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Washing Away Your Sins: Threatened Morality and Physical Cleansing

Chen-Bo Zhong^{1*} and Katie Liljenquist²

Physical cleansing has been a focal element in religious ceremonies for thousands of years. The prevalence of this practice suggests a psychological association between bodily purity and moral purity. In three studies, we explored what we call the “Macbeth effect”—that is, a threat to one’s moral purity induces the need to cleanse oneself. This effect revealed itself through an increased mental accessibility of cleansing-related concepts, a greater desire for cleansing products, and a greater likelihood of taking antiseptic wipes. Furthermore, we showed that physical cleansing alleviates the upsetting consequences of unethical behavior and reduces threats to one’s moral self-image. Daily hygiene routines such as washing hands, as simple and benign as they might seem, can deliver a powerful antidote to threatened morality, enabling people to truly wash away their sins.

When we find ourselves in morally compromising situations, how do we deal with the consequences of unethical behavior, given that most if not all of us desire a moral self-image? This paper investigates a basic coping mechanism that has been used by religions for centuries: washing away one’s sins.

Physical cleansing, such as bathing or washing hands, is at the core of many religious rituals. Baptism, for instance, is a water purification ritual practiced by Christians, Mandaeans, and Sikhs. Christians follow the admonition, “Arise and be baptized, and wash away your sins” (1), with faith that through the symbolic cleansing of their bodies they might also achieve a cleansing of conscience. Physical cleansing is also central to Islam; wudu (often translated as “ablution”) is the Muslim act of washing parts of the body in clean water to prepare for worship. Likewise, Hinduism requires great attention to bodily purity (2). Thus, many major religions discipline bodily purity, suggesting that physical cleansing ceremonies can purify the soul.

Research on the correspondence between physical and moral purity (3) has speculated that people are predisposed to use categories that are based on bodily experience (such as clean versus dirty) to construct complex social categories (such as moral versus immoral) (4). For example, in English, words such as “clean” and “pure” describe both physical and moral states (e.g., he has a clean record). Likewise, the Mandarin phrase “a pair of dirty hands” refers to a person who steals.

The association between bodily and moral purity may be based not only in cognition, but in emotion as well. As an example,

“disgust” represents an emotion that is experienced in both physical and moral domains. Pure disgust was originally a gustatory emotion rooted in evolution to avoid the intake of potentially hazardous food. Over time, it has taken on social and cultural meanings and has expanded to encompass broader categories of aversions including social or moral violations (5, 6). Although the experience of pure disgust devoid of moral connotations can be subjectively and behaviorally differentiated from the experience of disgust with moral connotations (7), they coincide considerably. Specifically, previous research suggests that pure disgust and moral disgust not only lead to similar facial expressions and physiological activation (6) but also recruit partially overlapping brain regions, mainly in the frontal and temporal lobes (7). Given the psychological, physiological, and neurological overlap between physical and moral disgust, physical cleansing acts that mitigate physical disgust might also reduce social or moral disgust, thereby alleviating moral condemnation.

Thus, Lady Macbeth’s hope that a little bit of water would clear her of the treacherous murder of King Duncan might not have been a product of literary creativity, but of Shakespeare’s acute understanding of the

human psyche. If physical and moral purity are so psychologically intertwined, Lady Macbeth’s desperate obsession with trying to wash away her bloodied conscience while crying, “Out, damned spot! Out, I say!” (8) may not have been entirely in vain.

Given that physical cleansing might function as a surrogate for moral purification, we set out to investigate (i) whether a threat to moral purity activates a need for physical cleansing (i.e., the Macbeth effect) and (ii) whether physical cleansing is actually efficacious in helping people cope with moral threats. We first determined whether a threat to moral purity increases the mental accessibility of cleansing-related words. We asked participants to recall in detail either an ethical or unethical deed from their past and to describe any feelings or emotions they experienced. Then they engaged in a word completion task in which they converted word fragments into meaningful words (9). Of the six word fragments, three (W _ _ H, SH _ _ ER, and S _ _ P) could be completed as cleansing-related words (wash, shower, and soap) or as unrelated words (e.g., wish, shaker, and step). Participants who recalled an unethical deed generated more cleansing-related words than those who recalled an ethical deed [$F(1,58) = 4.26, P = 0.04$], suggesting that unethical behavior enhances the accessibility of cleansing-related concepts (Table 1).

