

To Wash Your Body, or Purify Your Soul: Physical Cleansing Would Strengthen the Sense of High Moral Character*

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Physical cleansing, such as bathing or washing hands, is at the core of many religious rituals, suggesting that physical cleansing ceremonies can purify the soul. The present research examines the association between physical and moral purity by the semantic priming paradigm on which the participants made a lexical decision task. There is an interaction effect between the prime word (cleaning related vs. non-cleaning related) and target word (moral related word vs. non-word) which shows a significant priming effect. Thus, we think that physical cleansing would not only associate with moral transgression in memory stage, but also the sense of high moral character in perception stage.

Keywords: Physical Cleansing, Moral Purity, Moral Disgust, Priming Effect

Introduction

Baptism has existed as a significant ritual in many religions such as Christianity, Mandaeanism, Judaism, and Sikhism for thousands of years. The prevalence of this practice suggests a psychological association between bodily purity and moral purity. Uncleanliness has been served as a metaphor for sexual misdeed, idolatry, or unethical behavior. Cleanliness has been compared to sexual purity, service to one God alone, and correct action (Neusner, 1973). In China, Water-Splashing Festival is a grand traditional festival for The Dai in April 13 to 15 of every year. The Dai people splash water on one another to vanquish the devil and symbolically express the wish for better times ahead, meanwhile, singing the song "Ode to Dripping Water" in order to wash away all their worries and misfortunes, cleanse them of their selfishness and greediness, and keep them safe and sound forever. Moreover, no important ceremonies, such as wedding, funeral and birth, will take place without water. When young couples get married, the old man who presides over the wedding ceremony will sprinkle water on them to wish a happy time and a good future. In a word, Chinese are sure about that physical cleansing ceremony can purify the soul.

In Western cultures, the association between physical and moral purity has been demonstrated by Zhong and Liljenquist (Zhong & Liljenquist, 2006). Participants are more likely to think of cleansing-related words after recalling a moral transgression from their own lives, and they reveal a desire to engage in cleansing behavior. Schnall (2008) uses prime paradigm and further demonstrates that the feeling of cleanliness reduce the perceived seriousness of moral transgressions (Schnall, Benton, & Harvey, 2008). Schnall also demonstrate that induced feelings of disgust can attach themselves to moral judgments, leading the person to conclude that a particular moral action is quite wrong (Schnall, Haidt, Clore, & Jordan, 2008). The experiments reported in this article investigate the basic relationship: the feeling of cleanliness would strengthen

the sense of high moral character through priming paradigm because concepts of cleanliness can be primed in subtle ways. In research 2, we investigate if one after moral trespasses would be induced to clean body for keep a good self-image. A lexical decision task has been used in this experiment. The prime and the target are presented in pairs and a word/non-word judgment to the target is required. Because the sense of physical cleaning from the priming should be attributed to the moral judgments and one after moral trespasses would be induced to clean body, it is expected that priming with cleanliness words would strengthen the sense of high moral character more so than would priming with neutral control words. We also infer that priming with moral trespasses words would strengthen the tendency to clean body more so than would priming with neutral control words.

Experiment 1

Method

Participants

Forty Hunan normal university undergraduate students (30 female, 10 male; mean age = 20.00 years, SD = 1.85 years) participated as part of a course requirement. All subjects were healthy, right-handed, with normal or corrected to normal vision, and reported no history of affective disorder. Each subject signed an informed consent form for the experiment.

Materials

The stimulus material consisted of 80 prime-target pairs, which were divided into four experimental conditions, and each including 20 prime-target pairs (See Appendix A). All pairs repeat twice (160 prime-target trials). The main factors manipulated in the experiment are prime word (cleaning related or non-cleaning related word) and target word (moral purity word or pseudo word). All prime words are verbs and target words are adjectives. All experimental stimuli were made into images by PC with Microsoft Office Picture Manager, with the image size, word length and familiarity matched between cleaning related or non-cleaning related words. The level of design is 2

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(cleaning related VS non-cleaning related word) \times 2 (moral purity word VS pseudo word).

