1987). A "magical" transmission is believed to occur where a neutral object is just as threatening as an actual pollutant for its relation to the pollutant, or if it shares similar characteristics. An example would be if an individual is afraid to use a spoon a person with cancer has used in the past, despite the spoon being thoroughly washed, and therefore fears they will contract cancer from using that shared object.

Mental contamination focuses on trying to rid the self from an unwanted thought or image that can be distressing, disgusting, violent, immoral, or sexual in nature (Fairbrother, Newth & Rachman 2005). The feelings of dirtiness and the urges to clean parallel the contamination symptom, but do not offer the same relief that cleaning compulsions give individuals with physical contamination OCD. Mental contamination has been regarded as "less

identifiable and less likely to be ‘fixed’ by cleaning” (Cougle, Lee, Horowitz, Wolitzky-Taylor & Telch, 2008, p. 341). Specific bodily locations that feel dirty are less precise than regular contamination as there is not a direct location of contact. Instead, the feeling is more internalized, which makes it harder to find relief when washing oneself to get rid of the contaminated feeling.

Mental contamination can also be a symptom of posttraumatic stress disorder (PTSD; Fairbrother & Rachman, 2004). Studies have found a greater disgust propensity as well as greater negative emotions such as sadness and anger in individuals with PTSD (Finucane, Dima, Ferreira, & Halvorsen, 2011). Additionally, the severity of PTSD symptoms was predicted by greater peritraumatic (occuring at the time of trauma) disgust and fear in soldiers deployed to war zones in Afghanistan (Engelhard, Olatunji, & de Jong, 2011). Likewise, there is an association between contamination symptoms of OCD and disgust (Olatunji, Cisler, McKay & Phillips, 2010). Therefore, disgust is believed to be a possible underlying cause of both OCD and PTSD. Although OCD is only in 1% of the general population, 12-month prevalence may range from 24% to as high as 57% in those also diagnosed with PTSD (Brown, Campbell, Lehman, Grisham & Mancill, 2001; Kessler et al., 2005). The feelings of disgust and dirtiness that linger after a traumatic event such as sexual assault may explain this link between the two. Sexual trauma especially has been linked to mental contamination. When given a script detailing an incident of a sexual assault, survivors of sexual assault felt significantly greater feelings of dirtiness and urges to wash than women who did not have a past experience with sexual assault (Badour, Feldner, Babson, Blumenthal & Dutton, 2013). Additionally, post-traumatic stress symptom severity predicted greater symptoms of mental contamination.

Initial Studies on Mental Contamination

Only recently have studies emerged trying to understand how mental contamination works in individuals. The first study conducted in 2004 focused on female survivors of sexual assault. The participants were asked to recall a pleasant memory as well as the memory of their assault. Out of the group, 60% reported feelings of mental contamination and there was a greater urge to clean when the women thought of their assault opposed to the pleasant memory (Fairbrother & Rachman, 2004). Out of the 50 women in the study, nine got up to wash their hands following the recall of the sexual assault when told that they could. A similar finding was present in a follow up study the next year. In this study, female undergraduate students were asked to imagine a scenario of a non-consensual kiss at a party (Fairbrother, Newth, & Rachman, 2005). Feelings and urges were asked after a five minute break where a research assistant offered everyone a glass of water and gave instructions on how to find the bathroom. Of the 121 women in the study, eight engaged in washing behaviors to rid themselves of reported dirty feelings. Additionally, students in the non-consensual scenario had greater feelings of mental contamination, urges to wash, and negative emotions compared to the consensual kiss group. These findings were significant as the memories and feelings from an assault that had happened months or years before still evoked intense feelings of impurity and humiliation.

A reframed version of this study occurred in 2012 with male participants being instead the perpetrators of a non-consensual kiss (Rachman, Radomsky, Elliot & Zysk, 2012). By listening to an audio recording with their eyes closed, participants imagined they were at a party and kissed an unwilling young woman. This study examined if being the perpetrator could draw feelings of mental contamination rather than depending upon past memories that would dig up feelings from that event. Participants gave a baseline measurement of feelings of anxiety, anger, disgust, and sadness, and then reported those feelings after the task. Afterwards, the participants

reported if they had engaged in cleaning behaviors during a break such as washing hands or drinking the water offered to them and why, which gave reasons such as wanting to counteract the effects of the images from the task. Additionally, reports were given for what their thoughts during this break were in which strategies were revealed such as "thinking of something else," "thinking of something cheerful," and "started playing with a pen," (Rachman et al., 2012). Overall, the perpetrators reported higher levels of anxiety, disgust, guilt, and greater feelings of contamination compared to the consensual kiss group. The researchers reported that effects were enhanced by a sense of betrayal included in the experimental group. This betrayal was that the unconcsensual kiss was with a woman who had just summoned the courage to attend a party after recovering from a sexual assault in the past. Researchers hypothesized that betrayal would enhance urges to wash and intensity of dirtiness. Participants who were assigned to be perpetrators felt dirtier after the manipulation, but urges to wash and actual washing behavior was not significant, although a few men did engage in such behavior (Rachman, et al., 2012).

Other studies focusing on washing behavior reveal conflicting results in trying to document the relationship between cleansing behaviors and morality. A term dubbed the "Macbeth Effect" has recently been explored in mental contamination work for its similarity of experience to Shakespeare's Lady Macbeth who cannot stop rinsing her hands of imaginary blood after arranging murder. This effect states urges for physical cleansing arise from threats to moral purity (Zhong & Liljenquist, 2006). Researchers had undergraduate students handcopy in detail either an ethical or unethical scenario. Afterwards, participants were asked to rate the desirability of a selection of products. These products were classified as a "consumer" (candy bar, juice, batteries) or a "cleansing" product (antiseptic wipes, soap, Lysol disinfectant).

Participants who wrote about the unethical scenario rated the cleansing products as significantly more desirable (Zhong & Liljenquist, 2006).

In a second study, participants were asked to recall an unethical deed from the past and then were asked to either wipe their hands with an antiseptic wipe or do nothing. Afterwards, participants were asked to complete an emotional state questionnaire and then asked to volunteer for another research study. Those who cleaned their hands were significantly less likely to volunteer (74% in non-cleansed condition offered to volunteer, 41% in the cleansed condition offered; Zhong & Liljenquist, 2006). Also, participants reported less intense negative feelings after they were able to clean themselves. This study served as an example that cleansing is desired when faced with moral impurities. Additionally, the results suggest that engaging in cleansing rituals may counteract negative feelings associated with the self, meaning that when people feel they have morally done something good, they do not feel an urge to engage in another moral activity.

A 2014 study attempted to replicate this "Macbeth Effect" in a 4-part series. In the first study, college undergrads in the unethical condition did not rate cleaning products as more desirable than consumer products (Earp, Everett, Madva & Hamlin, 2014). Additionally, participants were asked how much they were willing to pay for each product, which were the same products as in the original study, except for American brands swapped out for British ones. There were no significant differences between conditions in willingness to pay more for cleaning products than consumer products. The researchers then replicated the study once more, but instead of using a British sample as they did in the first study, they used a U.S. sample to more accurately depict the population used in the original study by Zhong and Liljenquist (who used U.S. participants). Again, there were no significant differences in desirability or willingness to

pay for cleansing products. A third attempt at replication was tried, this time with U.S. participants writing out a story of an unethical deed by hand rather than typing it. The researchers found no significant differences, suggesting that replication of the Macbeth Effect is difficult to find. Additionally, other modes of examining mental contamination may be necessary. This study focused on a single unethical deed. Perhaps a more effective manipulation is needed in order to surface feelings of mental contamination.

The study was carried once more with an Indian sample because Earp and colleagues felt Indian culture had a stronger emphasis on moral purity, and thus there could be a difference to the previous samples. However, no such differences arose, and thus the researchers concluded that they could not replicate the findings of Zhong and Liljenquist (2006), showing no relationship between physical and moral purity. Earp and colleagues (2014) argued that they do actually believe there is a relationship between physical and moral purity and that the original study had lots of promising features and background. Their issue was publication bias in that there were two other attempts at replicating the findings of Zhong and Liljenquist that did not get published for their null findings. They believe more evidence could come about for the "Macbeth Effect," but not without null findings first being published in order to establish a more expansive backbone to curate better measures of examining moral psychology.

Mental Contamination in Clinical Samples

The studies above have shown that non-clinical samples are also capable of having symptoms of mental contamination by recalling an immoral act (Zhong and Liljenquist, 2006), imagining receiving a non-consensual kiss at a party (Fairbrother et al., 2005), and being the perpetrator of a non-consensual kiss (Rachman et al., 2012). Additionally, past experiences have evoked mental contamination if there was trauma from a sexual assault (Fairbrother & Rachman,

2004). In clinical samples, symptoms of mental contamination have been noted in individuals with symptoms of OCD and PTSD (Olatunji et al., 2012; Dykshoorn, 2013). This theory of mental contamination had a lot of significance for OCD as there seemed to be a lot of overlap in symptoms concerning cleansing rituals and being a good person. The actual empirical evidence of this theory with a diagnosed population is more limited. In one of the earliest studies, a sample of 20 individuals with contamination-based OCD were interviewed to explore whether they showed feelings of mental contamination (Coughtry, Shafran, Lee & Rachman, 2011). Every participant reported feelings of dirtiness even in the absence of a contaminant, such as feeling dirty by doing something wrong or being superstitious of certain numbers. Additionally, 85% of participants felt dirty even when they knew they were clean, 85% felt dirty when recalling a memory that was about past physical contact with a contaminant or something immoral, 75% felt better after cleansing rituals when feeling contaminated, and 80% employed neutralizing strategies other than cleaning in order to remove feelings of dirtiness. This study supported Rachman's initial beliefs about mental contamination and OCD, and demonstrated that a real link does exist.

A clinical replication of Zhong & Liljenquist (2006) was done with an OCD sample as an experimental group, and had better success than the Earp et al. (2014) replication (Reuven, Liberman & Dar, 2013). Participants recalled an immoral deed from the past and typed it into a computer. Half of the participants wiped their hands before the next stage of the experiment which was filling in an emotional state questionnaire. After, all participants were asked if they would volunteer to participate in another study for a graduate student with low funds. There was a significant effect of those with OCD who did not get to wipe their hands being much more willing to volunteer than those who did wipe their hands with OCD, and in comparison to the

healthy control, which was not as willing. This study showed that cleansing behavior effectively relieved feelings of guilt and immorality, at least for that short moment, in individuals with OCD. Unlike the Earp et al. (2014) study, Reuven et al. (2013) produced feelings of contamination in its participants, even in the healthy controls, though the manipulation task had a greater effect on the OCD group.

Samples like Reuven et al. (2013) are telling as people with OCD may feel the symptoms of mental contamination more intensely. Unfortunately, the literature of mental contamination is largely based on non-clinical samples, and usually with an undergraduate population. One could imagine that an in-patient sample would produce different results. Additionally, the age range is conflated to the early twenties, and thus we know little about how the older population feels mental contamination. However, the benefits of a non-clinical sample are that more participants can be incorporated into the study in order to examine an idea as novel as mental contamination. Additionally, non-clinical samples provide evidence that mental contamination exists in populations undiagnosed with OCD, and thus obsessive-compulsive symptoms may be more common than we believe. While mental contamination is considered to be an element of OCD, it may actually exist beyond this diagnosis, and we may see it in other disorders as well such as PTSD. The current study will look at a non-clinical sample but be open to all mental diagnoses, ages, races, genders, and locations. Therefore, the results of this study will not be able to provide evidence for how mental contamination affects people with OCD, but provide a sample similar to the general population.

Neutralization Strategies

Neutralization strategies are compulsive behaviors. Cognitive-behavior theories view neutralizations as learned and voluntary responses to intrusive thoughts (Salkovskis,Westbrook,

Davis, Jeavons & Gledhill, 1997). This behavior reinforces intrusive thoughts, and thus a pattern of intrusions and combating the anxiety of such thoughts ensues. As previously stated, intrusive thoughts are experienced by almost everybody, and often cause no harm. People with OCD develop obsessions from intrusive thoughts because instead of disregarding the thought, it is appraised as threatening. Additionally, Salkovskis notes that in OCD, the intrusions are given personal responsibility by the individual, and this could be from personal beliefs and pre-existing attitudes that may make the individual vulnerable (Salkovskis et al., 1997). Due to the responsibility aspect, the individual is compelled to prevent such a thought from causing harm to themself or others.

A feature of OCD are neutralization strategies which become compulsions to ward off intrusive thoughts. Any person may have intrusions that are deflected by a neutralization every once in a while, but people with OCD more often than not will use a neutralizing strategy (Salkovskis & Harrison, 1984). It is theorized that people neutralize because they feel personally responsible if an intrusive thought were to occur (Forrester, Wilson, & Salkovskis, 2002). For example, if the intrusion is “my brother will fall off the top of the ladder,” then the individual neutralizes, or else they will have commanded the accident to happen, or the accident will occur because they did not try to neutralize it away. Salkovskis (1991) has described neutralizing as a safety-seeking behavior. However, such behavior is ultimately detrimental because it reinforces counterproductive behaviors. Salkovskis and colleagues have three reasons as to why this occurs: neutralizing prevents the individual from seeing that the event would not occur regardless of their behavior; neutralizing focuses the individual’s attention on harm and how to prevent it; and intrusions become more frequent with greater attempts to neutralize (Salkovskis, Thorpe, Wahl, Wroe & Forrester (2003).

OCD and Morality

As previously stated, OCD operates in a perpetual manner with intrusive thoughts being appraised as highly important, and neutralization strategies are a counterintuitive method to alleviate distress from these thoughts. This inherently creates a harmful cycle where compulsions are employed to reduce intrusions, and the individual does not learn that the thoughts are not actually threatening to their livelihood. The interpretation is usually a misappraisal as an individual with OCD believes the thoughts are a threat to how they see themself (Clark, 2007). Researchers have found that people with OCD are more likely to doubt their own self-worth, morality, and lovability (Bhar & Kyrios, 2001). This could mean OCD is affiliated with a vulnerability to doubting oneself. Clark (2004) explains that individuals have a threatened positive self because the intrusive thoughts make them believe they have infractered their own morality and social approval. This makes sense when considering the dysfunctional belief of inflated responsibility as one feels a personal responsibility to prevent harm from happening. It has been accepted by researchers that people with OCD appraise their intrusive thoughts with greater significance about themselves and the world. Therefore, the intrusions are believed to be detailing incompetencies within their own lives (Doron & Kyrios, 2005; Clark, 2004; Rachman, 1997).

The concept of Thought-Action-Fusion (TAF) emerges here because it is the phenomenon of people interpreting their thoughts to have power to influence their everyday life (Rachman, 1993). There are two types of TAF: likelihood and moral (Siev, Chambless, & Huppert, 2010). Likelihood-TAF is the belief that having an intrusive thought makes that intrusion more likely to happen in real life. Therefore, if someone were to have an intrusive thought that their sister is held at gunpoint, then the idea is that now that thought has been

spoken into the universe, it is more likely to happen. Moral-TAF is the belief that having an unjust thought is the moral equivalent of actually doing that intrusion. In the situation of your sister, thinking she is going to be held at gunpoint is just as bad as her actually being held at gunpoint. Since you willed the thought, this makes you an immoral person. It is possible to have one TAF and not the other, but it is common for both to be at play (Shafran, Thorardson, & Rachman, 1996). Research into these areas has identified self-perception as being a major role within OCD. Doron et al. notes that the self is multidimensional, with some domains holding greater significance, such as morality of the self (Doron, Moulding, Kyrios & Nedeljkovic, 2008). People with OCD may have greater anxiety about intrusive thoughts that pertain to their own morality. Additionally, it has been observed that OCD individuals have more morality-based obsessions, especially with religious Catholics and Protestants who have reported a greater fear of god, and higher TAF-moral (Abramowitz, Deacon, Woods, & Toolin, 2002; Shafran et al., 2006). Religiosity has a strong influence on self-perceptions of morality as well as the content of obsessions.

