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The Effect of Physical Cleaning on Threatened Morality in Individuals With Obsessive-Compulsive Disorder

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Abstract
The association between morality and physical cleansing has been demonstrated in a series of studies by Zhong and Liljenquist. We predicted that this association would be especially prominent in people with obsessive-compulsive disorder (OCD). Participants with OCD and matched control participants wrote about an immoral deed they had committed, after which half of the participants in each group cleaned their hands with a wipe. All participants were then offered an opportunity to help a fictitious graduate student by taking part in her experiment. Replicating previous findings, physical cleaning reduced the willingness to help and relieved moral emotions. As predicted, this effect was particularly prominent among participants with OCD. We discuss two processes that may account for the association between morality and cleanliness in general and particularly in the context of OCD: embodiment of morality in terms of physical cleanliness and assigning abstract meaning to the physical actions of cleaning.

Keywords
cleaning, morality, obsessive-compulsive disorder, washers, embodiment

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The association between physical cleanliness and morality is reflected in language (e.g., "my hands are clean"), in literature (e.g., Lady Macbeth scrubbing her hands; Shakespeare, 1603–1607/1998), and in religious rituals (e.g., the Islamic religion requires cleaning one's body before each prayer). Zhong and Liljenquist (2006) demonstrated this association empirically in a series of laboratory studies that showed that people use physical cleaning to alleviate concerns with moral misconduct (for replications and extensions, see Lee & Schwarz, 2010; Schnall, Benton, & Harvey, 2008; Schnall, Haidt, Clore, & Jordan, 2008). Specifically, Zhong and Liljenquist showed that physical cleaning can restore moral integrity. In one of their studies, participants who recalled an unethical deed and then cleaned their hands were less motivated to help another person as compared to participants who recalled an unethical deed but did not clean their hands. The authors reasoned that writing about immoral deeds undermined participants' sense of morality, which they then sought to restore by helping a person in need. Cleaning their hands, however, helped to restore participants' sense of morality, thereby reducing their need to help.

Cleanliness and morality are central concerns for individuals with obsessive-compulsive disorder (OCD; Rachman, 1994; Rachman & Hodgson, 1980), who may be preoccupied or even debilitated by obsessions about moral transgressions and by elaborate hand washing rituals. Cleaning, and particularly hand washing, appears to carry both practical and symbolic meanings for individuals with OCD. A person with OCD might wash hands to relieve distress caused by contact with a contaminant (e.g., "dirty" bodily fluids) but also in an attempt to obtain relief from "dirty thoughts" (e.g., images of "inappropriate" sexual encounters). This symbolic meaning of cleanliness is captured by the term *mental contamination* (Rachman, 2004, 2006), which refers to the feeling of being polluted, dirtied, infected, or endangered in the absence of physical contact with a contaminant. Mental contamination tends to be accompanied by feelings of shame, guilt, disgust, and impurity and to provoke an

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urge to wash (e.g., Coughtrey, Shafran, Lee, & Rachman, 2012). Along similar lines, sensitivity of the self in the morality domain appears to be a central concern in individuals with OCD and to be specifically related to washing rituals (Doron & Kyrios, 2005; Doron, Moulding, Kyrios, & Nedeljkovic, 2008). Along these lines, Doron, Sar-El, and Mikulincer (2012) recently found that threatening participants' moral self-perceptions triggered contamination-related behavioral tendencies.

In the present study, we examined whether individuals with OCD would exhibit a particularly strong association between morality and physical cleanliness. Borrowing Zhong and Liljenquist's (2006) procedure, we asked participants with OCD and matched control participants to describe something unethical that they had done in the past. Afterward, half of the participants in each group wiped their hands, whereas the other half did not. At the end of the experiment, all participants were asked if they would help a graduate student by taking part in her study. Following Zhong and Liljenquist (2006), we reasoned that a moral threat (reporting past immoral behavior) would motivate participants to volunteer to help, but that participants who cleaned their hands would be less motivated to volunteer. More pertinent, we hypothesized that this effect would be particularly prominent in participants with OCD. In the same vein, we predicted that as in the original study, wiping hands would reduce feelings related to immorality and that this effect would also be enhanced in participants with OCD.