Procedure

Subjects were seated in a quiet room at approximately 120 cm from a computer Screen. In order to familiarize participants with the task, experiment started with 14 practice trials (7 words and 7 pseudo words). Each trial was initiated by a 500ms presentation of a small white cross on the black computer screen, followed by a blank screen for 800 - 1000 ms. Then, the presentation of prime words followed by the presentation of target words (presentation time for prime was 150ms, and for target was 500 ms). The interstimulus interval (ISI) between prime and target was 100 ms. Half subject were instructed to press the "Z" key on the key board (as accurately and quickly as possible) if the targets were words and to press the "/" key if the targets were pseudo words. If the participants made an incorrect response, the computer will emit a 500-ms beep. For the remaining subjects the response pattern was reversed. The procedure is designed by E-PRIME 2.0

Results

Reaction time is analyzed by a two-way repeated measures analysis of variance (ANOVA). Trials with reaction times below 300 ms or above 1200 ms are defined as outliers and removed from the data set. The percentage of the data categorize as outliers do not exceed 2.0%. The data from a participant is not included in the analysis because the participant shows high error rates (21%) in the lexical decision task. The results showed a significant prime word by target word interaction effect [$F(1, 38) = 4.129, p < .05$] (see Figure 1). The simple effect analysis indicated that the reaction time was faster in cleaning related word priming condition compared to non-cleaning related word priming condition when the target word was moral purity word [$F(1, 38) = 10.79, p < .01$]. However, there was no significant response difference between cleaning related word priming condition and non-cleaning related word priming condition when the target word was pseudo word [$F(1, 38) = .32, p > .05$].

In addition, the analysis of the accuracy also demonstrated a significant prime word by target word interaction effect [$F(1, 38) = 6.67, p < .05$]. The simple effect analysis indicated that the response accuracy was higher in cleaning related word priming condition compared to non-cleaning related word priming condition when the target word was moral purity word [$F(1, 38) = 9.86, p < .01$], and no difference existed when the target word was pseudo word [$F(1, 38) = .03, p > .05$]. ALL data is processed by SPSS.

Discussion

As expected, we found an obvious priming effect indexed by RT (reaction time) and ACC (accuracy). Subjects made more fast response for moral purity word when primed by cleaning related word compared to non-cleaning related word. Moreover, the ACC also higher for processing moral purity word when primed by cleaning related word that of primed by non-cleaning related word. These results were consistent with previous study that cleaning had a stronger connection with moral purity (Schnall et al., 2008; Wheatley & Haidt, 2005). Since the study of Meyer and Schvaneveldt (1971) demonstrating that a target word (e.g. butter) is recognized faster when preceded by an associated prime (e.g. bread) than by a non-associate (e.g. nurse) (Meyer & Schvaneveldt, 1971), the semantic priming effect has

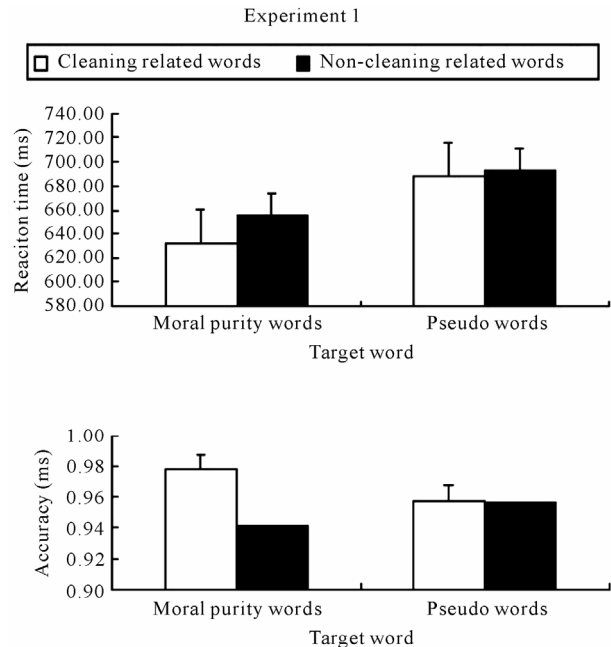


Figure 1. Effects of reaction time and accuracy as a function of prime words (cleaning related or non-cleaning related words) and target words (moral purity words or pseudo words). Error bars represent standard error.

been extensively applied in written word recognition, especially for associatively related pairs (Lupker, 1984). The priming paradigm has been proved to be a good method to investigate the automatic processing of information. The present study extended previous studies by proving the existent of connection between cleaning and moral purity via priming experiment paradigm. In other words, we proved it at the unconscious level, which could made our result more objective compared to previous research's results indexed by participant's subjective rating (Schnall et al., 2008; Wheatley & Haidt, 2005). As discussed above, we found aims of the experiment which is the stronger association between cleaning and moral purity. In the Experiment 2, we also adopted priming experiment paradigm to investigate whether the exposure to moral disgust produced a psychological desire for cleansing or not.

Experiment 2

Method

Participants

Forty Hunan normal university undergraduate students (20 female, 20 male; mean age = 20.00 years, SD = 1.85 years) have participated as part of a course requirement. All subjects were healthy, right-handed, with normal or corrected to normal vision, and reported no history of affective disorder. Each subject signed an informed consent form for the experiment.