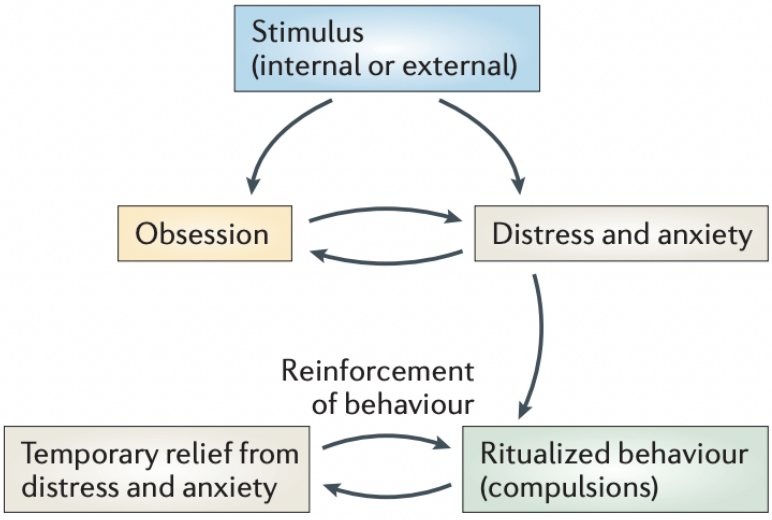

Figure 1. Pauls et al. (2014) theoretical basis of obsessive-compulsive disorder. An individual with OCD overestimates the potential harm of a stimulus, resulting in feelings of anxiety and

repeated attention, forming an obsession. In order to temporarily relieve the distress and anxiety from the obsession, an individual will engage in neutralizing strategies. Relief from the stressor is associated with the strategies, which results in a cycle of repetitive behaviors and forms into compulsions.

The OCD symptom of contamination appears to be linked to morality in a way. Washing behavior and cleanliness are attributes of certain religions, and thus may influence specific washing obsessions. For example, Khanna and Channabasavanna (1988) observed that a high percentage of OCD-diagnosed Hindus had washing obsessions. The researchers noted that this religion encourages cleanliness and purity, and thus may have influenced washing behavior as an obsession. Other religions may have an emphasis on cleanliness, such as orthodox Jews and Muslims (Okasha, Saad, Khalil, Dawla, & Yehia, 1994). The difficulty in linking religiosity and OCD subtype is separating culture as a variable. It is possible that washing behavior may be more characteristic of Indians rather than Hindus, for example. Therefore, more evidence is needed before making such claims. Fortunately, research is noticing patterns between morality and cleanliness in general.

Religion aside, OCD has a relationship with self-sensitivity in relation to morality (Rachman & Hogson, 1980). As previously stated, research into mental contamination has begun to investigate feelings of contamination in the absence of a physical contaminant. Morality is a concept that could be used to summon feelings of mental contamination. Based on the moral foundations theory, there are five domains across cultures that signify moral dilemmas (Haidt & Joseph, 2004). These domains are care/harm, fairness, group loyalty, authority/subversion, and purity/sanctity. The purity foundation is where contamination emerges as this category has been associated with physical contamination, disgust, degradation, and deviant behavior (Haidt, Koller, & Dias, 1993; Haidt & Graham, 2007). Since people with OCD may perceive themselves as less competent in areas such as their own morality, they may have heightened anxiety and

compulsions surrounding contamination. Research has identified that people with OCD have greater sensitivity about the moral domain than non-clinical participants (Doron et al., 2008). In one study, after controlling for depressive symptoms, higher morality sensitivity was associated with higher symptoms of contamination. A second study found that priming people with negative self-perceptions in the morality domain significantly increased contamination-related tendencies compared to a neutral morally-irrelevant self-perception (Doron, Sar-El, & Mikulincer, 2012). This supported past research by Doron and Kyrios (2005) who proposed that threats to one's competency in OCD-related domains (morality) can threaten an individual's self-worth, and result in neutralizing behavior to counteract such threats.

These studies provide a basis of self-perceptions of morality having an influence on OC-symptoms, especially contamination. The studies thus far have evaluated self-reports of morality, job competency, and social acceptance (Doron et al., 2008). However, having participants face moral transgressions apart from themselves is less supported. Additionally, comparing moral transgressions to physical contamination acts have not been looked at exclusively. The current study aims to provide a better understanding of these two dimensions of OCD in direct comparison.

The Present Study

The background literature has provided a basis for observing mental contamination with a non-clinical sample. These findings have provided support of creating a manipulation that is capable of bringing on feelings of mental contamination through imagined scenarios. However, these scenarios involve an aspect of physical contact in order to feel contaminated (i.e. non-consensual kiss, assault). My question is whether or not mental contamination can be evoked in the absence of any physical contact. I believe yes if moral transgression is a variable.

Based on findings centered around the MacBeth Effect (Zhong & Liljenquist, 2006; Earp et al., 2014), it is possible that people may have stronger urges to wash themselves when reflecting on an immoral deed, or imagining a situation where one acts maliciously. Taking this into account, my study will observe if moral transgressions are capable of evoking feelings of dirtiness and impurity, and therefore produce an effect of mental contamination.

Three vignettes are curated in hopes of summoning feelings of mental contamination. One is a neutral story acting as the control, and two are the experimental variables: stories about either 1) physical contamination or 2) being the perpetrator of a moral offense. Physical contamination can be directly compared to moral transgression to identify if morality is as persuasive as a factor in mental contamination. Additionally, symptoms of OCD will be observed through the use of two self-reports, the Obsessive-Compulsive Inventory Revised (OCI-R), and the Obsessive Beliefs Questionnaire (OBQ-20), regarding behaviors and thought patterns related to obsessive-compulsive behavior. The current study will explore if there are relationships between OCD symptom type and specific domains of thinking as predictors of feeling more contaminated in addition to looking at morality as a factor in producing feelings of mental contamination. I hypothesize the following:

H1: The contamination groups (physical contamination and moral transgression) will score higher on the VAS post-vignette than the control (neutral) group.

H2: Individuals scoring higher on the OCI-R will report higher ratings on the VAS post-vignette compared to individuals with lower OCI-R scores.

Exploratory hypotheses:

H3: Individuals scoring higher on in the OCI-R will be more likely to report use of a neutralization strategy.

H4: Specific OCD beliefs via the OBQ will predict greater distress from the contamination vignettes via post-vignette VAS scores (e.g., higher scores on overestimation of threat subtype report higher VAS scores).

Method

Participants

There were 112 participants in the study ranging from 18-72 years old (M= 32.12). One participant was excluded for exiting the survey before completion (N = 111). Recruitment online allowed for a greater variety of people, such as 14 countries of residence being represented, with most participants from the United Kingdom (42), followed by Poland (17), Portugal (10), and South Africa (9). Four races were represented: white (92), black or African American (10), Asian or Asian American (2), and other, which was written-in text of Latinx (3), biracial black-white (1), and the rest prefered not to say. Participants reported their gender as either female (64), male (46), or gender-nonconforming/non-binary (1).

Power Analysis

Prior to collecting data, an a priori power analysis for ANOVA tests was conducted through RStudio to confirm the number of participants necessary. The analysis parameters were: power of 0.80, alpha level of 0.05, a small/medium effect size of 0.3 for 3 groups. This yielded 111 needed participants. These parameters were met by recruiting the necessary number of participants (N=112).

Procedure

Recruitment occurred through the Prolific interface, where participants self-selected themselves to take part in the online survey of interest. There was no exclusion criteria through this program, but participants had to be at least 18 years of age, and the study was conducted in

English. The study was advertised as a "moral beliefs and dilemmas" study. Recruitment occurred for two days, March 15 - 16, 2022. The entirety of the study was completed in its entirety in one session done anonymously online using the Qualtrics survey platform. Due to Prolific acting as a mediator between researcher and participant, no identifiable data was collected, and participants were paid $9.54/hr, for on average, 13 minutes of participation.

In the consent form, participants were told they were taking part in a study examining attitudes and feelings about moral dilemmas. After giving consent, participants completed the Visual Analog Scale (VAS) to assess feelings and urges at baseline. Participants were then randomly assigned one of three conditions: physical contamination, moral transgression, or control group. The only difference amongst the groups was the type of vignette assigned, and participants were given the same survey format regardless of their condition. Next, everyone completed the VAS a second time. Additionally, a new question was added to the end of the VAS which served as a manipulation check. Using the same slider format of the VAS, the question asked, "How much did you agree with the actions of the narrator in the short story?"

After completing the VAS, the next screen informed participants that they were given a one minute break to get comfortable and to click next for the minute to begin. On this screen, a countdown appeared and progression to the next screen had to wait until the minute was up. The break could be seen as a way to relax after reading potentially distressing vignettes. My intention for the break was to give people the opportunity to engage in a neutralizing strategy to reverse the anxiety-inducing effects of the vignettes. After the break, the next screen asked, "What strategies did you use during the break to relax? (Select all that apply)" A list of 15 options was provided with answers such as "tried to control the thought I had," "counted," and an option for "did nothing," and "other," which allows participants to fill in an option. While it was not

expected that many participants would engage in a neutralizing behavior because it is seen as a behavior depicted in clinical populations, it would be useful to observe if non-clinical participants engage in such behavior after imagining an uncomfortable scenario. This was inspired by Rachman et al. 2012 in which participants were given a 5-minute break to observe whether washing behaviors would be engaged in following a mental contamination thought-task. Reports were given for any behaviors that were engaged in during the minute, and responses were given about playing with a pen to trying to think of something other than the previous task. Although only a few people *did* wash their hands, it was an interesting finding nonetheless to observe how a non-clinical population coped, and what strategies were employed.

Afterwards, participants were given two surveys to complete about OCD symptoms and thinking. It was not stated that these surveys specifically look at OCD, and instead participants were informed that the surveys were about attitudes and beliefs that some people held. The OBQ came first, which measured dysfunctional beliefs related to OCD. The second survey was the OCI-R which looked at OCD symptom type and severity. Following the OCI-R was a debriefing statement informing of the study's intent to look at feelings of contamination in the absence of a contaminant, and domains of thinking related to OCD. The statement clarified that two of the vignettes were purposely uncomfortable to read to bring on feelings of dirtiness. It was also stated that while OCD-related thinking was being observed, many people share contamination-related feelings, and the study is for everyone.

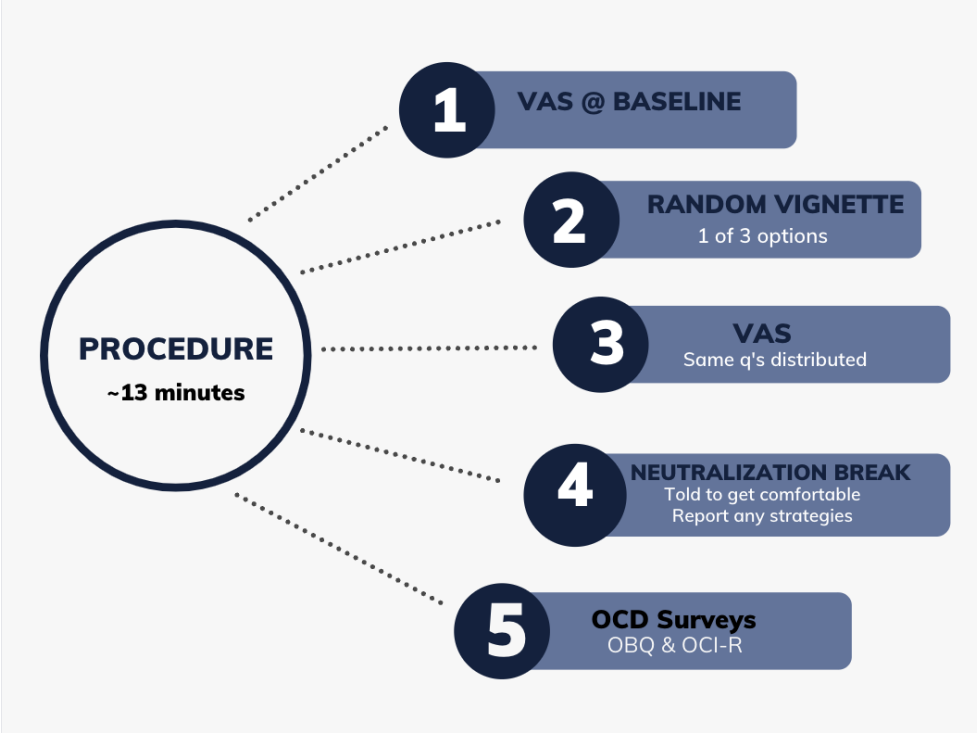

Figure 2. Breakdown of the study in order. All measures conducted online during one session that took on average, 13 minutes.

Measures

Obsessive Beliefs Questionnaire (OBQ-20)

The OBQ-20 is a 20-item self report questionnaire adapted from the original OBQ-44 into a simplified format (Moulding, Anglim, Nedeljkovic, Dorin, Kyrios, & Ayalon, 2011; OCCWG, 2001). The survey aims to identify cognitive domains within OCD on clinical and non-clinical samples using a 7-point Likert scale. The cognitive domains can be placed into three categories: 1) responsibility/threat estimation; 2) perfectionism/certainty; 3) importance/control of thoughts. This first revision depicts high internal consistency and validity based on these groupings (Cronbach *a*) ranging from 0.89-0.95 (OCCWG, 2005). The current version offers the best fit across undergraduate and adult samples, and can assess cognitive domains with half as many questions as the OBQ-44 (Fergus, Latendresse & Wu, 2017). Additionally, this version allows

for an assessment of threat and responsibility. The survey breaks down areas of thinking that are typically found to be central to OCD, also known as dysfunctional beliefs. Scoring of the survey demonstrates if an individual is high in beliefs common in OCD, and the specific subtype of thinking they may be prone to. Such statements are: "If I can't do something perfectly, I shouldn't do it at all," and "Having nasty thoughts means I'm a terrible person." Each of these statements is associated with a subscale.

Obsessive Compulsive Inventory - Revised (OCI-R)

The OCI-R by Foa et al. (2002) has been adapted from the original 1998 version, which had good to excellent internal consistency and test-retest reliability (range .59-.96; *r*s = .77-.97). This version improves by simplifying the survey to 18 items on a self-report Likert-type scale. The number of items per subscale were reduced, so now there are 3 statements across 6 subscales: a) washing, b) obsession, c) hoarding, d) ordering, e) checking and f) mental neutralizing. The current version has good internal consistency as Cronbach alpha coefficients for the full scale ranged from 0.81 to 0.93, and for the subscales ranged from 0.57 to 0.93. Overall, the scale assesses the severity of symptoms common in OCD as well as the type of symptoms. Clinical and non-clinical populations have used this scale in OCD, PTSD, and generalized social phobia (GSP).