Method

Participants

Participants were 29 individuals with a clinical diagnosis of OCD and 29 participants without psychiatric history who were matched to the OCD sample in age, gender, and education. Each group consisted of 14 men and 15 women. Participants' age ranged from 18 to 44 years, with a mean of 28.2, and their mean level of education was 14.2 years.

Participants with OCD were recruited by advertisements on the Internet that described the study briefly and promised a compensation of 100 NIS (approximately $25 at the time of the study) for participation. All those who responded to the advertisements were invited to an interview with a clinical psychologist. The interviewer verified that respondents met diagnostic criteria for OCD and assessed the presence of comorbid disorders using the Mini-International Neuropsychiatric Interview (MINI; see the Measures section). Exclusion criteria were current or past psychotic episodes or features (only 1 participant met these criteria and was excluded). Of the 29 participants with OCD included in the study, 3 also met criteria for depression, 4 met criteria for generalized anxiety disorder, 2 met criteria for specific phobia, and 2 met criteria for panic disorder without agoraphobia. Of the 29 participants with OCD, 18 were receiving pharmacological treatment with various serotonin reuptake inhibitors.

The diagnostic interview also assessed the nature of the interviewee's primary obsessions and compulsions. Based on the interview, 9 of the 29 participants with OCD were identified as primarily checkers, 12 were identified as primarily washers, and 8 were identified as having mixed symptoms.

Participants in the control sample also responded to advertisements on the Internet. These participants were selected to match the OCD sample in age, gender, and education. The control sample also completed the diagnostic interview to rule out current or past anxiety or psychotic disorders (no one was excluded on that basis).

Measures

Primary and comorbid diagnoses were assessed with the MINI (Sheehan et al., 1998). The MINI is a short structured interview that assesses diagnostic criteria of the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; American Psychiatric Association, 1994). The MINI was shown to be a valid and time-efficient alternative to the Structured Clinical Interview for *DSM-IV* and Composite International Diagnostic Interview, with kappa coefficients between .76 and .93 (Lecrubier et al., 1997; Sheehan et al., 1998).

OCD severity was assessed by the Obsessive-Compulsive Inventory–Revised (OCI-R; Foa et al., 2002). The OCI-R is an 18-item measure of OC symptoms. Previous studies reported a Cronbach's alpha of .88 for this scale (Hajcak, Huppert, Simons, & Foa, 2004). In this study, Cronbach's alpha was .84 in the OCD group and .86 in the control group.

Procedure

We used the procedure described by Zhong and Liljenquist (2006). Participants were invited to a 1-hr individual session. They received an outline of the research procedure, signed an informed consent, and were paid.[1] Following the diagnostic procedure, which included the MINI psychiatric interview and the OCI-R, participants were seated at the computer station and were instructed to describe in detail an unethical thing they had done and any feelings or emotions they experienced. As participants started to type their narratives, the experimenter left the room for a few minutes to allow them to write in privacy.

Following the completion of the written narrative, half of the participants were told that the Research Protection

Board recommended that everyone should wipe their hands after using public computers. The experimenter handed these participants a wipe, which all of them used to clean their hands. The other half of the participants continued directly to the next phase, in which all participants completed a paper-and-pencil questionnaire to assess their emotional state. Specifically, participants rated on scales that ranged from 1 (*not at all*) to 7 (*very much*) the extent to which they felt disgust, happiness, amusement, guilt, embarrassment, regret, calm, shame, confidence, excitement, distress, and anger. Following Zhong and Liljenquist (2006), we computed an index of moral emotions as an average of the ratings of disgust, regret, guilt, shame, embarrassment, and anger.