Materials

The stimulus material consisted of 92 prime-target pairs, which were divided into four experimental conditions, and each including 23 prime-target pairs (See Appendix B). All pairs repeat twice (184 prime-target trials). The main factors manipulated in the experiment are prime word (moral disgust word or non-moral disgust but negative word) and target word

(cleaning related word or pseudo word). All prime words are adjectives and target words are verbs. All four experimental stimuli (moral disgust word, non-moral disgust word, cleaning related word and pseudo word) are rated by 100 participants for the degree of familiarity and arouse on a 5-point scale (1 = "not familiar at all" to 5 = "extremely familiar", 1 = "not exciting at all" to 5 = "extremely exciting"). The degree of familiarity was 4.32(4.32 ± 2.09) for moral disgust words, 4.35(4.35 ± 2.35) for non-moral transgressions words. The degree of arouse was 4.62(4.62 ± 2.39) for moral disgust words, 4.57(4.57 ± 2.45) for non-moral disgust words. The T-test showed that there was no significant difference existed between moral disgust word and non-moral disgust word in the degree of familiarity and arouse ($p > 0.05$). The level of design is 2 (moral disgust word VS non-moral disgust but negative word) × 2 (cleaning related word VS pseudo word).

Procedure

The procedure was the same as experiment 1. Subjects were seated in a quiet room at approximately 120 cm from a computer Screen. In order to familiarize participants with the task, experiment started with 14 practice trials (cleaning related word or non-cleaning related word). Each trial was initiated by a 500 ms presentation of a small white cross on the black computer screen, followed by a blank screen for 800 - 1000 ms. Then, the presentation of prime words followed by the presentation of target words (presentation time for prime was 150 ms, and for target was 500 ms). The inter stimulus interval (ISI) between prime and target was 100 ms. Half subject were instructed to press the "Z" key on the key board (as accurately and quickly as possible) if the targets were words and to press the "/" key if the targets were pseudo words. If the participants made an incorrect response, the computer will emit a 500-ms beep. For the remaining subjects the response pattern was reversed.

Results

Reaction time is analyzed by two-way repeated measures analysis of variance (ANOVA). Trials with reaction times below 300 ms or above 1200 ms are defined as outliers and removed from the data set. The results showed a significant prime word by target word interaction effect [$F(1, 38) = 5.01, p < .05$] (see Figure 2). The simple effect analysis indicated that the reaction time was faster in moral disgust word priming condition compared to non-moral disgust word priming condition when the target word was cleaning related word [$F(1,38) = 13.30, p < 0.01$]. However, there was no significant response difference between moral disgust word priming condition and non-moral disgust word priming condition when the target word was non-cleaning related word [$F(1, 38) = 0.54, p > 0.05$].

However, the analysis of the accuracy did not show significant main effect on prime word [$F(1, 38) = 0.008, p > .05$], target word [$F(1, 38) = 2.91, p > .05$], or prime word by target word interaction effect [$F(1, 38) = 0.639, p > .05$].

Discussion

As predicted, we also found that subjects made more fast response for cleaning related word when primed by moral disgust word compared to non-moral disgust word. This was likely because that the exposure to moral disgust word made people more desire for cleaning, which contributed to faster processing of cleaning related word compared to that of primed by non-moral disgust word. This is consistent with previous study of moral cognition where a threat to the moral self would moti-

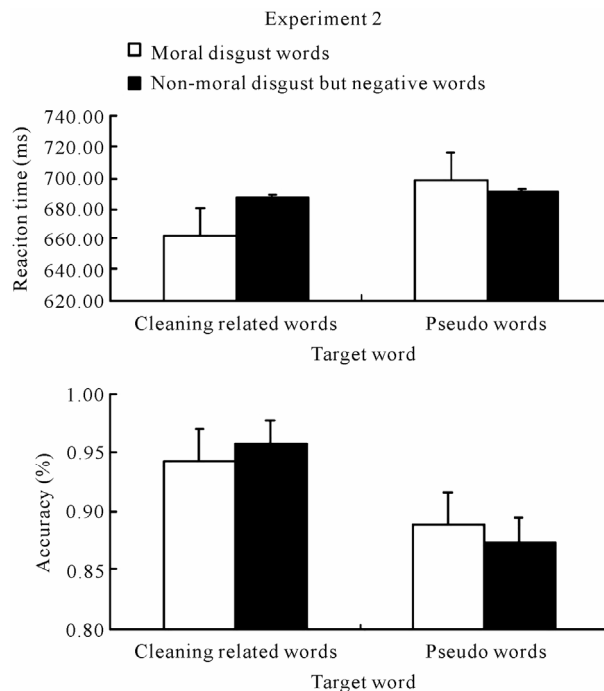


Figure 2. Effects of reaction time and accuracy as a function of prime words (moral disgust word or non-moral disgust but negative word) and target words (cleaning related words or pseudo words). Error bars represent standard error.

vate cleansing activities (Zhong & Liljenquist, 2006). In the present study, we also proved that the exposure to moral disgust situation would produce psychological need to engage in cleansing behaviors. Moreover, the priming experiment paradigm made our result more objective and convincing.