Mental Contamination Visual Analog Scale (VAS)

A VAS was created specifically for this study's focus on mental contamination. These visual scales allowed for individuals to quickly self-rate their current state of being without being bogged down by numbers. The first use of a visual scale was used back in 1921 (Hayes and Patterson, 1921), and has since evolved into a tool to assess pain, hunger, and even mood and anxiety in clinical settings (Ahearn, 1997). Typically, a VAS has "anchor words" at the ends of

the scales to label the two extremes. These words are kept brief in order to keep the scale simple and appealing to use. Traditional paper methods leave researchers measuring with a ruler where a participant marked along the scale. Now, online versions of the VAS have allowed for more precise data collection, even easier use by a slider format, and ability to capture subtle changes (Abend, Dan, Maoz, Raz & Bar-Haim, 2014). This capturing of change is especially important for the present study as the VAS will be employed twice: before and after the vignette manipulation task. To my knowledge, no prior VAS have been created to measure mental contamination or the related categories of contamination and dirtiness. For the sake of this study, a scale was created specifically for the intentions of measuring feelings of dirtiness and urges to clean. There are six "sensation" questions that ask the participant "how excited are you right now," and "how clean do you feel." Three of these questions are fillers, while the other four measure dirtiness, cleanliness, distress and disgust. There are six "urges" questions with 4 fillers, and two mental contamination measures (e.g., For fillers: "how great is your urge to laugh?"; mental contamination: "how great is your urge to clean?" and "how great is your urge to do good?" (see Appendix E)).

The Vignettes

Participants received one of three vignettes. One is a story that involves being physically contaminated, one is about a moral transgression, and the other is the control which was a neutral story. To standardize the stories, each vignette is fourteen lines in length. Additionally, all are from the first person perspective, and therefore you are reading as the perpetrator of the actions in the story. The control story is about taking a walk around the neighborhood where you walk beside a body of water and observe other people walking. To ensure that the physical contamination story was the sole vignette responsible for evoking feelings of contamination, and

accounting for the possible effects of the pandemic and interacting with others, the neutral story does not involve face-to-face interactions with other people or objects, solely observations, and takes place within nature. The physical contamination story is about coming across a deer recently struck by a car on the side of the road. As the narrator, you inspect it, touch it, press upon it and observe the openings and gore. The moral transgression story is about the narrator sabotaging a coworker because you are both up for the same promotion. As the narrator, you download child pornography onto the coworker's laptop and leave an anonymous note with the boss concerned about what is on his laptop. The coworker is seen being taken into a room with the boss and authority figures, and it is presumed your scheme has worked. Both of the manipulation vignettes attempt to evoke feelings of mental contamination by making the reader feel dirty and impure in different ways. The vignettes should only take a minute or two to read.

Study Design

For the first hypothesis, a 2 (Time: Pre and Post) x 3 (Condition: Physical Contamination, Moral Transgression, and Control) mixed Analysis of Variance (ANOVA) was conducted for each variable of mental contamination. Time is a within-subjects factor as it is a repeated measure since VAS scores are being compared at baseline and post-vignette reading. The condition is a between-subjects factor since each group has its own set of participants. Multiple correlations were also executed for the second hypothesis to examine if there is a relationship between OCD symptom severity (OCI-R scores) and feelings of mental contamination (VAS scores). The OCI-R total was computed for each participant as well as the change score for the VAS. This was done by subtracting the pre VAS score from the post VAS score for each variable of mental contamination. This meant that a correlation was conducted for each of the mental contamination variables for both physical contamination and moral transgression, resulting in 12

total correlations. Mental contamination was measured by the following variables: clean, dirty, disgust, distress, urge to clean, and urge to do good. These sensations were decided upon because they were used in past studies. I added the urge to do good because it was relevant for the morality condition.

Results

Descriptive statistics for gender, age, race, ethnicity, and reported mental disorders can be found in Table 1. Additionally, a breakdown of the country of residence can be found in the appendix (appendix A1). Participants were removed from the analyses for not completing the questions necessary for the corresponding test (e.g., Incomplete VAS for pre-feelings of disgust mean the data was not computed in the disgust ANOVA).

Manipulation Check

A one-way ANOVA was conducted in order to determine how much participants agreed with the actions of the narrator in the vignettes. This assessment determined if participants took time to read the vignette, and whether they were giving thoughtful responses. It was expected that the two manipulation conditions (physical and moral) would have low ratings of agreement with the narrator as the acts are disgusting or immoral. Agreement with the narrator was conducted on the same VAS as the mental contamination questions. The control group was a neutral story, so it was expected that participants would be more likely to agree with the narrator. Looking at Figure 3., there was a statistically significant effect of the condition type on the agreement with the narrator, $F(2, 66) = 192$, $p < 0.001$. To further unpack this finding, a Tukey post-hoc test was conducted to reveal that physical contamination was significantly different from the control ($p < 0.001$), and that moral transgression was significantly different from the ratings of the control ($p < 0.001$), such that. These results suggest that participants were engaged

in the vignettes as the manipulation conditions had less agreement with the narrator than the control. This is important in identifying that participant's did respond to the independent variable and that the vignettes effectively modulated participants' perceptions of the narrator.

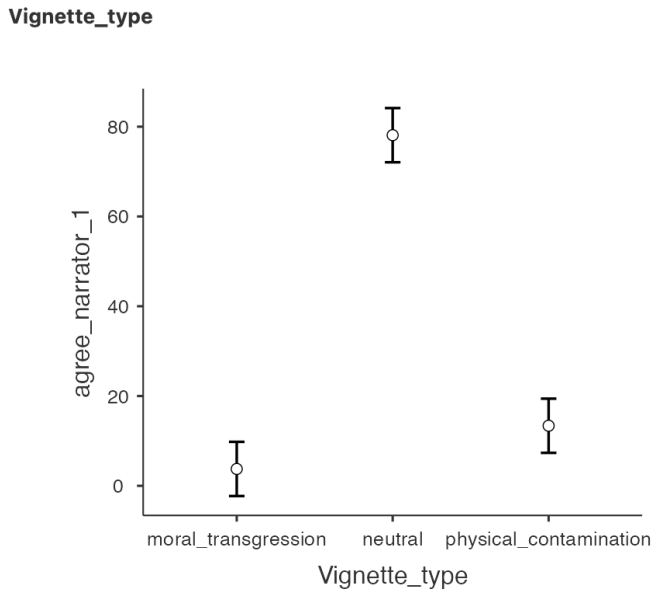

Figure 3. Plot of the one-way ANOVA conducted for the manipulation check. Participants who read the neutral vignette had significantly higher agreement with the narrator (M=78.11) as compared to participants who read the moral transgression (M=3.76) and physical contamination (M= 13.38) vignettes. Error bars indicate standard error of the mean.

Mixed Design ANOVA

A 2 (Time: Pre and Post) x 3 (Condition: Physical Contamination, Moral Transgression, and Control) mixed Analysis of Variance (ANOVA) was conducted to examine differences in feelings of mental contamination via the VAS scores at baseline and post-vignette reading. Multiple aspects of mental contamination were tested: feelings of cleanliness, dirtiness, disgust, and distress as well as the urge to clean and urge to do good. For cleanliness, there was a significant main effect of time, $F(1,108) = 25.8$, $p < 0.001$, $\eta^2 = 0.029$ and for condition, $F(2,108) = 6.05$, $p = 0.003$, $\eta^2 = 0.083$ (see Figure 4 below). There was also an interaction between time and condition, $F(2,108) = 12.2$, $p < 0.001$, $\eta^2 = 0.028$ To qualify the nature of this interaction

effect, a Tukey post hoc comparison revealed that the physical contamination group felt significantly less clean than the moral transgression group ($p < 0.001$) and control group ($p < 0.001$), respectively.

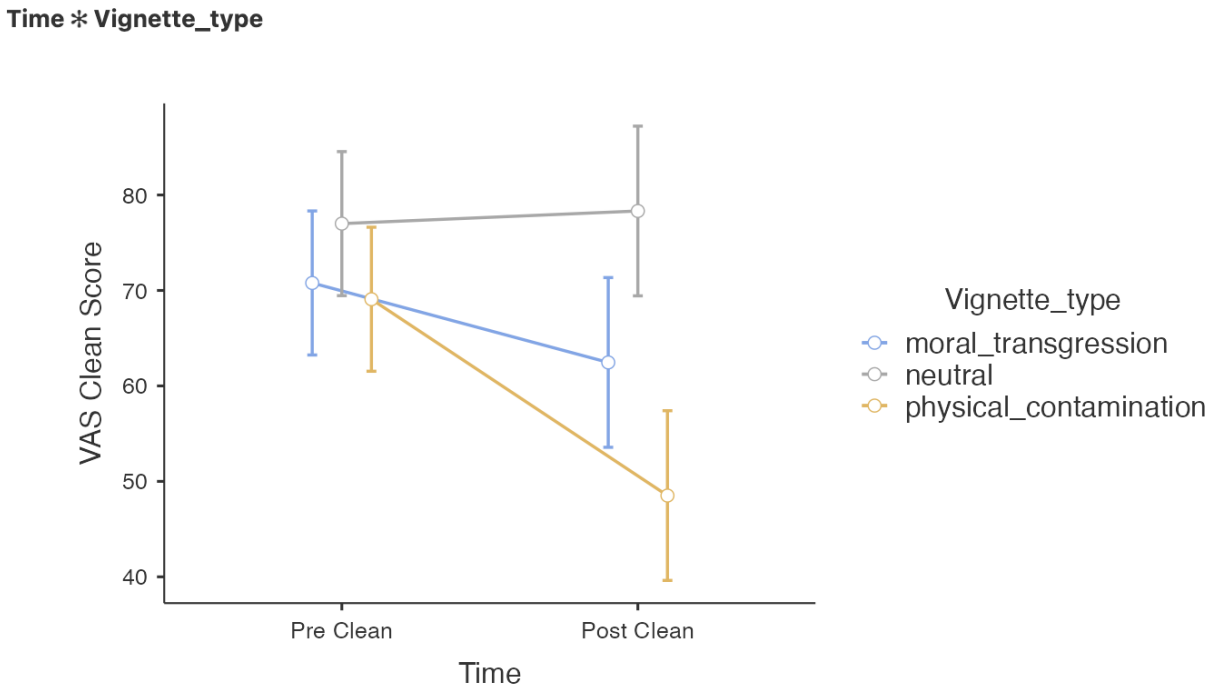

Figure 4. Results depicting a Time x Condition interaction for VAS cleanliness scores. Participants in the physical contamination group—but not the moral transgression or neutral groups—did not feel as clean compared to baseline. Error bars indicate standard error of the mean.

For feelings of dirtiness, there was a significant main effect of time, $F(1,104) = 15.2$, $p < 0.001$, $\eta^2 = 0.023$ as well as condition, $F(2, 104) = 7.73$, $p < 0.001$, $\eta^2 = 0.101$. Additionally, there was an interaction between time and condition, $F(2, 104) = 12.2$, $p < 0.001$, $\eta^2 = 0.037$. A post hoc analysis using Tukey's test for comparisons showed a significant mean difference between pre and post vignette for feelings of dirtiness compared to the moral transgression condition ($p < 0.001$) and the control ($p < 0.001$). Those in the physical contamination condition

had an increase in feelings of dirtiness over time compared to the conditions of moral transgression and the control (See appendix A2 for figures and tables).

Ratings of disgust over time revealed a significant effect of time through a 2x2 mixed ANOVA, $F(1, 105)= 66.7$, $p < 0.001$, $\eta^2= 0.152$. Additionally, there was an effect for type of condition, $F(2, 105)= 27.4$, $p< 0.001$, $\eta^2= 0.175$. A time x condition interaction was apparent, $F(2,105) = 27.4$, $p< 0.001$, $\eta^2= 0.098$, indicating that feelings of disgust increased in the physical contamination and moral transgression conditions after reading the vignette. The Tukey post-hoc tests identified that both physical contamination ($p < 0.001$) and moral transgression ($p < 0.001$) significantly differed from the control in evoking greater feelings of distress from baseline to post vignette.

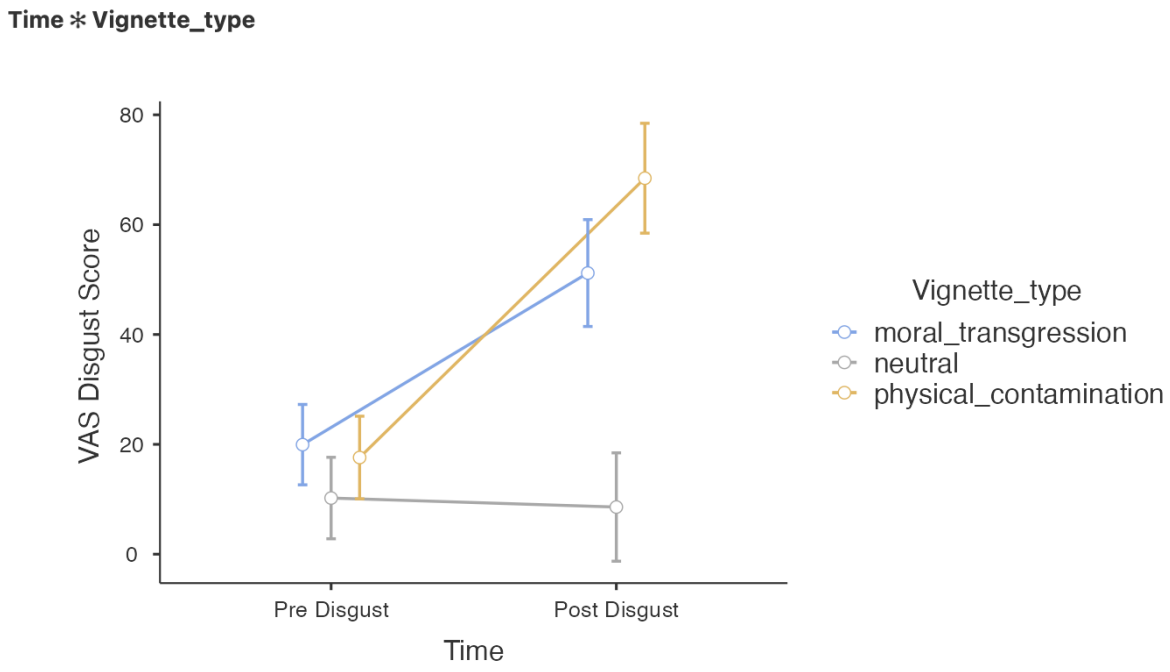

Figure 5. Mixed ANOVA indicated a significant interaction between time and condition for VAS disgust scores, with physical contamination and moral transgressions reporting significantly higher scores post- vs. pre-vignette. Error bars indicate standard error of the mean.

The mixed ANOVA for feelings of distress over time revealed a main effect of condition, $F(2, 108)= 4.35$, $p= 0.015$, $\eta^2= 0.059$. Additionally, there was an interaction between time and condition, $F(2,108) = 6.26$, $p= 0.003$, $\eta^2= 0.021$. Indicating that participants overall did feel more distressed after reading the vignette when compared to baseline. However, no one condition proved to be significantly different from the rest. A reason for this could be that the physical contamination group had a high starting distress score (M = 40.7), and therefore had a lesser degree of change to post scores (View Table 1. below for mean comparisons).

Estimated Marginal Means - Time * Vignette_type

				95% Confidence Interval	
Vignette_type	Time	Mean	SE	Lower	Upper
moral_transgression	Pre Distress	29.4	5.14	19.3	39.6
	Post Distress	38.4	5.13	28.2	48.6
neutral	Pre Distress	31.9	5.14	21.7	42.1
	Post Distress	21.5	5.13	11.3	31.7
physical_contamination	Pre Distress	40.7	5.14	30.5	50.9
	Post Distress	50.6	5.13	40.5	60.8

Table 1. The estimated marginal means comparing pre and post levels of distress measured by the VAS. A significant time x condition interaction occurred. The table displays the mean levels of distress prior to and following the vignettes, with moral transgression and physical contamination noticeably increasing.