Finally, and ostensibly unrelated to the study, all participants were asked if they would volunteer for another study to help a graduate student. The experimenter told participants in an informal manner about a desperate graduate student who needed to finish her dissertation in a short time but had no funds to run her study. The experimenter also mentioned that it was possible to volunteer for either the full version of the study or a short version, which would take less time. After indicating their choice (not volunteer at all, volunteer for the shorter version, or volunteer for the full study), participants were debriefed and thanked for their participation.

Results

Written narratives

Participants typed narratives about lying to significant others, stealing from a grocery store, riding on a bus or a train without a ticket, being unfaithful to a spouse, dating several people simultaneously, being unsupportive of a friend in trouble, and so on. The narratives of OCD and control participants were similar in length and style, and no OCD-specific themes were identified. To verify that the narrative of the two groups did not differ in terms of the severity of immorality, we submitted them to two independent judges who were blind to experimental condition. We asked the judges to rate the immorality of the deeds described in the narratives on a 5-point scale (1 = *least morally wrong*, 5 = *most morally wrong*). The ratings of the two judges were in reasonable agreement, as indicated by the interjudge Pearson correlation coefficient, $r(58) = .49$, $p < .001$. A t test comparing the mean of the two judges' ratings showed that there was no difference between the groups in the severity of the immoral deeds ($M_{OCD} = 3.08$, $M_{control} = 3.36$), $t(56) = 0.90$, $p = .37$.

Volunteering to help

We coded not volunteering to help as 1, volunteering for the short version as 2, and volunteering for the full study as 3. We submitted this score to a 2 (OCD vs. control) × 2 (wiped hands vs. did not wipe hands) between-subjects fixed-factors ANOVA. Replicating Zhong and Liljenquist (2006), participants that did not wipe their hands were more willing to help than were those who wiped their hands, $F(1, 54) = 110.41$, $p < .001$, $\eta^2 = .076$. In addition, participants with OCD were more willing to help than were control participants, $F(1, 54) = 4.04$, $p = .050$, $\eta^2 = .003$. Most important and as predicted, an interaction effect indicated that wiping hands had a stronger effect on participants with OCD than on control participants, $F(1, 54) = 42.73$, $p < .001$, $\eta^2 = .03$ (see Fig. 1). In fact, of the participants with OCD who did not wipe their hands, all but one agreed to participate in the most demanding version of the alleged experiment ($M = 2.93$, $SD = 0.26$), whereas of those who did wipe their hands all but one declined to volunteer at all ($M = 1.07$, $SD = 0.27$), $t(28) = 18.90$, $p < .001$, $d = 2.35$. As expected, the control group showed a smaller though statistically significant effect, so that those who did not clean their hands were more willing to help ($M = 2.00$, $SD = 0.38$) than those who did ($M = 1.57$, $SD = 0.65$), $t(28) = 2.19$, $p = .04$, $d = 0.54$. The effect of wiping hands did not differ among the three OCD subtypes (washers, checkers, and mixed symptoms), $F(2, 23) = 0.49$, $p = .62$, for the interaction between OCD subtype and hand wiping condition.

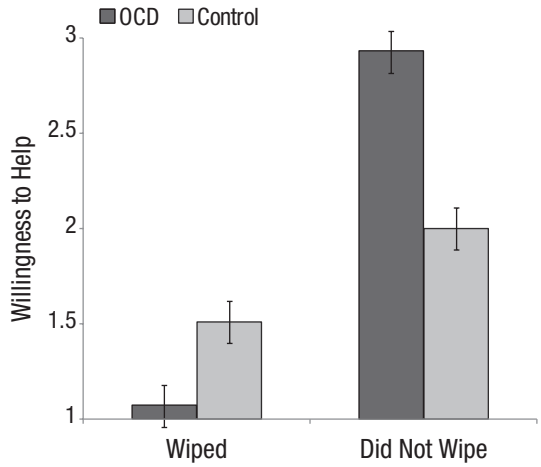

Fig. 1. Willingness to help (on a 1–3 scale) as a function of group (OCD vs. non-OCD) and experimental condition (wiped vs. did not wipe).
Note: Vertical bars denote standard errors of the mean.