General Discussion

There exists a moral-purity metaphor that likens moral goodness to physical cleanliness (Rozin, Millman, & Nemeroff, 1986; Zhong & Liljenquist, 2006). In the Experiment 1, we found a stronger connection between moral purity and cleaning. In the Experiment 2, we further found that the exposure to moral disgust situation would elicit a psychological need for cleaning. More importantly, these results were based on the unconscious level using priming paradigm, which made our result more objective than that of using other subjective evaluation paradigm. As mentioned in the Introduction, religious rituals or traditional custom might not only be a simple religious or culture phenomenon, but also an acute reflection of human psyche in implicit level. When you wash your body, you expect wash your soul, which can make you feel clean, chaste, self-restrained, spiritually pure, and should strive to live in a sacred, divine way, distinguish yourselves from other animals, attempt to place yourselves close to higher spiritual beings by being physically and morally pure (Haidt, 2001; Haidt, Koller, & Dias, 1993). Thus, the psychological meaning of baptism is to protect the purity of your soul, not just your body.

The implications of this research may be substantial. Future studies that 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? 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. The future research would investigate the electrophysiological evidence through Event-related potential technology.

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Appendix A (all words are translated in English)

Type1		Type2		Type3		Type4	
Physical clean Word (Verbs)	moral related word (adjective)	non-physical clean word (Verbs)	moral related word (adjective)	physical clean word (Verbs)	non-word	non-physical clean word (Verbs)	non-word
洗澡 bathe	贞操 virtue	奔波 rush about	敬仰 worship	打扫 sweep	案焦	爬行	类厉
洗手 wash one's hands	廉洁 incorruptible	参观 visit	敬佩 admire	盥沐 wash one's hands and face	傲忙	闲逛 hack around	领丈
沐浴 take a bath	清廉 unincorrupted	走动 walk about	廉明 incorruptible and intelligent	盥漱 wash one's face and rinse one's mouth	米依	漫步 ramble	晒泥
洗脚 footbath	孝敬 Give presents to one's elders	降落 descend	廉正 rightness	盥澡 scouring bath	薄狠	踱步 pace	碌粗
净手 wash one's hands	尊贵 honorable	解散 dismiss	贞节 chastity	换洗 change and wash	衬极	攀爬 scramble	率凄
漱口 gargle	圣洁 sanctity	旁观 look on	仁义 humaneness and righteousness	净白 pandaram	楚疲	跛行 limp	忙夸
洗浴 Bath	宽容 tolerant	跑步 run	忠诚 loyal	清洁 clean	荡保	健步 walk with vigorous strides	蒙拥
漱洗 wash one's face and rinse one's mouth	仁厚 clemency	散步 take a walk	坚韧 tenacity	清扫 clear	点纪	赛跑 run	纳滋
搓洗 hand-laundry	忠厚 kind and sincere	搜寻 hunt for	忠实 faithful	漱涤 gargling	周点	奔驰 coursing	巧早
搓澡 give sb. a rubdown with a damp towel	孝顺 filial	挖掘 excavate	忠烈 loyal till death	漱盥 brushed one's teeth	朵精	追赶 pursue	然紧
沐浴 Bath	贞洁 chastity	围观 surround and watch	正义 justice	刷白 whiten	分严	冲刺 spurt	弱仓
冲洗 rinse	坚贞 faithfulness	消遣 amuse	坚强 staunch	刷亮 brushing	怪默	踏步 tramp	式实
淋浴 shower	坦荡 magnanimous	休假 vacation	忠勇 loyal and brave	刷洗 scrub	犷初	慢跑 jogging	适信
冲澡 take a shower	正直 probity	摇摆 waver	刚毅 fortitude	刷牙 tooth brushing	糊瘦	徜徉 roam	酸自
洗漱 wash one's face and rinse one's mouth	善良 kind-hearted	走路 walk	崇敬 admire	洗涤 rinse	华崇	转悠 take a leisurely walk	态国
擦背 rub one's back with a towel	忠孝 loyalty and filial piety	蹒跚 stumble	正派 upright and honest	浸洗 immersion cleaning	滑湊	小跑 trot	统极
清洗 purge	仁慈 kindness	踉跄 stagger	崇高 sublime	洗烫 laundering	缓迷	飞越 fly	味规
擦洗 scrub	恭敬 respectful	奔走 be busy running about	无私 selfless	洗衣 wash clothes	境激	游泳 swim	物呼
擦澡 take a sponge bath	忠贞 loyal and dependable	徘徊 linger	仗义 uphold justice	洗濯 cleansing	峻怜	运动 campaign	吸总
洗脸 have a wash	高雅 elegance	飞奔 run like split	敬爱 respect and love	洗面 wash one's face	愧艰	咀嚼 chew	雄优