For the urge to do good, the mixed ANOVA showed there was a significant effect of time, $F(2, 106)= 4.76$, $p = 0.031$, $\eta^2= 0.004$. Additionally, there was an interaction between time and condition, $F(2,106) = 3.38$, $p = 0.038$, $\eta^2= 0.006$. As for the urge to clean, there was an effect for condition type, $F(2, 106) = 8.78$, $p < 0.001$, $\eta^2= 0.124$ and an interaction between time and condition, $F(2, 106)= 11.709$, $p < 0.001$, $\eta^2= 0.023$. The physical contamination condition had a significant difference from the control ($p < 0.001$) and compared to its scores at baseline

compared to post vignette ($p < 0.001$). This partially supported my hypothesis as the manipulation conditions did have an effect on VAS scores. However, moral transgression alone did not have a significant effect for condition type (See Appendix A1 for figures).

Correlations

The following analyses concerned whether a relationship existed between scores on the OCI-R and changes in the VAS scores for the feelings and urges related to mental contamination. These change scores were computed from the differences between the pre-vignette and post-vignette VAS. The physical contamination group was first analyzed. There was not a relationship between OCI-R scores and change in feelings of cleanliness for the physical contamination group, $r(37) = 0.02$, $p= 0.907$. Neither was there a significant relationship for OCI-R scores and the change in feelings of distress, $r(37) = -0.284$. $p= 0.088$, dirtiness $r(37) = -0.06$, $p= 0.726$, the urge to do good $r(37) = 0.103$, $p= 0.543$ and the urge to clean $r(37) = -0.069$, $p= 0.068$ (See Appendix A1 for figures).

However, there was a significant correlation between OCI-R scores and change in disgust $r(37) = -0.345$, $p =0.039$ (see Figure 6.). Indicating a slight, negative relationship. For distress, although not significant, was seen trending downwards (Appendix A3). Meanwhile, the urge to do good trends upwards. For the most part, there was very little movement in the correlation across the variables, but these two showed the most prominent patterns.

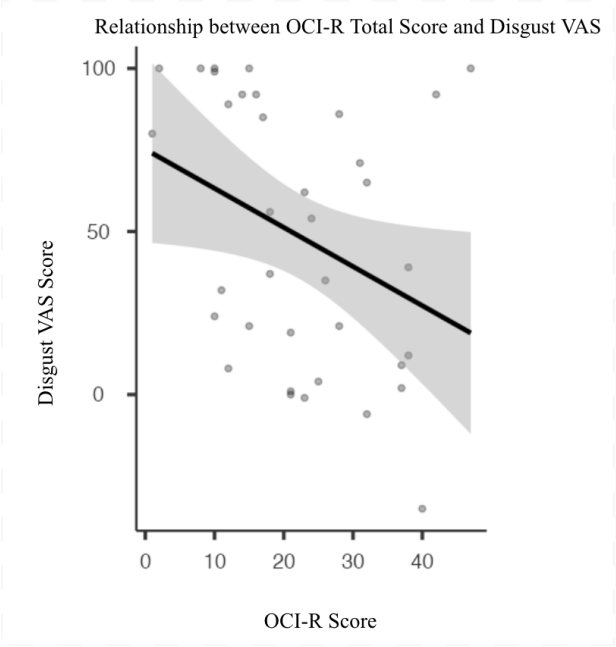

Figure 6. Correlational analysis showing a negative relationship between OCI-R scores change in VAS disgust scores. Shaded region indicates 95% confidence in predicted values around the regression line.

The next analyses were conducted for the moral transgression condition (N = 37). For this group, a Pearson correlation was computed to examine a relationship between changes in feelings of cleanliness via the VAS and the total score of the OCI-R. There was no relationship between changes in cleanliness and the OCI-R score $r(37) = -0.079$, $p = 0.642$. There was also no significant correlation for the OCI-R score and the VAS scores for a change in feelings of distress, $r(37) = 0.024$, $p = 0.889$, disgust $r(37) = -0.047$, $p = 0.784$, and dirtiness, $r(37) = 0.04$, $p = 0.816$.

The two mental contamination urges of urge to clean and urge to do good were also computed to show differences in the score over time. There was no correlation between OCI-R score and VAS score for the urge to clean, $r(37) = -0.315$, $p=0.065$, but there was a marginal trend towards significance. There was no correlation for the urge to do good $r(37) = -0.138$, $p=0.423$ (See appendix). Additionally, when controlling the analyses to look at correlations for

participants who scored over 21 on the OCI-R, the cutoff used to detect for OCD, the previous correlations did not become significant in either the physical contamination nor moral transgression conditions.

Discussion

This study investigated whether or not feelings of mental contamination can be evoked through imagined scenarios of physical contact as well as the absence of physical contact with an immoral deed. The main independent variable was the condition type as represented by the vignette topics: physical contamination, moral transgression, and control. The main outcome measure was feelings of contamination, as operationalized by changes in ratings on the VAS pre and post vignette. A mixed design Analysis of Variance was used to analyze this effect. A second hypothesis investigated if there was a relationship between scores of OCD symptom severity (the OCI-R) and changes in feelings of mental contamination (post VAS score - pre VAS score)—the prediction being that there would be a positive relationship.

My primary hypothesis was partially supported in that the contamination groups of physical contamination and moral transgression did score higher on the VAS after reading the vignette. However, physical contamination was the only condition in which I observed consistent and reliable effects for multiple aspects of mental contamination. This finding meant that there was a significant enough difference from the baseline VAS measure to the post-vignette VAS measure. This indicated that the specific vignette was responsible for changing the participant's level of contamination. Moral transgression only appeared to be significant for disgust. For the urge to do good, it had the greatest mean difference, but was not significantly different from the other conditions.

The repeated measures ANOVAs revealed an effect for time and an interaction of time and physical condition for changes in the feelings of cleanliness, dirtiness, disgust, and urge to clean. This indicates that the post VAS measures differed from the baseline scores, and that the physical contamination group specifically felt elevated feelings of mental contamination in comparison to the other conditions. For the urge to do good, there was a significant effect of condition as well as a significant interaction effect. However, post hoc tests revealed no one condition to be significantly different from the rest. What was interesting about this analysis was that the urge to do good was the only variable moral transgression exceeded physical contamination when comparing the scores at post-vignette. This occurrence makes sense because the moral transgression condition attempted to manipulate one's feelings about morality, which is inevitably linked to right and wrong. Following the vignette, those in the moral condition would probably feel a greater sense of wanting to relieve themselves from the immoral actions of the narrator.

Measuring Mental Contamination Against OCD Symptoms

Contrary to my hypothesis, the correlational analyses did not reveal a relationship between OCI-R scores and scores on the VAS. My prediction was that people who score higher on the OCI-R, and therefore report greater symptoms of OCD severity, would score higher on the VAS, showing greater changes in mental contamination from pre to post vignette. Interestingly, physical contamination tended to trend slightly negative, while I would have assumed a positive relationship between the two. The trends are very slight, but it is peculiar that those who scored higher on OCD symptom severity would be *less* affected by the physical contamination vignette. A similar phenomenon occurred with the moral transgression correlations in which if there was any sort of trend, it happened to be negative.

The only variables that had a positive trend were disgust and the urge to do good in the physical contamination group. Why only these two? It would make more sense for the moral group to be trending in the urge to do good since doing good has more of a relationship to morality than feeling contaminated. However, this is not the case in the correlations. Perhaps the content of the physical vignette, about touching a deer that has been hit by a car, was especially upsetting to those participants, and thus they felt an urge to reverse the effects of handling a harmed animal. As for disgust, this is a complex emotion that incorporates negative sentiment and biological sensation. Perhaps this variable was more easily manipulated by the stories than feeling clean or dirty, which are more rooted in physical sensation than emotion. Additionally, past studies that manipulate disgust have found success in using vignettes and photos.

Cleanliness and dirtiness are topics less explored, and therefore may be harder to evoke with just a short story. Rachman et al. (2012) had success in significantly manipulating feelings of disgust, dirtiness, and the urge to wash in the perpetrator effect study. However, this study incorporated physical contamination and morality into one condition, and compared a consensual versus non-consensual kiss. The reason for such significant findings could be the two variables working together to manipulate feelings of mental contamination. It cannot be determined whether the physical contact or moral transgression of the scenario alone can account for a change in feelings from baseline.

There could be a few reasons why the OCI-R and VAS scores did not correlate. First, that the VAS is too specific in measuring the domain of contamination. The OCI-R asks questions pertaining to the six subtypes: washing, checking, ordering, obsessing, hoarding, and neutralizing. It is possible that participants who scored high altogether on the OCI-R had symptoms more relative to domains unrelated to washing and contamination. Since the VAS was

my own design, there was no background to support that this scale specifically was going to be related to a scale that measures OCD symptoms. Secondly, much of the empirical evidence I relied on pertaining to mental contamination manipulations used undergraduate populations, and thus consisted mostly of participants 18-22 years old. My participants tended to be older, with a range from 18-72 years old, the mean being 32 years old.

Additionally, I had participants from many countries (England, Portugal, South Africa, etc.) instead of one region, such as a university population. Perhaps age and culture do have an effect on perceptions of dirtiness, cleanliness, etc. Or, maybe the manipulation is not as effective in older participants, which was reflected on lower VAS scores. The OCI-R was an instrument created in the United States, and during its construction it was practiced on an American group of in-patient participants from an unspecified region (Foa et al., 2002). While there has been validation of the OCI-R in different languages, such as Spanish, Chinese, and Turkish, it is not known whether this tool is validated in all the countries represented in this study, so it is possible participants had different interpretations of the questions asked. Also, if this study was done with a clinical sample, it is possible there would have been greater effects, and therefore participants may have reported higher VAS scores.

Physical vs. Moral Contamination

The physical contamination condition had great success in summoning mental contamination sensations. Moral transgression was also effective, but to a lesser degree. Why this disparity? Mental contamination is closely related to physical contamination as both concern feelings of dirtiness, avoidance of pollutants (physical or magical), and distress and anxiety in warding off contamination (Coughtrey et al., 2012). Past studies have identified that recalling a memory or imaging a scenario in which one is touched nonconsensually produces feelings of

mental contamination (Fairbrother & Rachman, 2004; Rachman et al., 2012; Herba & Rachman, 2007). My findings support this literature as participants reacted to an imagined scenario, and perceived their own increased feelings of dirtiness and distress. Although morality did increase feelings of mental contamination, it did not produce effects at the level physical contamination did. This is telling that physical contact could be a basis for mental contamination, and is more influential at manipulating how dirty one feels.

Cleanliness and dirtiness are associated with physical sensation while morality is a societal and cultural principle. Hence, the feelings of dirtiness and cleanliness, and the urge to clean may be more rooted in physical sensations rather than emotional ones. Disgust, however, had a significant effect for both physical contamination and moral transgression. This emotion could be the main link between the two conditions concerning mental contamination. There is evidence that higher disgust propensity is related to symptoms of OCD and PTSD (Olatunji et al., 2012). Additionally, there have been correlations between disgust propensity and contamination-related OCD symptoms, indicating that disgust could be a factor in why people with OCD have a fear of contamination (Melli, Bulli, Carreressi, & Stopani, 2014). Disgust also had a relationship to morality in that immoral acts often elicit disgust across cultures (Haidt & Joseph, 2004). The reasoning for such a link is not concrete, but some theorize that it is evolutionary, or disgust is intuitive and not logical, and therefore is a reaction to why things feel harmful although they are not necessarily, and that disgust is an innate way to signal condemnation of something that does not fit within rules a group (society or culture) may follow (Melli et al., 2014; Ekman, 1972).

The Macbeth Effect

I was unable to produce a "Macbeth Effect" to the degree that Zhong & Liljenquist accomplished (2006). Their study had participants recall one's own immoral deed, which may have been more effective at feeling contaminated as it came from a personal level. Although my moral vignette did contain elements that touched upon all the domains in the Moral Foundations Theory (Haidt & Joseph, 2004), the scenario may have been too unrelatable as it concerned sabotaging a coworker by downloading content from the dark web. The physical contamination vignette detailed grotesque contact with a dead deer. Since roadkill is a common sight, it could have been better visualized, and therefore more effective. While a significant "Macbeth Effect" was not observed, a couple participants (N=4) actually did report that they washed themself during the minute break, which was a surprise in a non-clinical sample. My study supported Earp et al. (2014) in which the effect could not be replicated, and therefore it could not be inferred that moral and physical cleanliness had an effect on one another. The 2014 study believed an effect could be found with more robust research into this domain. I think this could be possible if more studies attempted to separate morality and physical contamination from one another. Additionally, further studies could observe what type of foundation of morality is most closely linked to physical contamination. I would predict that it would be purity/sanctity as this domain is most closely linked to disgust and preservation of the body (Haidt & Joseph, 2004).

Exploratory Neutralization Strategies

Due to limited time, one of the exploratory hypotheses could not be analyzed deeply. Therefore the OBQ responses were not further looked into. As for the neutralization strategies hypothesis, a correlation was computed. This hypothesis stated individuals scoring higher on in the OCI-R will be more likely to report use of a neutralization strategy. There was a significant, positive relationship between OCI-R scores and the amount of neutralization strategies used

$r(111) = 0.243$, $p = 0.010$. This indicated that people with higher rates of OCD severity were more likely to use more strategies during the break to control the aversive effects of the vignettes (See Appendix A3). It should be noted, though, that the scoring of the neutralization strategies proved to be difficult in discerning what responses were directly linked to thoughts about the vignette versus any thoughts at all. The limitations will go into deeper explanation about this topic. Therefore, a correlation does exist between the OCI-R scores and neutralization strategies, but we should be cautious in assuming the extent of the relationship.

This finding is interesting because OCI-R scores did not correlate with greater feelings of mental contamination, but did with neutralizing. Additionally, neutralizing can occur in non-clinical populations, but it is less common (Salkovskis et al., 1997). Perhaps these manipulations were especially effective at being disturbing, or maybe neutralizing is more common than previously thought.

Limitations

There were several limitations to the study. The first being the use of my own VAS design in order to measure feelings of mental contamination. As far as I know, there are no tools that specifically measure mental contamination. Thus, past studies, and my own, rely on creating a measure that fits the needs of the study. Due to this, the validity is unknown since my VAS was not a standardized measure. Additionally, the reliability is unknown, and therefore a reproduction of this study may produce different results. On the other hand, the manipulation check did reveal that participants interpreted the contamination stories to be distressing. There would need to be multiple replications to indicate whether the study consistently finds similar results across different groups of people at a different time.

On a similar note, the vignettes were my own design, and were the manipulation the study revolved around. While not uncommon for vignettes to be used in morality studies, I cannot confirm how well my vignettes executed their intended use of evoking feelings of contamination against other measures. Additionally, other mediums may have been more effective at producing feelings of mental contamination. For example, in the perpetrator effect study, participants listened to audio recordings of an imagined scenario (Rachman et al., 2012). Other studies had participants recall their own immoral deeds or memories, which could be more powerful than an imagined scenario. It is possible a video could have been more influential at creating feelings of contamination. However, the vignettes made it easy to standardize across conditions. Additionally, my vignettes were tied down to very specific situations. It is possible that a certain domain of contamination or morality is more effective for a certain individual. For example, a participant with a phobia of blood or needles would react more strongly to a vignette in a hospital setting. This being said, I created a vignette that was trying to affect as many people as possible, but there were certain areas of contamination that were neglected for the sake of keeping the story short and simple.