Was this accessibility the result of an urge to cleanse one’s body when moral integrity was threatened? Study 2 investigated whether an implicit threat to moral purity produces a psychological desire for cleansing, through expressed preferences for cleansing products. Participants were told that we were investigating the relationship between handwriting and personality and were asked to hand-copy a short story written in the first person. The story described either an ethical, selfless deed (helping a co-worker) or an unethical act (sabotaging a co-worker) (9). Participants then rated the desirability of various products from 1 (completely undesirable) to 7 (com-

Table 1. Summary of Results. Study 1 measured the effect of recalling ethical versus unethical behavior on the mental accessibility of cleansing-related words. Study 3 explored the effect of recalling ethical versus unethical behavior on the likelihood of choosing antiseptic wipes (over pencils). Study 4 assessed the effect of hand cleansing on the likelihood of engaging in moral compensatory behaviors (i.e., offering help).

Study 1: Average number of cleansing-related words completed (SEM)		Study 3: Percentage who chose antiseptic wipes		Study 4: Percentage who volunteered to help	
Ethical recall (n = 30)	Unethical recall (n = 30)	Ethical recall (n = 16)	Unethical recall (n = 16)	Cleansed (n = 22)	Not cleansed (n = 23)
.90 (1.88)	1.43 (1.77)	33.3%	66.7%	40.9%	73.9%

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pletely desirable). Cleansing products included Dove shower soap, Crest toothpaste, Windex cleaner, Lysol disinfectant, and Tide detergent; other products included Post-it Notes, Nantucket Nectars juice, Energizer batteries, Sony CD cases, and Snickers bars. As expected, copying the unethical story increased the desirability of cleansing products as compared to copying the ethical story [$F(1,25) = 6.99, P = 0.01$], with no differences between conditions for the noncleansing products [$F(1,25) = 0.02, P = 0.89$] (Fig. 1).

We sought to replicate the results of Study 2 using behavioral measures, so our next study examined the likelihood of taking an antiseptic cleansing wipe after recalling an ethical or unethical deed. Participants engaged in the same recall task as in Study 1 and were then offered a free gift and given a choice between an antiseptic wipe and a pencil (verified in a control condition to be equally attractive offerings). Those who recalled an unethical deed were more likely to take the antiseptic wipe (67%) than were those who recalled an ethical deed (33%) ($\chi^2 = 4.57, P = 0.03$) (Table 1).

These three studies provided evidence for the Macbeth effect: Exposure to one's own and even to others' moral indiscretions poses a moral threat and stimulates a need for physical cleansing. Our final study investigated the efficacy of physical cleansing—can it actually wash away moral sins?

Physical cleansing may wash away moral sins through symbolic self-completion (10); that is, people are motivated to complete their self-definitions (e.g., musicians) when indicators or symbols of this definition are lacking (e.g., skills) by engaging in activities that complete the symbols (e.g., training). Thus, when moral self-definition is at stake, such as when one has indulged in morally questionable activities, one should naturally be motivated to engage in activities that will restore moral integrity. For

instance, Tetlock and colleagues (11) have shown that the mere contemplation of violating one's core values spurs intent to take actions that will restore and protect those values. The restoration or completion of the moral self can be achieved through direct restitution, but it may also be achieved through substitutable symbols or activities that are not directly related (10, 11). Given the demonstrated association between physical cleansing and moral purity, cleansing activities that improve physical cleanliness may also compensate for moral impurity.

Thus, we expected that a threat to the moral self would motivate the restoration of moral purity through direct compensatory behaviors (e.g., volunteering to help). If, however, physical cleansing restores the moral self, then individuals should have less need to engage in direct compensatory behaviors after physically cleansing themselves.