Appendix B

Type1		Type2		Type3		Type4	
moral aversive word (adjective)	Physical clean Word (Verbs)	Non moral aversive word (adjective)	Physical clean Word (Verbs)	moral aversive word (adjective)	non-word	Non moral aversive word (adjective)	non-word
歹毒 vicious	冲洗 rinse	烦恼 upset	洗漱	刻薄 acrimony	浑安	消极 passive	遥光
卑贱 mean and low	漱口 gargle	消沉 depression	沐浴	淫秽 obscene	宁便	焦躁 impatient	滑方
下贱 baseness	洗脚 footbath	荒唐 absurd	洗涤	狡黠 crafty	宜浑	蛮横 rude and unreasonable	便知
奸诈 duplicity	洗澡 bathe	郁闷 unhappy, gloomy	洗面	粗野 insolent	圆奇	苦闷 anguish	足筒
自私 selfish	刷牙 tooth brushing	恼火 annoy	擦洗	齷齪 dirty	异资	懒惰 lazy	朴果
虚伪 hypocritical	洗浴 Bath	窝囊 wimp	清扫	险恶 inclemency	深冷	沮丧 dejected	效梧
可耻 shameful	擦澡 take a sponge bath	颓丧 dispirited	擦澡	放荡 libidinous	暂威	怯懦 recreancy	善缠
卑劣 despicable	清洗 purge	衰老 feeble and old	清洁	淫荡 lechery	武古	迟缓 sluggish	绵稳
残忍 merciless	沐浴 Bath	孤单 lone	浸洗	阴险 cattiness	朴严	惶恐 terrified	凉超
残酷 cruel	搓洗 hand-laundry	懒散 lentitude	冲澡	低俗 vulgar	谨坚	悲观 pessimistic	理洪
粗俗 vulgar	淋浴 shower	落后 fall behind	洗脸	无耻 without any sense of shame	决洋	惆怅 disconsolate	宗迅
刻薄 acerbity	洗漱 wash one's face and rinse one's mouth	自卑 inferior	洗手	下流 ribaldry	俭道	烦恼 upset	捷显
淫秽 obscene	沐浴 take a bath	消极 passive	冲洗	歹毒 vicious	利审	消沉 depression	赫合
狡黠 crafty	洗涤 rinse	焦躁 impatient	漱口	卑贱 mean and low	妙顽	荒唐 absurd	适殷
粗野 insolent	洗面 wash one's face	蛮横 rude and unreasonable	洗脚	下贱 baseness	皮合	郁闷 unhappy, gloomy	切幽
齷齪 dirty	擦洗 scrub	苦闷 anguish	洗澡	奸诈 duplicity	蓄雍	恼火 annoy	静称
险恶 inclement	清扫 clear	懒惰 lazy	刷牙	自私 selfish	密正	窝囊 wimp	俭无
放荡 libidinous	搓澡 give sb. a rubdown with a damp towel	沮丧 dejected	洗浴	虚伪 hypocritical	规谦	颓丧 dispirited	畏镇
淫荡 lechery	清洁 clean	怯懦 recreancy	搓澡	可耻 shameful	重亢	衰老 feeble and old	面高
阴险 cattiness	浸洗 immersion cleaning	迟缓 sluggish	清洗	卑劣 despicable	奋委	孤单 lone	朗细
低俗 vulgar	冲澡 take a shower	惶恐 terrified	沐浴	残忍 merciless	婉合	懒散 lentitude	确合
无耻 without any sense of shame	洗脸 have a wash	悲观 pessimistic	搓洗	残酷 cruel	体茂	落后 fall behind	格厚
下流 ribaldry	洗手 wash one's hands	惆怅 disconsolate	淋浴	粗俗 vulgar	密庄	自卑 inferior	职明