Another limitation was that feelings of contamination could have been influenced by the COVID pandemic. It is possible that people are feeling more dirty and disgusted in general because of the threat of the virus. It was important to create a physical contamination vignette that did not include contact with another person for this reason. However, participant's feelings at baseline could have been swayed by unknown factors relating to the pandemic. Having the study being conducted online has its own limitations and strengths to this matter. The strength being that people did not need to come into a new environment and stress about COVID regulations or the risk of getting COVID. This also means that the environment participant's took

the study in is unknown and could not be controlled across the group. Perhaps participants felt unclean in the location they took the study, or were surrounded by people, and thus felt contaminated.

Improvements

If I were to do this study again, I would adjust how I phrased the neutralization strategies. Again, this measure was my own, but I adapted from a list used by Freeston & Laudocer (1997) and covert strategies from Garcia-Soriano & Belloch (2013). After going through the results I realized that the options were too vague. I was trying to assess whether people were using strategies in order to rid themselves of thoughts from the vignette. The way some were worded, however, could indicate that participants were trying to replace a thought, or that they were simply thinking about something else. One of the options was "thought about something else," which in hindsight I interpreted as a person actively choosing to think of anything else other than the story. However, it could have been selected by a participant if they chose to daydream during the minute break, or perhaps were worried about something unrelated to the study. I should have asked if participants intentionally thought of something other than the study. This was also an issue with the option of "visualized the thought" because this could mean any thought, not just imagining the contents of the vignette. Due to this, I had to be more discriminatory when analyzing this dataset, and only include options that were more obvious that participants were trying to control or rid themselves of the effects of the vignette (e.g., "told self to stop thinking about thought", "control thoughts in head," "religious action," "washed self," etc.)

Future Directions

Future studies should measure mental contamination with physical contact and morality as separate variables. In doing so, it can be observed whether or not morality could have an effect on physical sensations such as cleanliness or dirtiness. While my study did not find this, further research with larger samples and different groups of people may have an alternate finding. There needs to be more empirical evidence to determine if physical contact is the main attribute of mental contamination. Likewise, there needs to be more research that examines mental contamination across cultures to determine if washing behaviors and cleanliness have more prominence in certain groups of people. On a similar note, studies should experiment with different types of manipulations pertaining to contamination. There are subtypes of OCD that could be experimented with (hoarding, obsessing, etc.). Additionally, different types of contamination can be used. Examples could range from unhygienic situations such as dirty bathrooms, animals, hospitals, to the mystical of contracting non-contagious diseases.

Additionally, there is no main measure of mental contamination as every study forms their own tool to fit the needs of the study. Development of an official measure would help operationalize what mental contamination is. This tool could be used in future studies, but also in assessing intrusive thoughts of people with OCD, and in memories for people with trauma. This could help assess the link between OCD and PTSD, and get a better understanding of the importance of disgust in trauma. This measure would also allow for more general research into mental contamination since a valid tool would be available. Studies could begin to be more experimental with its variables; such as comparing genders, comorbidities, and adolescents and adults.

Future studies should also attempt to use more clinical samples. Although mental contamination is regarded as a facet of OCD, very little studies actually use participants

diagnosed with OCD. Perhaps clinical samples would react more strongly to vignettes about physical contamination or morality. Also, the vignettes in this study concern being the perpetrator of one's own contamination. It would be interesting to see a comparison of being the victim of unwarranted contamination vs. the perpetrator of it. Again, this could be done with a clinical sample compared to a non-clinical one.

Conclusion

To the best of my knowledge, this study is one of the first to directly compare the effects of mental contamination with a physical contamination and moral transgression manipulation. In doing so, it can be better understood whether physical contact can be attributed to feelings of mental contamination in an imagined scenario, and if immoral deeds can produce a similar effect. I found partial support for my first hypothesis in that a vignette about physical contamination produced feelings of mental contamination. Moral transgression did evoke feelings of mental contamination, but only significant effects were found for disgust, although it did trend for the other variables. Morality may have more influence over disgust rather than the other sensations of mental contamination, such as cleanliness and dirtiness, which are more connected to bodily sensations. Additionally, the findings of this study indicated no correlations between symptom severity of OCD and an increase of feelings of contamination. Perhaps mental contamination is a phenomenon that occurs outside of OCD, and therefore more people may be affected by it than we can imagine. Broadening our understanding on mental contamination will assist how intrusive thoughts are perceived and treated, and provide a more extensive background on the fear of contamination. Future research should ask if physical contact is the main element to feeling contaminated. The importance of morality in people with OCD also

needs more clarity. Perhaps morality is less concerned with contamination-related OCD, and more so with another subtype.

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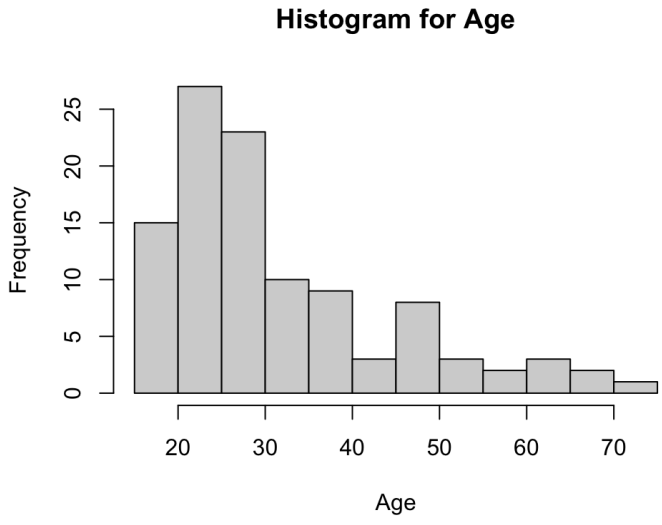
Appendix A1

Descriptives

Table 1. Study Sample Characteristics and Predictors (N=111)

Variable	Summary Statistic
Age in years (SD)	68.61 (30.09)
Gender (%)	
Male	46 (41.4)
Female	64 (57.7)
Non-binary	1 (0.9)
Race (%)	
White	92 (82.9)
Black	10 (9.0)
Asian	2 (1.8)
Other	7 (6.3)
Ethnicity (%)	
Hispanic/Latinx	14 (12.6)
Not Hispanic	95 (85.6)
Unknown	2 (1.8)

Age was only limited to being 18 years old or over. The "other" category for race allowed for participants to write in responses in which 3 wrote variations of "Latinx," 1 for "biracial black-white," and 2 "prefer not to say."



Histogram depicting the range of ages reported by the participants via the demographic questionnaire.

Frequencies of Mental Disorder

Levels	Counts	% of Total	Cumulative %
Generalized Anxiety Disorder	19	17.4%	17.4%
Major Depressive Disorder	4	3.7%	21.1%
Obsessive-Compulsive Disorder	4	3.7%	24.8%
Social Anxiety Disorder	6	5.5%	30.3%
Post-Traumatic Stress Disorder	3	2.8%	33.0%
Major Depressive Disorder,Bipolar Disorder	1	0.9%	33.9%
Bipolar Disorder	1	0.9%	34.9%
None	66	60.6%	95.4%
Other	5	4.6%	100.0%

Table depicting reports of mental disorders from the demographic questionnaire.

```
> table(demographics.pro$X.12)

                  Canada CONSENT REVOKED Current Country of Residence
                       7                1                           1
                 Germany           Greece                     Hungary
                       1                3                           2
                   Italy           Latvia                      Mexico
                       2                2                           5
                  Poland         Portugal                    Slovenia
                      17               10                           1
            South Africa            Spain              United Kingdom
                       9                6                          42
           United States
                       4
```

Table depicting the country of origin reported from the participants.

Appendix A2

Mixed ANOVA Analyses

Tukey post hoc comparison tables for each variable and a plot of the marginal means for each condition.

Post Hoc Tests

Post Hoc Comparisons - Time ✻ Vignette_type

Comparison					Mean Difference	SE	df	t	P_{tukey}
Time	Vignette_type		Time	Vignette_type					
Pre Clean	moral_transgression	-	Pre Clean	neutral	−6.22	5.38	108	−1.155	0.857
		-	Pre Clean	physical_contamination	1.70	5.38	108	0.316	1.000
		-	Post Clean	moral_transgression	8.32	3.14	108	2.655	0.093
		-	Post Clean	neutral	−7.54	5.88	108	−1.282	0.794
		-	Post Clean	physical_contamination	22.27	5.88	108	3.786	0.003
	neutral	-	Pre Clean	physical_contamination	7.92	5.38	108	1.471	0.683
		-	Post Clean	moral_transgression	14.54	5.88	108	2.472	0.142
		-	Post Clean	neutral	−1.32	3.14	108	−0.422	0.998
		-	Post Clean	physical_contamination	28.49	5.88	108	4.843	<.001
	physical_contamination	-	Post Clean	moral_transgression	6.62	5.88	108	1.126	0.870
		-	Post Clean	neutral	−9.24	5.88	108	−1.571	0.619
		-	Post Clean	physical_contamination	20.57	3.14	108	6.559	<.001
Post Clean	moral_transgression	-	Post Clean	neutral	−15.86	6.34	108	−2.502	0.133
		-	Post Clean	physical_contamination	13.95	6.34	108	2.199	0.247
	neutral	-	Post Clean	physical_contamination	29.81	6.34	108	4.701	<.001

Estimated Marginal Means - Time ✻ Vignette_type

				95% Confidence Interval	
Vignette_type	Time	Mean	SE	Lower	Upper
moral_transgression	Pre Clean	70.8	3.81	63.2	78.3
	Post Clean	62.5	4.48	53.6	71.3
neutral	Pre Clean	77.0	3.81	69.5	84.5
	Post Clean	78.3	4.48	69.4	87.2
physical_contamination	Pre Clean	69.1	3.81	61.5	76.6
	Post Clean	48.5	4.48	39.6	57.4

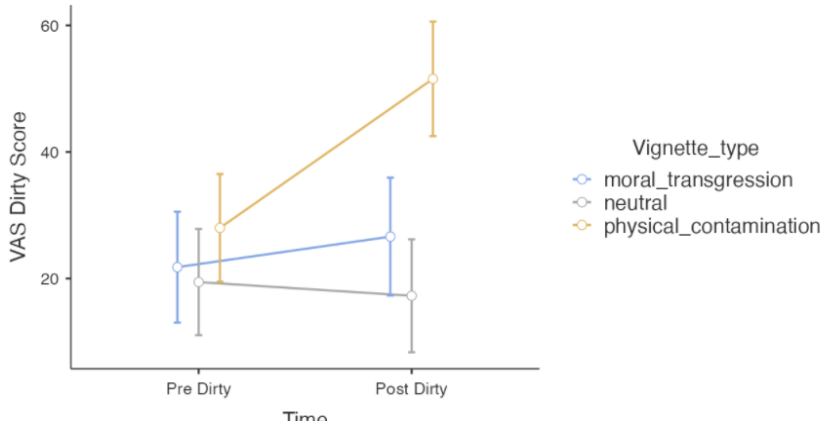
Post Hoc Comparisons - Time ✻ Vignette_type

Comparison					Mean Difference	SE	df	t	p_{tukey}
Time	Vignette_type		Time	Vignette_type					
Pre Dirty	moral_transgression	-	Pre Dirty	neutral	2.36	6.12	104	0.386	0.999
		-	Pre Dirty	physical_contamination	−6.21	6.16	104	−1.007	0.915
		-	Post Dirty	moral_transgression	−4.82	3.94	104	−1.225	0.824
		-	Post Dirty	neutral	4.52	6.31	104	0.717	0.979
		-	Post Dirty	physical_contamination	−29.76	6.35	104	−4.685	<.001
	neutral	-	Pre Dirty	physical_contamination	−8.57	6.03	104	−1.421	0.715
		-	Post Dirty	moral_transgression	−7.19	6.32	104	−1.136	0.865
		-	Post Dirty	neutral	2.16	3.78	104	0.573	0.993
		-	Post Dirty	physical_contamination	−32.12	6.23	104	−5.159	<.001
	physical_contamination	-	Post Dirty	moral_transgression	1.38	6.36	104	0.217	1.000
		-	Post Dirty	neutral	10.73	6.22	104	1.725	0.519
		-	Post Dirty	physical_contamination	−23.56	3.83	104	−6.154	<.001
Post Dirty	moral_transgression	-	Post Dirty	neutral	9.35	6.51	104	1.437	0.705
		-	Post Dirty	physical_contamination	−24.94	6.55	104	−3.808	0.003
	neutral	-	Post Dirty	physical_contamination	−34.29	6.41	104	−5.348	<.001

[4]

Estimated Marginal Means

Time ✻ Vignette_type



Estimated Marginal Means - Time ✻ Vignette_type

Vignette_type	Time	Mean	SE	95% Confidence Interval	
				Lower	Upper
moral_transgression	Pre Dirty	21.8	4.42	13.03	30.6
	Post Dirty	26.6	4.70	17.30	35.9
neutral	Pre Dirty	19.4	4.24	11.03	27.8
	Post Dirty	17.3	4.50	8.34	26.2
physical_contamination	Pre Dirty	28.0	4.29	19.49	36.5
	Post Dirty	51.6	4.56	42.50	60.6

Post Hoc Comparisons - Time ✻ Vignette_type

Comparison					Mean Difference	SE	df	t	p_{tukey}
Time	Vignette_type		Time	Vignette_type					
Pre Disgust	moral_transgression	-	Pre Disgust	neutral	9.72	5.26	105	1.850	0.439
		-	Pre Disgust	physical_contamination	2.35	5.29	105	0.443	0.998
		-	Post Disgust	moral_transgression	–31.24	5.61	105	–5.572	<.001
		-	Post Disgust	neutral	11.36	6.19	105	1.834	0.448
		-	Post Disgust	physical_contamination	–48.51	6.25	105	–7.761	<.001
	neutral	-	Pre Disgust	physical_contamination	–7.38	5.33	105	–1.385	0.736
		-	Post Disgust	moral_transgression	–40.97	6.17	105	–6.639	<.001
		-	Post Disgust	neutral	1.64	5.68	105	0.288	1.000
		-	Post Disgust	physical_contamination	–58.23	6.28	105	–9.272	<.001
	physical_contamination	-	Post Disgust	moral_transgression	–33.59	6.20	105	–5.415	<.001
		-	Post Disgust	neutral	9.02	6.26	105	1.441	0.702
		-	Post Disgust	physical_contamination	–50.86	5.77	105	–8.821	<.001
Post Disgust	moral_transgression	-	Post Disgust	neutral	42.61	6.99	105	6.098	<.001
		-	Post Disgust	physical_contamination	–17.27	7.04	105	–2.454	0.148
	neutral	-	Post Disgust	physical_contamination	–59.87	7.09	105	–8.451	<.001

Estimated Marginal Means - Time ✻ Vignette_type

				95% Confidence Interval	
Vignette_type	Time	Mean	SE	Lower	Upper
moral_transgression	Pre Disgust	19.95	3.69	12.63	27.3
	Post Disgust	51.19	4.91	41.46	60.9
neutral	Pre Disgust	10.22	3.74	2.80	17.6
	Post Disgust	8.58	4.97	–1.28	18.4
physical_contamination	Pre Disgust	17.60	3.79	10.08	25.1
	Post Disgust	68.46	5.05	58.45	78.5