Moral emotions

A fixed-factor 2 (OCD vs. control) × 2 (wiped hands vs. did not wipe hands) ANOVA on the moral emotions index revealed that wiping hands reduced moral emotions ($M = 1.52$, $SD = 0.36$) relative to not wiping ($M = 3.94$, $SD = 0.76$), $F(1, 54) = 341.10$, $p < .001$, $\eta^2 = .150$.

Also, participants with OCD reported higher levels of moral emotions (M = 3.09, SD = 1.48) than did control participants (M = 2.45, SD = 1.16), $F(1, 54) = 22.99$, $p < .001$, $\eta^2 = .010$. An interaction effect indicated that wiping hands had a slightly stronger effect on moral emotions for participants with OCD ($M_{cleaning}$ = 1.68, $SD_{cleaning}$ = 0.34; $M_{no\ cleaning}$ = 4.41, $SD_{no\ cleaning}$ = 0.63; $d = -2.02$) as compared to control participants ($M_{cleaning}$ = 1.37, $SD_{cleaning}$ = 0.33; $M_{no\ cleaning}$ = 3.47, $SD_{no\ cleaning}$ = 0.59; $d = -1.83$), $F(1, 54) = 5.89$, $p = .02$, $\eta^2 = .003$. The effect of wiping hands on moral emotions did not differ among the three OCD subtypes (washers, checkers, and mixed symptoms), $F(2, 23) = 0.75$, $p = .29$, for the interaction between OCD subtype and hand wiping condition.

Discussion

In this study we borrowed the procedure used by Zhong and Liljenquist (2006) to examine the relationship between cleanliness and morality in OCD. Replicating Zhong and Liljenquist, we found that cleaning hands after writing about an immoral deed reduced participants' willingness to help another person. As predicted, participants with OCD were particularly susceptible to this effect, showing extreme willingness to help when they did not clean their hands and essentially no willingness to help after cleaning. These findings corroborate the previously demonstrated association between physical cleansing and relief of moral discomfort and show that this association is particularly strong in OCD. Also replicating Zhong and Liljenquist, wiping hands relieved participants' moral emotions (disgust, regret, guilt, shame, embarrassment, and anger), and this effect, too, was stronger among participants with OCD than among control participants.

It is interesting to consider the finding that cleaning hands created a sense of moral relief among participants with OCD from the perspective of Szechtman and Woody's model of OCD. According to Szechtman and Woody (2004), actions such as hand washing, which are designed to prevent harm to self or others, normally produce a termination signal to the security motivation system. People with OCD, according to this model, are unable to generate this termination signal. As a result, they repeat the security-related behavior over and over again in an attempt to overcome the dysfunctional feedback mechanism. Along the same lines, Summerfeldt (2004) postulated that OCD is associated with sense of incompleteness, the core of which is a malfunction in the internal signal that usually terminates behavior. Our results, however, indicate that cleaning did produce a sense of completion among participants with OCD, as evidenced by the finding that cleaning eliminated the need to perform further action directed toward restoring the sense of morality.

Why do people connect immorality with physical cleanliness, and why would this connection be particularly strong among people with OCD? The original study and its many replications and extensions (e.g., Lee & Schwarz, 2010; Schnall, Benton, et al., 2008; Schnall, Haidt, et al., 2008) subscribe to the theory of embodiment (Barsalou, 2008), according to which people associate morality and cleanliness because morality is represented in concrete terms, as a metaphor to cleanliness. In that view, cleanliness is a concrete, embodied representation of the abstract, intangible concept of morality. People with OCD, according to this interpretation, might have a particularly concrete view of morality and might rely more than others on an embodied representation of this abstract concept.