This is indeed what we found. In Study 4, participants described an unethical deed from their past (the same recall task as in Study 1). Afterwards, they either cleansed their hands with an antiseptic wipe or not. Then they completed a survey regarding their current emotional state (9). After completing the survey, participants were asked if they would volunteer without pay for another research study to help out a desperate graduate student. Presumably, participants who had cleansed their hands before being solicited for help would be less motivated to volunteer because the sanitation wipes had already washed away their moral stains and restored a suitable moral self.

As predicted, physical cleansing significantly reduced volunteerism: 74% of those in the not-cleansed condition offered help, whereas only 41% of participants who had a chance to cleanse their hands offered help ($\chi^2 = 5.02, P = 0.025$). Thus, the direct compensatory behavior (i.e., volunteering) dropped by almost 50% when participants had a chance to physically cleanse after recalling an unethical behavior (Table 1).

Physical cleansing also influenced participants' emotional state. Based on an exploratory factor analysis (9), the assessed emotions clustered into two categories: moral emotions (i.e., disgust, regret, guilt, shame, embarrassment, and anger; Cronbach Alpha = 0.90) and nonmoral emotions (i.e., confidence, calm, excitement, and distress; Cronbach Alpha = 0.65). As expected, participants who cleansed their hands after the unethical recall reported reduced moral emotions ($M = 1.75, SEM = 0.19$) compared with those who did not ($M = 2.23, SEM = 0.26$), $F(1,41) = 2.94, P = 0.047$. Hand washing, however, did not influence nonmoral emotions, $F(1,41) = 0.25, P = 0.31$ (12).

These four studies document a psychological association between physical and ethical cleanliness: Threats to moral purity activate a

need for physical cleansing, which can assuage moral emotions and reduce direct compensatory behaviors. Although there are surely limits to the absolution afforded by a bar of soap, our findings shed light on Lady Macbeth's feverish attempts to physically cleanse herself after the murder of King Duncan. If even an implicit threat to one's moral image can produce a psychological need to engage in cleansing behaviors, it is only natural that those who suffer genuine guilt would be all the more relentless in their attempts to restore a pure conscience.

The implications of this research may be substantial. Future studies that specifically address the psychological and behavioral consequences of physical cleanliness will provide valuable insight into regulatory mechanisms that drive ethical decisions. Given the boost to one's moral self afforded by physical cleansing, how might it influence subsequent behavior? Would adherence to a rigorous hygiene regimen facilitate ethical behavior? Or, would cleansing ironically license unethical behavior? It remains to be seen whether clean hands really do make a pure heart, but our studies indicate that they at least provide a clean conscience after moral trespasses.

References and Notes

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12. We included participants' sex as a covariate. Sex itself had no impact on emotional state or offers of help. We used one-tailed tests for the effect of cleansing on emotional state because we had predicted that hand washing would reduce moral emotions but not affect the other emotions.
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Supporting Online Material

www.sciencemag.org/cgi/content/full/313/5792/1451/DC1
Materials and Methods
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References and Notes

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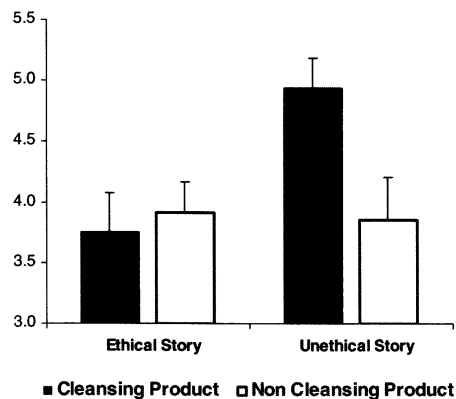


Fig. 1. Effect of hand-copying an ethical ($n = 16$) vs. unethical story ($n = 11$) on the desirability of cleansing and noncleansing products on a scale of 1 (low) to 7 (high). Error bars represent standard error.