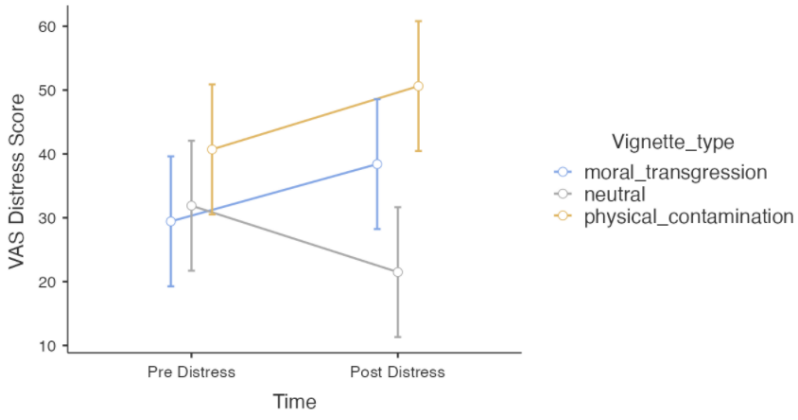
Post Hoc Comparisons - Time ✻ Vignette_type

Comparison					Mean Difference	SE	df	t	p_{tukey}
Time	Vignette_type		Time	Vignette_type					
Pre Distress	moral_transgression	-	Pre Distress	neutral	−2.46	7.26	108	−0.339	0.999
		-	Pre Distress	physical_contamination	−11.27	7.26	108	−1.552	0.632
		-	Post Distress	moral_transgression	−8.97	4.59	108	−1.957	0.374
		-	Post Distress	neutral	7.95	7.26	108	1.094	0.883
		-	Post Distress	physical_contamination	−21.19	7.26	108	−2.918	0.048
	neutral	-	Pre Distress	physical_contamination	−8.81	7.26	108	−1.213	0.830
		-	Post Distress	moral_transgression	−6.51	7.26	108	−0.897	0.946
		-	Post Distress	neutral	10.41	4.59	108	2.269	0.216
		-	Post Distress	physical_contamination	−18.73	7.26	108	−2.580	0.111
	physical_contamination	-	Post Distress	moral_transgression	2.30	7.26	108	0.316	1.000
		-	Post Distress	neutral	19.22	7.26	108	2.647	0.095
		-	Post Distress	physical_contamination	−9.92	4.59	108	−2.163	0.264
Post Distress	moral_transgression	-	Post Distress	neutral	16.92	7.26	108	2.331	0.191
		-	Post Distress	physical_contamination	−12.22	7.26	108	−1.683	0.546
	neutral	-	Post Distress	physical_contamination	−29.14	7.26	108	−4.015	0.002

[4]

Estimated Marginal Means

Time ✻ Vignette_type



Estimated Marginal Means - Time ✻ Vignette_type

				95% Confidence Interval	
Vignette_type	Time	Mean	SE	Lower	Upper
moral_transgression	Pre Distress	29.4	5.14	19.3	39.6
	Post Distress	38.4	5.13	28.2	48.6
neutral	Pre Distress	31.9	5.14	21.7	42.1
	Post Distress	21.5	5.13	11.3	31.7
physical_contamination	Pre Distress	40.7	5.14	30.5	50.9
	Post Distress	50.6	5.13	40.5	60.8

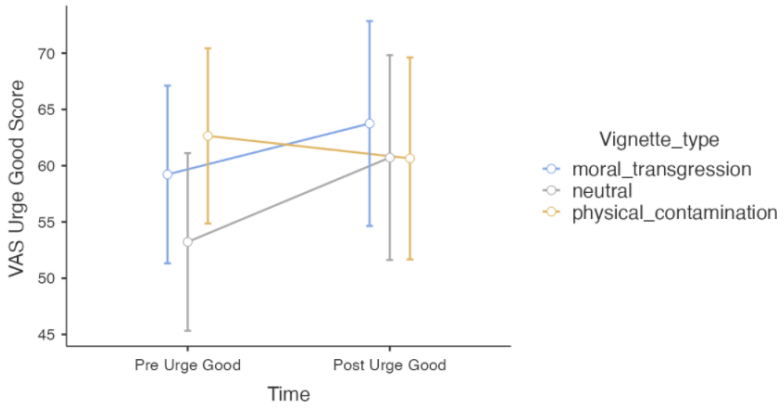
Post Hoc Comparisons - Time ✻ Vignette_type

Comparison					Mean Difference	SE	df	t	p_{tukey}
Time	Vignette_type		Time	Vignette_type					
Pre Urge Good	moral_transgression	-	Pre Urge Good	neutral	6.0000	5.63	106	1.0650	0.894
		-	Pre Urge Good	physical_contamination	−3.4264	5.60	106	−0.6124	0.990
		-	Post Urge Good	moral_transgression	−4.5278	2.67	106	−1.6979	0.536
		-	Post Urge Good	neutral	−1.5000	6.08	106	−0.2468	1.000
		-	Post Urge Good	physical_contamination	−1.4264	6.03	106	−0.2365	1.000
	neutral	-	Pre Urge Good	physical_contamination	−9.4264	5.60	106	−1.6847	0.545
		-	Post Urge Good	moral_transgression	−10.5278	6.08	106	−1.7319	0.514
		-	Post Urge Good	neutral	−7.5000	2.67	106	−2.8125	0.063
		-	Post Urge Good	physical_contamination	−7.4264	6.03	106	−1.2312	0.821
	physical_contamination	-	Post Urge Good	moral_transgression	−1.1014	6.04	106	−0.1822	1.000
		-	Post Urge Good	neutral	1.9264	6.04	106	0.3188	1.000
		-	Post Urge Good	physical_contamination	2.0000	2.63	106	0.7603	0.973
Post Urge Good	moral_transgression	-	Post Urge Good	neutral	3.0278	6.49	106	0.4663	0.997
		-	Post Urge Good	physical_contamination	3.1014	6.45	106	0.4809	0.997
	neutral	-	Post Urge Good	physical_contamination	0.0736	6.45	106	0.0114	1.000

[4]

Estimated Marginal Means

Time ✻ Vignette_type



Estimated Marginal Means - Time ✻ Vignette_type

				95% Confidence Interval	
Vignette_type	Time	Mean	SE	Lower	Upper
moral_transgression	Pre Urge Good	59.2	3.98	51.3	67.1
	Post Urge Good	63.8	4.59	54.6	72.9
neutral	Pre Urge Good	53.2	3.98	45.3	61.1
	Post Urge Good	60.7	4.59	51.6	69.8
physical_contamination	Pre Urge Good	62.6	3.93	54.9	70.4
	Post Urge Good	60.6	4.53	51.7	69.6

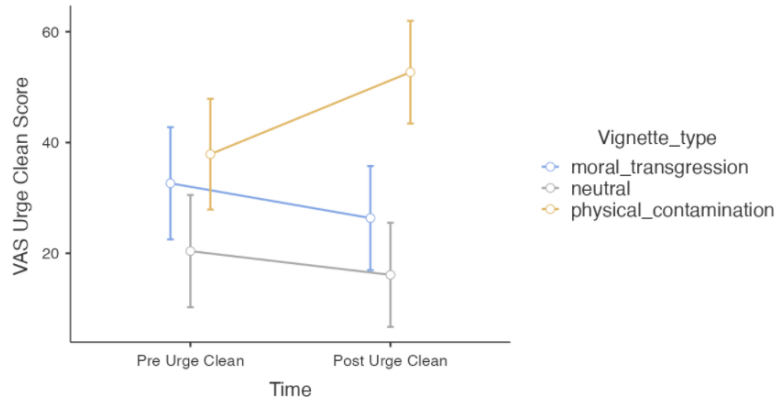
Post Hoc Comparisons - Time ✻ Vignette_type

Comparison					Mean Difference	SE	df	t	p_{tukey}
Time	Vignette_type		Time	Vignette_type					
Pre Urge Clean	moral_transgression	-	Pre Urge Clean	neutral	12.25	7.23	106	1.694	0.539
		-	Pre Urge Clean	physical_contamination	−5.25	7.18	106	−0.731	0.978
		-	Post Urge Clean	moral_transgression	6.28	3.43	106	1.829	0.452
		-	Post Urge Clean	neutral	16.53	6.97	106	2.371	0.176
		-	Post Urge Clean	physical_contamination	−20.06	6.93	106	−2.896	0.051
	neutral	-	Pre Urge Clean	physical_contamination	−17.50	7.18	106	−2.437	0.153
		-	Post Urge Clean	moral_transgression	−5.97	6.97	106	−0.857	0.956
		-	Post Urge Clean	neutral	4.28	3.43	106	1.246	0.813
		-	Post Urge Clean	physical_contamination	−32.31	6.93	106	−4.664	<.001
	physical_contamination	-	Post Urge Clean	moral_transgression	11.53	6.92	106	1.666	0.557
		-	Post Urge Clean	neutral	21.78	6.92	106	3.147	0.025
		-	Post Urge Clean	physical_contamination	−14.81	3.39	106	−4.374	<.001
Post Urge Clean	moral_transgression	-	Post Urge Clean	neutral	10.25	6.70	106	1.529	0.646
		-	Post Urge Clean	physical_contamination	−26.34	6.66	106	−3.957	0.002
	neutral	-	Post Urge Clean	physical_contamination	−36.59	6.66	106	−5.497	<.001

[4]

Estimated Marginal Means

Time ✻ Vignette_type



Estimated Marginal Means - Time ✻ Vignette_type

				95% Confidence Interval	
Vignette_type	Time	Mean	SE	Lower	Upper
moral_transgression	Pre Urge Clean	32.6	5.11	22.50	42.8
	Post Urge Clean	26.4	4.74	16.96	35.8
neutral	Pre Urge Clean	20.4	5.11	10.25	30.5
	Post Urge Clean	16.1	4.74	6.71	25.5
physical_contamination	Pre Urge Clean	37.9	5.04	27.89	47.9
	Post Urge Clean	52.7	4.67	43.43	62.0

Appendix A3

Correlational Analyses

Physical Contamination

Correlation Matrix

Correlation Matrix

		OCIR_total	VAS_clean_change
OCIR_total	Pearson's r	—	
	p-value	—	
	95% CI Upper	—	
	95% CI Lower	—	
	N	—	
VAS_clean_change	Pearson's r	0.020	—
	p-value	0.907	—
	95% CI Upper	0.342	—
	95% CI Lower	−0.306	—
	N	37	—

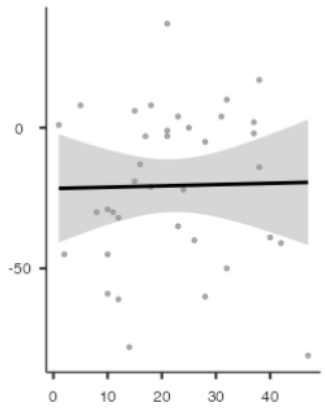
Note. * p < .05, ** p < .01, *** p < .001

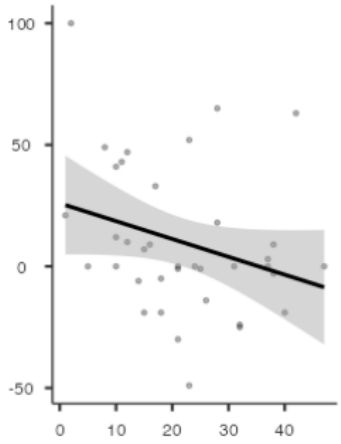
Correlation Matrix

Correlation Matrix

		OCIR_total	VAS_distress_change
OCIR_total	Pearson's r	—	
	p-value	—	
	95% CI Upper	—	
	95% CI Lower	—	
	N	—	
VAS_distress_change	Pearson's r	−0.284	—
	p-value	0.088	—
	95% CI Upper	0.044	—
	95% CI Lower	−0.557	—
	N	37	—

Note. * p < .05, ** p < .01, *** p < .001





Relationship between OCI-R total and change in feelings of cleanliness $r(37)= 0.020$, $p= 0.907$ (left). Relationship between OCI-R total and change in feelings of distress $r(37)= -0.284$, $p= 0.088$ (right).

Correlation Matrix

Correlation Matrix

		OCIR_total	VAS_dirty_change
OCIR_total	Pearson's r	—	
	p-value	—	
	95% CI Upper	—	
	95% CI Lower	—	
	N	—	
VAS_dirty_change	Pearson's r	–0.060	—
	p-value	0.726	—
	95% CI Upper	0.270	—
	95% CI Lower	–0.376	—
	N	37	—

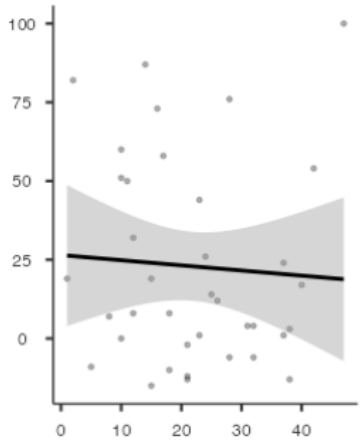
Note. * p < .05, ** p < .01, *** p < .001

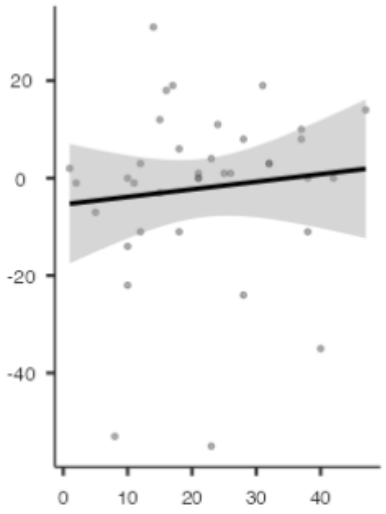
Correlation Matrix

Correlation Matrix

		OCIR_total	VAS_udogood_change
OCIR_total	Pearson's r	—	
	p-value	—	
	95% CI Upper	—	
	95% CI Lower	—	
	N	—	
VAS_udogood_change	Pearson's r	0.103	—
	p-value	0.543	—
	95% CI Upper	0.414	—
	95% CI Lower	–0.228	—
	N	37	—

Note. * p < .05, ** p < .01, *** p < .001





Relationship between OCI-R total and change in feelings of dirtiness $r(37)= -0.06$, $p= 0.726$ (left). Relationship between OCI-R total and change in the urge to do good $r(37)= 0.103$, $p= 0.543$ (right).