An alternative hypothesis to consider is that humans tend to assign symbolic, particularly moral, meanings to physical cleanliness and that this is especially the case in OCD. Rather than a tendency to concretize the abstract concept of morality, as suggested by embodiment theory, this hypothesis postulates a tendency to assign abstract meanings to the concrete action of cleaning. This is by no means a novel idea. In *Totem and Taboo*, Freud (1913/1960) illustrated the symbolic meanings that individuals and societies assigned to basic acts and specifically stressed the similarities between religious and OCD-related cleansing rituals. From a different vantage point, the theory of action identification (Vallacher & Wegner, 1985, 1987) posits that people tend to assign abstract meanings to their acts and that habitual acts are identified in particularly high-level terms. For example, Wegner, Vallacher, and Dizadji (1989) showed that frequent drinkers construed alcohol consumption at higher levels of identification (e.g., relieving tension) than did inexperienced drinkers (e.g., lifting a glass).

Directly relevant to the present discussion, Dar and Katz (2005) found that people with OCD were more likely than matched control participants to use high-level action identifications to describe hand washing. For example, OCD participants tended to agree more with statements such as "When I wash my hands, I clean myself internally" and less with statements such as "When I wash my hands I run water over my hands." Together with the present findings, the results of Dar and Katz suggest that individuals with OCD assign an abstract meaning to the act of hand washing that goes beyond physical cleanliness to moral and perhaps spiritual cleansing.

Of note, the two alternatives suggested above do not exclude each other: It is possible that people (and individuals with OCD in particular) both concretize the abstract concept of cleansing *and* assign abstract meaning to the concrete act of cleaning. However, whereas the former possibility has been frequently invoked to explain why cleanliness enhances morality and why immorality feels dirty, the latter possibility has been largely ignored

in the literature. We believe that is important to consider it alongside embodiment theory as a possible account of the ubiquitous association between cleanliness and morality.

Our results demonstrate that washing rituals in OCD are an effective, if only short-lived, means to reduce uncomfortable negative emotions associated with guilt or immorality. This effect was not limited to individuals with washing rituals but rather was equally robust in individuals with checking and mixed rituals, suggesting that the relationship between cleansing in morality in OCD may be quite broad. It is possible that other disorders are also associated with assigning special meaning to physical cleanliness. For example, women with posttraumatic stress disorder (PTSD) related to sexual assault reported washing their body in an attempt to relieve sensations evoked by the memory of the assault (Fairbrother & Rachman, 2004). It would be interesting to examine whether people suffering from PTSD would also exhibit a stronger than normal association between physical cleanliness and morality, similar to what we found for individuals with OCD.

In sum, our results demonstrate that morality and physical cleanliness are associated particularly strongly among people suffering from OCD. This finding is consistent with the clinical picture of OCD, in which hand washing is often used not only to clean real or imagined contaminants but also to cleanse "dirty thoughts" (Rachman, 2004, 2006). Our results are also consistent with recent findings demonstrating that threats to morality increase the urge of people with OCD to wash their hands (Doron et al., 2008; Doron et al., 2012). Future studies might examine the embodiment versus symbolic hypotheses suggested above to account for this association. For example, it might be interesting to track the development of the meanings assigned to the act of hand washing (and cleaning more generally) in the general population and specifically in people with OCD. It may also be important to examine how our findings might be integrated into extant cognitive-behavioral therapy for OCD. For example, patients might be guided to develop more realistic and relevant means to cope with guilt or feelings of immorality, which might help them to break the vicious cycle of compulsive hand washing and other cleaning rituals.

Declaration of Conflicting Interests

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

Note

1. Participants were paid after signing the consent form rather than at the end of the experiment because we suspected that receiving and signing for the money would induce a sense of closure that might reduce participants' urge to help to restore their sense of morality (see, e.g., Liberman, Förster, & Higgins, 2007).

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