Correlation Matrix

		OCIR_total	VAS_uclean_change
OCIR_total	Pearson's r	—	
	p-value	—	
	95% CI Upper	—	
	95% CI Lower	—	
	N	—	
VAS_uclean_change	Pearson's r	–0.069	—
	p-value	0.686	—
	95% CI Upper	0.261	—
	95% CI Lower	–0.384	—
	N	37	—

Note. * p < .05, ** p < .01, *** p < .001

Moral transgression

Correlation Matrix

Correlation Matrix

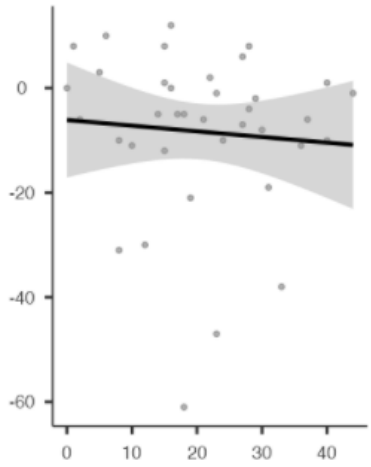
		OCIR_total	VAS_clean_change
OCIR_total	Pearson's r	—	
	p-value	—	
	95% CI Upper	—	
	95% CI Lower	—	
	N	—	
VAS_clean_change	Pearson's r	–0.079	—
	p-value	0.642	—
	95% CI Upper	0.251	—
	95% CI Lower	–0.393	—
	N	37	—

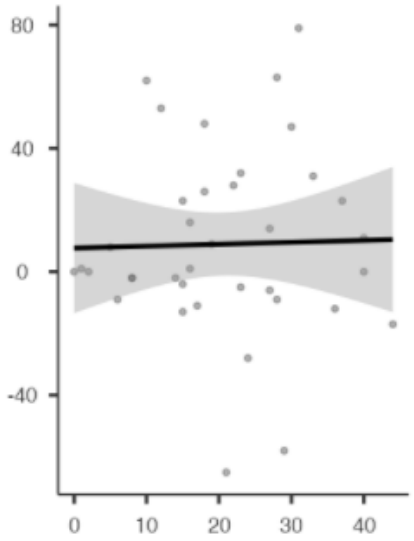
Note. * p < .05, ** p < .01, *** p < .001

Correlation Matrix

		OCIR_total	VAS_distress_change
OCIR_total	Pearson's r	—	
	p-value	—	
	95% CI Upper	—	
	95% CI Lower	—	
	N	—	
VAS_distress_change	Pearson's r	0.024	—
	p-value	0.889	—
	95% CI Upper	0.345	—
	95% CI Lower	–0.303	—
	N	37	—

Note. * p < .05, ** p < .01, *** p < .001





Relationship between OCI-R total and change in feelings of cleanliness (left) $r(37)= -0.079$, $p= 0.642$. Relationship between OCI-R total and change in feelings of distress $r(37)= 0.024$, $p= 0.889$ (right).

Correlation Matrix

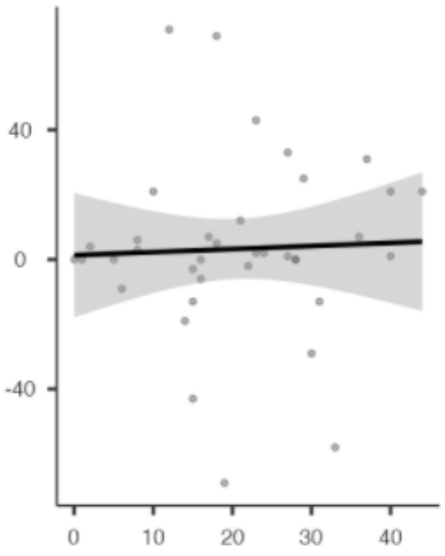
		OCIR_total	VAS_disgust_change
OCIR_total	Pearson's r	—	
	p-value	—	
	95% CI Upper	—	
	95% CI Lower	—	
	N	—	
VAS_disgust_change	Pearson's r	–0.047	—
	p-value	0.784	—
	95% CI Upper	0.282	—
	95% CI Lower	–0.365	—
	N	37	—

Note. * p < .05, ** p < .01, *** p < .001

Correlation Matrix

		OCIR_total	VAS_dirty_change
OCIR_total	Pearson's r	—	
	p-value	—	
	95% CI Upper	—	
	95% CI Lower	—	
	N	—	
VAS_dirty_change	Pearson's r	0.040	—
	p-value	0.816	—
	95% CI Upper	0.359	—
	95% CI Lower	−0.288	—
	N	37	—

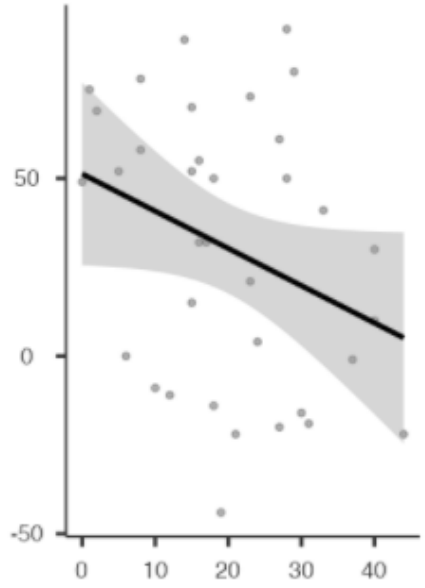
Note. * p < .05, ** p < .01, *** p < .001



Correlation Matrix

		OCIR_total	VAS_urgedogood_change
OCIR_total	Pearson's r	—	
	p-value	—	
	95% CI Upper	—	
	95% CI Lower	—	
	N	—	
VAS_urgedogood_change	Pearson's r	−0.315	—
	p-value	0.065	—
	95% CI Upper	0.020	—
	95% CI Lower	−0.587	—
	N	35	—

Note. * p < .05, ** p < .01, *** p < .001

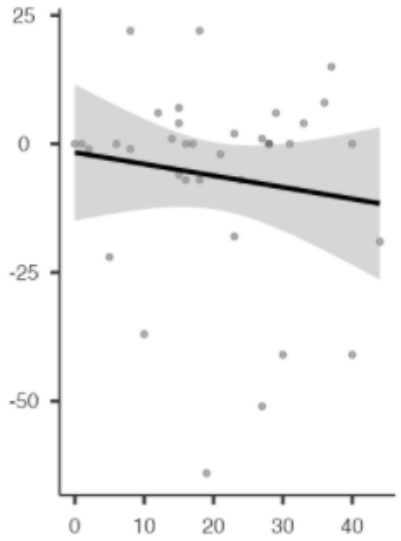


Relationship between OCI-R total and change in feelings of dirtiness $r(37)= 0.040$, $p= 0.816$ (left). Relationship between OCI-R total and change in the urge to do good $r(35)= -0.315$, $p= 0.065$ (right).

Correlation Matrix

		OCIR_total	VAS_urgeclean_change
OCIR_total	Pearson's r	—	
	p-value	—	
	95% CI Upper	—	
	95% CI Lower	—	
	N	—	
VAS_urgeclean_change	Pearson's r	−0.138	—
	p-value	0.423	—
	95% CI Upper	0.200	—
	95% CI Lower	−0.446	—
	N	36	—

Note. * p < .05, ** p < .01, *** p < .001

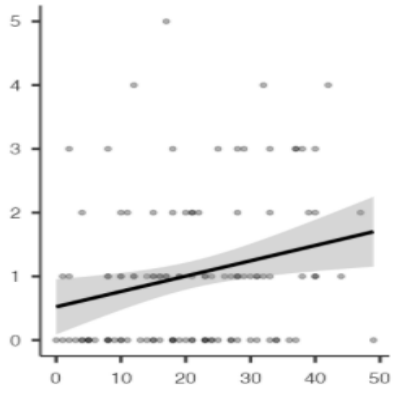


Relationship between OCI-R total and change in the urge to clean $r(36)= -0.138$, $p= 0.423$.

Correlation Matrix

		OCIR_total	Neut_controlthought
OCIR_total	Pearson's r	—	
	p-value	—	
	95% CI Upper	—	
	95% CI Lower	—	
	N	—	
Neut_controlthought	Pearson's r	0.245 **	—
	p-value	0.010	—
	95% CI Upper	0.413	—
	95% CI Lower	0.062	—
	N	111	—

Note. * p < .05, ** p < .01, *** p < .001



Exploratory hypothesis correlation showing a relationship between the severity of OCD symptoms (OCI-R total) and number of neutralization strategies pertaining to trying to control one's thoughts.

Appendix B

Consent Form

Thank you for your interest in this experiment. The purpose of this psychology study is to examine attitudes and feelings about moral dilemmas. The study is being conducted by Katie Fallon in Bard College's Psychology Program, under the supervision of Professor Richard Lopez.

About this study: As a participant, you will be asked about yourself and to complete questionnaires about some ideas and your mood. You will read a brief scenario and answer some questions about it. This study should take no more than 20 minutes in one sitting online. You must be 18 or older to participate.

Benefits & Risks: As a participant, there are no direct benefits in being part of this study. The experiment poses no serious risk but the short scenario you read may make you feel slightly uncomfortable. You may be asked to read about a sensitive topic. This topic might be relate to dead bodies, abortion, child pornography, or gun rights. If you do not wish to proceed with the experiment, you may end your participation at any time without penalty by closing the window, or you may skip any questions.

Compensation: You will be compensated $2.50 for your efforts.

Confidentiality: Participant data will be kept confidential between the researchers. No identifying information will be collected. All data will be kept on a password-protected computer. De-identified data may be shared with other researchers.

Your rights: Your participation is voluntary. You may contact Katie Fallon (kf0754@bard.edu), or her project supervisor, Richard Lopez (rlopez@bard.edu), for any questions or concerns as a participant. You may also contact the Bard College Institutional Review Board (irb@bard.edu) for information about your rights as a participant.

By checking the box below, you agree to have read over this form in its entirety, consent to participating, and that you are 18 years old or older.

[Click agree]

Appendix C

Debriefing Statement

Principal Investigator: Katie Fallon (kf0754@bard.edu)

Thank you for participating in this experiment! The purpose of this study was to examine domains of thinking related to Obsessive-Compulsive Disorder (OCD) and feelings of contamination in the absence of a physical contaminant. Although some individuals have OCD, many people may be affected by some thoughts relating to it. Thus, we were interested in everyone's responses.

You were asked to complete a questionnaire which identifies obsessive types of thinking and can be seen in many people. Additionally, you completed an inventory which asks about symptoms relevant to OCD. Your contribution will help us understand if scoring higher on this scale relates to specific domains of obsessive thinking, as well as to understand if these thought processes were related to greater distress from reading the story.

Your mood assessment before and after reading the story helped in understanding if certain types of mental contamination are more distressing to certain individuals based on their obsessive beliefs and symptoms. You read a story which focused on either contamination by physical contact, contamination by an immoral deed, or was not about contamination. The first two were purposely uncomfortable to read in order to bring on feelings of dirtiness and disgust. Additionally, I was interested in neutralization strategies, which were the coping behaviors reported during the minute break.

There has not been an investigation into the relationship between physical and moral impurities for mental contamination. Additionally, the relationship between symptom type and feelings of mental contamination are unclear. Your support in this study helps us learn more about the link between feeling physically contaminated and morality as well as the associations

with obsessive compulsive symptoms. If you have any questions or concerns about this study, please contact the researcher Katie Fallon (kf0754@bard.edu) or her project supervisor, Richard Lopez (rlopez@bard.edu).

Resources

Please refer to the following mental health resources if you continue to feel uncomfortable after completing the study:

The National Alliance on Mental Illness (NAMI) Helpline: 1-800-950-NAMI (6264) or info@nami.org

24/7 Crisis Text Line: text HOME to 741-741

OCD-specific resources:

International OCD Foundation https://iocdf.org/

Find support groups in your area, and for specific needs:

https://iocdf.org/ocd-finding-help/supportgroups/online-and-phone-ocd-support-groups/

Thank you for your participation in this study!

Sincerely,

Katie Fallon

Appendix D

Demographic Questions

1. What is your age?
    a. Fill in age ____
2. What is your gender identity? (Choose all that apply)
    a. Female
    b. Male
    c. Non-binary or gender non-conforming
    d. Transgender
    e. Other: ____
    f. Choose not to respond
3. Please select the race you feel best describes you (Choose all that apply)
    a. American Indian or Alaska Native
    b. Asian or Asian American
    c. Black or African American
    d. Native Hawaiian or Pacific Islander
    e. White
    f. Other: ____
4. Please select the ethnicity you feel best describes you
    a. Hispanic/Latinx origin
    b. Not Hispanic/Latinx origin
5. Have you been diagnosed with any of the following mental disorders by a health professional? (Choose all that apply)
    a. Major Depressive Disorder
    b. Generalized Anxiety Disorder
    c. Social Anxiety Disorder
    d. Post-Traumatic Stress Disorder
    e. Bipolar Disorder
    f. Persistent Depression Disorder
    g. Other: ____

Appendix E

Visual Analog Scale Questions

Please drag the slider across the bar to correspond with how much you feel the following sensations in the moment.

Contamination questions

1. How clean do you feel?
2. How dirty do you feel?
3. How distressed do you feel?
4. How disgusted do you feel?

Contamination urges

1. How great is your urge to clean yourself?
2. How great is your urge to do something good?

Filler questions

1. How anxious do you feel?
2. How frustrated do you feel?
3. How excited do you feel?
4. How safe do you feel?

Urges filler questions

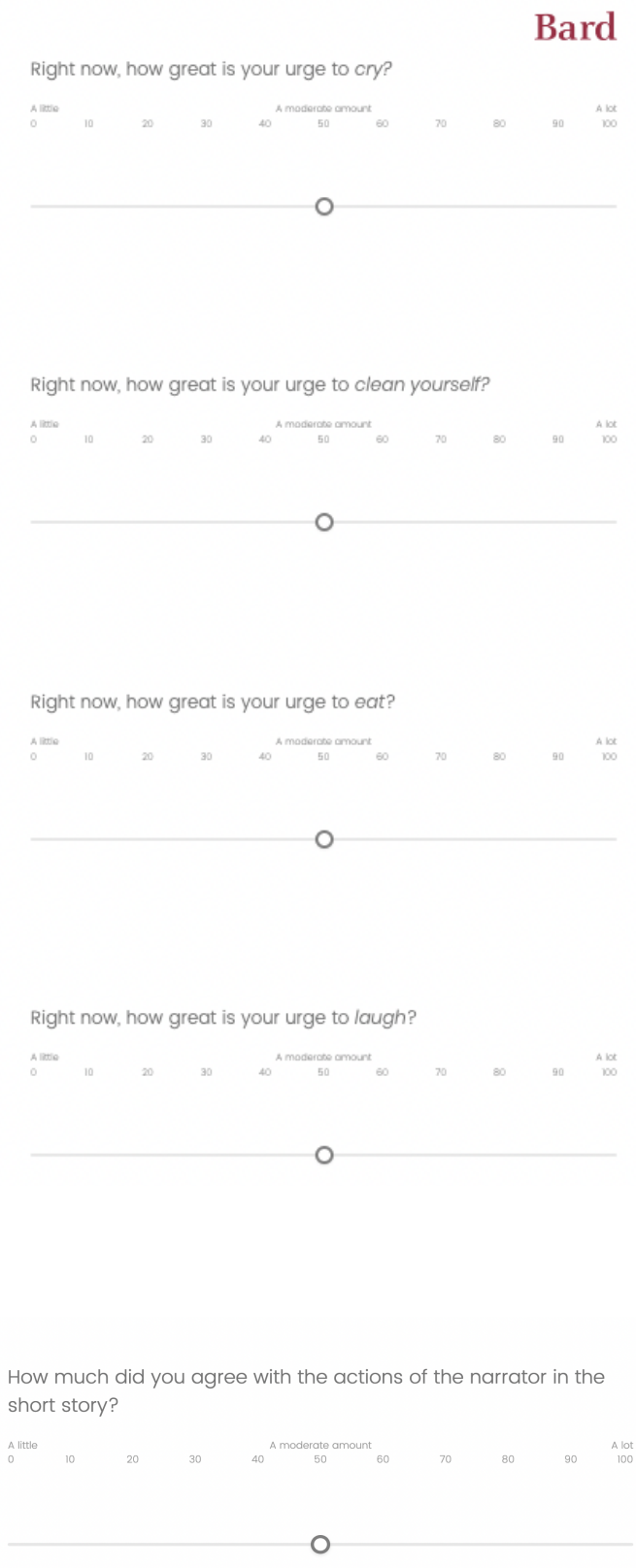
1. How great is your urge to eat?
2. How great is your urge to cry?
3. How great is your urge to laugh?
4. How great is your urge to do something bad?

Manipulation check question

To be asked at the end of the second Visual Analog Scale distribution. The question will match the format of the previous sale questions.

1. How much did you agree with the actions of the narrator in the short story?

Example of slider format below



Appendix F

Vignettes

Physical Contamination

You are walking around your neighborhood and come across a discolored mass on the side of the road. As you walk closer, you realize that it is a young deer that has just been hit by a car. You stop right next to it and notice the gash on the side of the deer's body that is oozing blood onto the pavement. The underside of the body is bent inwards from the hit of the car, and the legs of the deer are mangled and broken, sitting at unnatural angles. You can see the bone and tissue protruding from the ripped hair and flesh of the deer. Chunks of hair and tissue litter the road, aligning with where the body was first hit and thrown off to the side. You notice flies landing and making their way into the opening on the deer. No one is around to see you, so you place your hand on the side of the deer above the gash and feel the rough hair of the deer. Keeping your hand there, you push down on the deer, and guts and blood ooze out onto the street. Blood and organs squeeze out. Since you are curious you swipe a chunk off the ground and examine the black-red clot in your hand and squeeze, watching more blood pop and ooze all down your hand. The consistency is thick and sticky; it entirely coats your fingers. You then back away to look at the deer once more, and then carry on with your walk.

Moral Contamination

One day at work you overhear your manager and boss discussing a promotion between you and a co-worker named Alex. The two of you joined the company over a year ago, and Alex is one of the more focused, hard-working coworkers. You enjoy Alex's company at work and consider him to be a friend as he is funny and cares a lot for his kids. Today, you see Alex go out of his way and check in with the manager to see if there is anything to help with, and you regret not

stepping up. There is nothing you can do to make yourself appear a better worker, so you must tarnish his reputation. When no one is around, you go to Alex's work computer and access a dark web browser you have heard of. There, you search words related to young girl and boy genitals and browse the sites. You download as many files as you can from sites offering photos and videos, and then close out the tabs. The next morning, you slip an anonymous note under the boss' door saying you thought you saw child pornography on Alex's computer. Within an hour, your boss and manager confiscate Alex's computer and take Alex into a locked conference room. Later, you see authority figures come in, and they leave with Alex.

Control Shopping Trip

The weather has been nice recently, so you decide to take a walk to your local park. It is a longer walk than you usually take, but since you have the time, you decide why not. You tie up your sneakers and pull on a coat, and head out the door. Walking to the end of your driveway, you catch the mailman dropping off a package, so you give him a wave. Turning onto the street, you begin your walk past the neighboring houses. A few people are out doing yard work, and you admire the symmetry of plants one neighbor has within their front yard. Continuing on, you notice quite a few people have also taken advantage of the nice weather. A family walks on the other side of the road, pushing their baby in a stroller. Further up, a young boy is walking his dog, which appears to be a golden retriever. The retriever notices another dog approaching, and stands alert, wagging its tail in hopes to greet the passerby. The two dogs greet each other in an excited tangle before the owners pull away. You turn right, and start walking by a body of water. There are kayaks and boats out on the water, and on the land people eat at picnic tables. After

another ten minutes or so you reach a large space of greenery and enter through an iron archway into the park. There, you make your way to your favorite bench which overlooks the hills.

Appendix G

Neutralization Strategies

Please mark which of the following strategies you used, if any, during the minute break. If you used a strategy not listed, please select *Other* and describe what you did. If you used multiple strategies, please mark all that apply.

1. Washed self (hands, body, mouth, etc.)
2. Counted
3. Tried to control the thought I had
4. Ordered object(s)
5. Told self to stop thinking at all
6. Thought about something pleasant
7. Focused on a different thought unrelated to the short story
8. Told self the thought was unimportant
9. Visualized what I was thinking about
10. Did a physical action
11. Tried not to think about the thought, or get thought out of my head
12. Talked about what I thought
13. Religious strategy (praying, talking to a god, etc.)
14. Analyzed the thought
15. Did nothing
16. Other: ____

Appendix H

Preregistration

CONFIDENTIAL - FOR PEER-REVIEW ONLY

CONFIDENTIAL - FOR PEER-REVIEW ONLY

The Effect of Physical Contamination and Moral Transgressions on Feelings of Mental Contamination (#90449)

Created: 03/09/2022 04:33 PM (PT)

This is an anonymized copy (without author names) of the pre-registration. It was created by the author(s) to use during peer-review. A non-anonymized version (containing author names) should be made available by the authors when the work it supports is made public.

1) Have any data been collected for this study already?

No, no data has been collected for this study yet.

2) What's the main question being asked or hypothesis being tested in this study?

H1: The contamination groups (physical contamination and moral transgression) will score higher on the VAS post-vignette than the control (neutral) group. H2: Individuals scoring higher on the OCI-R will report higher ratings on the VAS post-vignette compared to individuals with lower OCI-R scores.

3) Describe the key dependent variable(s) specifying how they will be measured.

Feelings of mental contamination via scores on the VAS questions post-reading. The contamination-related questions relate to dirtiness, disgust, cleanliness, and distress. Two "urge" questions are the urge to clean and the urge to do something good.

4) How many and which conditions will participants be assigned to?

3 conditions based on vignette type: physical contamination, moral transgression, and control. All other elements of the study are the same for each group. Random assignment for each condition.

5) Specify exactly which analyses you will conduct to examine the main question/hypothesis.

One-way ANOVA for analyzing feelings of mental contamination amongst vignette types.
A correlation for OCI-R scores and VAS scores post-vignette. Exploratory analyses will follow to see if there is a relationship between subtypes of OCI-R symptoms and domains of thinking from the OBQ. Additionally, if subtypes predispose participants for greater distress from the vignettes.

6) Describe exactly how outliers will be defined and handled, and your precise rule(s) for excluding observations.

Z-scores for all measures will be computed and any scores that exceed ± 3 SD will be excluded.

7) How many observations will be collected or what will determine sample size? No need to justify decision, but be precise about exactly how the number will be determined.

Expected total sample size = 111. 37 participants per condition, or until funding runs out.

8) Anything else you would like to pre-register? (e.g., secondary analyses, variables collected for exploratory purposes, unusual analyses planned?) Included in this survey is a list of neutralization strategies that participants may engage in during a break. We are interested in seeing if there is an association between OCI-R severity and use of neutralization strategies. Additionally, if certain strategies are used more than others. This is exploratory.

Appendix I

IRB Approval

Bard College Institutional Review Board

Date: February 20, 2022
To: Katie Fallon
Cc: Justin Dainer-Best, Rich Lopez, Deborah Treadway, Brandt Burgess
From: Tom Hutcheon, IRB Chair
Re: Eww vs. Taboo: The Effect of Physical Contamination and Moral Transgression on Feelings of Mental Contamination

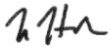
DECISION: APPROVED

Dear Katie,

The Bard Institutional Review Board has reviewed your revisions and approved your proposal entitled, "Eww vs. Taboo: The Effect of Physical Contamination and Moral Transgression on Feelings of Mental Contamination." Your proposal is approved through February 20, 2023 and your case number is 2022FEB20-FAL.

Please notify the IRB if your methodology changes or unexpected events arise.

We wish you the best of luck with your research!



Tom Hutcheon, Ph.D.
IRB Chair
Assistant Professor of Psychology
Bard College
thutcheo@bard.edu

Appendix J

A Priori Calculations and Budgeting

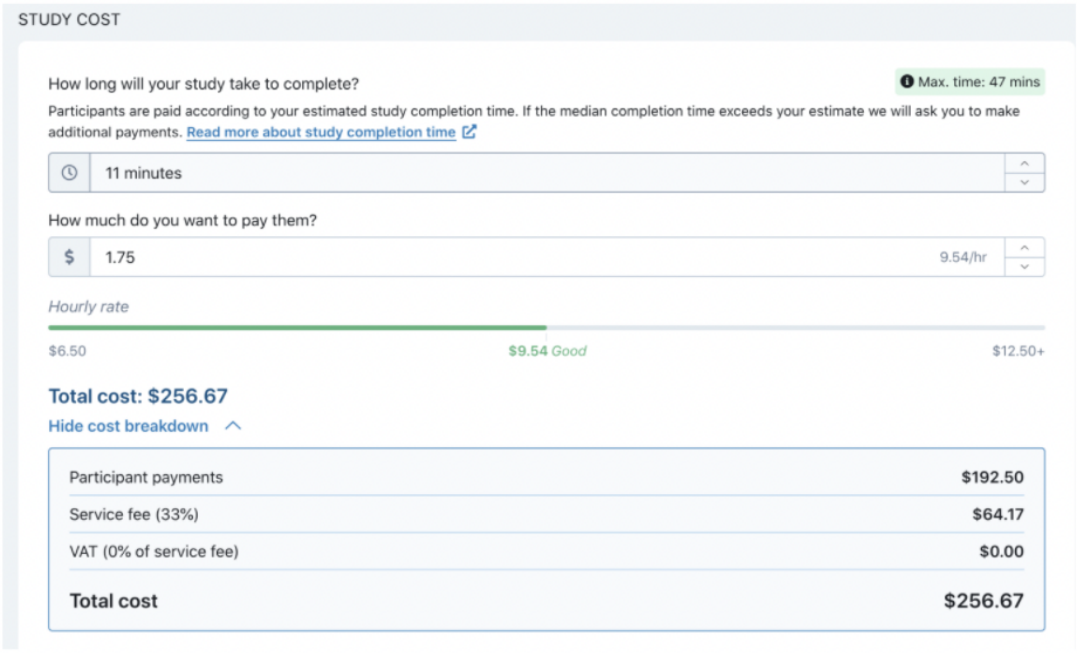
A priori power calculation for omnibus ANOVA with small/medium effect:

Based on an a priori power analysis conducted in G*Power (see output below), assuming 80% power, alpha=.05, a small/medium effect size of 0.3, and with 3 groups (as per the study design), I will need 111 participants (N=37 per group).

F tests - ANOVA: Fixed effects, omnibus, one-way

Analysis:	A priori: Compute required sample size		
Input:	Effect size f	=	.3
	α err prob	=	0.05
	Power (1-β err prob)	=	0.8
	Number of groups	=	3
Output:	Noncentrality parameter λ	=	9.9900000
	Critical F	=	3.0803869
	Numerator df	=	2
	Denominator df	=	108
	Total sample size	=	111
	Actual power	=	0.8034951

Predicted cost of the study, with N=110 Prolific Participants who take an average of ~11 minutes to complete the survey, is $256.67 (see calculation below).



Appendix K

Obsessional Beliefs Questionnaire

Bard

This next scale lists different attitudes or beliefs that people sometimes hold. Read each statement carefully and decide how much you agree or disagree with it. For each of the statements, choose the number matching the answer that best describes how you think. Because people are different, there are no right or wrong answers. To decide whether a given statement is typical of your way of looking at things, simply keep in mind what you are like most of the time.

	Disagree very much	Disagree moderately	Disagree a little	Neither agree nor disagree	Agree a little	Agree moderately	Agree very much
If I'm not absolutely sure, I'm bound to make a mistake.	○	○	○	○	○	○	○
To be a worthwhile person, I must be perfect at everything I do.	○	○	○	○	○	○	○
Even if harm is very unlikely, I should try to prevent it at any cost.	○	○	○	○	○	○	○
For me, having bad urges is as bad as actually carrying them out.	○	○	○	○	○	○	○
If I don't act when I foresee danger, then I am to blame for consequences.	○	○	○	○	○	○	○
In all kinds of daily situations, failing to prevent harm is just as bad as deliberately causing it.	○	○	○	○	○	○	○
For me, not preventing harm is as bad as causing harm.	○	○	○	○	○	○	○

	Disagree very much	Disagree moderately	Disagree a little	Neither agree nor disagree	Agree a little	Agree moderately	Agree very much
I should be upset if I make a mistake.	○	○	○	○	○	○	○
For me, things are not right if they are not perfect.	○	○	○	○	○	○	○
Having nasty thoughts means I'm a terrible person.	○	○	○	○	○	○	○
If I do not take extra precautions, I am more likely than others to have or cause a serious disaster.	○	○	○	○	○	○	○
I am more likely than other people to accidentally cause harm to myself or to others.	○	○	○	○	○	○	○
Having bad thoughts means I am weird or abnormal.	○	○	○	○	○	○	○
Even when I am careful, I often think bad things will happen	○	○	○	○	○	○	○

	Disagree very much	Disagree moderately	Disagree a little	Neither agree nor disagree	Agree a little	Agree moderately	Agree very much
Having intrusive thoughts means I'm out of control.	○	○	○	○	○	○	○
Harmful events will happen unless I'm careful.	○	○	○	○	○	○	○
I must keep working until it's done exactly right.	○	○	○	○	○	○	○
To me, failing to prevent disaster is as bad as causing it.	○	○	○	○	○	○	○
Having a bad thought is morally no different than doing a bad deed.	○	○	○	○	○	○	○
No matter what I do, it won't be good enough.	○	○	○	○	○	○	○

Obsessive Compulsive Cognitions Working Group. (2005). Psychometric validation of the Obsessive Belief Questionnaire and interpretation of intrusions inventory—part 2: Factor analyses and testing of a brief version. *Behaviour Research and Therapy*, *43*(11), 1527–1542. https://doi.org/10.1016/j.brat.2004.07.010

Appendix L

Obsessive-Compulsive Inventory

OCI-R

The following statements refer to experiences that many people have in their everyday lives. Circle the number that best describes **HOW MUCH** that experience has **DISTRESSED or BOTHERED you during the PAST MONTH.** The numbers refer to the following verbal labels:

0 Not at all	1 A little	2 Moderately	3 A lot	4 Extremely

1.	I have saved up so many things that they get in the way.	0	1	2	3	4
2.	I check things more often than necessary.	0	1	2	3	4
3.	I get upset if objects are not arranged properly.	0	1	2	3	4
4.	I feel compelled to count while I am doing things.	0	1	2	3	4
5.	I find it difficult to touch an object when I know it has been touched by strangers or certain people.	0	1	2	3	4
6.	I find it difficult to control my own thoughts.	0	1	2	3	4
7.	I collect things I don't need.	0	1	2	3	4
8.	I repeatedly check doors, windows, drawers, etc.	0	1	2	3	4
9.	I get upset if others change the way I have arranged things.	0	1	2	3	4
10.	I feel I have to repeat certain numbers.	0	1	2	3	4
11.	I sometimes have to wash or clean myself simply because I feel contaminated.	0	1	2	3	4
12.	I am upset by unpleasant thoughts that come into my mind against my will.	0	1	2	3	4
13.	I avoid throwing things away because I am afraid I might need them later.	0	1	2	3	4
14.	I repeatedly check gas and water taps and light switches after turning them off.	0	1	2	3	4
15.	I need things to be arranged in a particular way.	0	1	2	3	4
16.	I feel that there are good and bad numbers.	0	1	2	3	4
17.	I wash my hands more often and longer than necessary.	0	1	2	3	4
18.	I frequently get nasty thoughts and have difficulty in getting rid of them.	0	1	2	3	4

Foa, E.B., Huppert, J.D., Leiberg, S., Hajcak, G., Langner, R., et al. (2002). The Obsessive-Compulsive Inventory: Development and validation of a short version. Psychological Assessment, 14, 485-496.