

The Influence of Cleanliness Behavior and Cleanliness Perception on Moral Judgment

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Abstract

This study examines the influence of clean priming types on moral judgments. Using the Stroop paradigm, participants were asked to judge the part-of-speech of moral and immoral words under clean behavioral and clean cognitive priming conditions. Results indicate a strong association between clean priming and moral judgments, with different clean priming types exerting distinct effects on moral judgment directionality.

Keywords

Clean behavior; Clean cognition; Stroop paradigm; Moral judgment.

1. Introduction

As a uniquely human trait, morality has consistently drawn extensive scholarly attention, with the mechanisms underlying moral judgment forming a central focus of ongoing inquiry. Existing research indicates that bodily sensations related to physical actions influence moral judgments [1, 2, 12, 14]. For instance, Chinese cultural expressions like “unclean teeth and gums cause foul odors to rise” or “bad breath offends others” map abstract perceptions of filth and discomfort onto embodied experiences of oral hygiene. Similarly, English metaphors such as “a clean life” (a virtuous existence) and “throw dirt at someone” (slander someone) draw parallels between physical cleanliness and moral purity [3].

For instance, the expression “cleanliness borders on sanctity/virtue” metaphorically links the embodied perception of environmental cleanliness to moral purity at the spiritual level. Collectively, these cases reveal that in everyday cognitive activities, the clean/dirty dichotomy is imbued with explicit moral semantics, forming stable psychological associations between “clean-moral” and “dirty-immoral” [5, 6].

2. The Influence of Cleanliness on Moral Judgment

2.1. The Impact of Cleanliness on Moral Judgments is Inconsistent

However, different forms of clean priming exhibit significant variations in their interference effects on moral judgment. Current academic discourse primarily offers two theoretical frameworks: the metaphor consistency effect and the metaphor compensatory effect. Under the metaphor consistency effect framework, clean priming activates embodied moral representation systems, leading individuals to exhibit cognitive tendencies in moral judgments that align with the concept of cleanliness. In contrast, the metaphor compensation effect theory posits an inverse mapping relationship between clean priming and moral judgments. These findings support the compensatory regulation hypothesis: immoral behavior activates individuals' bodily contamination perceptions, thereby driving clean behaviors to compensate for the threat to self-concept posed by negative bodily experiences. Similarly, temperature perception studies reveal that bodily “hot” experiences mitigate the “cold” negative feelings triggered by social rejection [2, 7, 8, 9], providing cross-modal cognitive evidence for bodily

cleanliness compensation mechanisms. Based on this, it can be inferred that individuals may neutralize negative self-evaluations triggered by bodily contamination through cleansing behaviors, thereby maintaining self-esteem levels and psychological homeostasis.

2.2. Empirical Research on Clean-State Priming and Moral Judgment

However, consistent conclusions regarding the impact of clean-state priming on moral judgment have yet to be reached. For instance, Schnall et al. (2008) demonstrated that in a sentence-reorganization task involving disorganized sentences, participants who constructed sentences using clean vocabulary exhibited significantly more lenient moral judgment criteria than those using neutral vocabulary. In disgust-inducing video experiments, participants who washed their hands exhibited a tendency toward more lenient moral judgments compared to those who did not wash. Conversely, Zhong et al. (2010) found that participants who washed their hands rated moral events more harshly (Experiment 1), and those who imagined cleanliness also demonstrated stricter judgment standards in moral tasks (Experiment 2) [14]. Regarding the replicability of Schnall et al. (2008), ongoing academic debate persists. Existing research suggests methodological factors—specifically, discrepancies in the operational definition of cleanliness and ambiguity in the moral judgment targets—are key contributors to inconsistent findings [6]. These methodological heterogeneities collectively form a crucial explanatory framework for the divergent conclusions in current research.

2.3. Factors Influencing the Effect of Clean-Slate Priming on Moral Judgment

Existing research extensively confirms that clean-slate priming significantly influences individuals' moral judgment processes. However, the academic community has yet to reach a unified conclusion regarding the specific direction of this influence, particularly concerning the directionality of clean-slate priming's impact on moral judgment [4, 10]. A synthesis of prior literature reveals multiple factors influencing the relationship between clean-slate priming and moral judgment, including: initial emotional state prior to priming [14, 7, 11], the agent involved in the moral event (Chapman & Anderson, 2013; Tobia, 2015; Schnall et al., 2008); the type of moral event [4, 14], and other mediating and moderating factors. Among these, the most significant and deserving of further investigation is the impact of different cleanliness operations on moral judgments.

Existing research reveals that the activation of cleanliness concepts is multidimensional, primarily encompassing the following five operational paradigms: First, direct physical cleaning behaviors (such as performing actions like washing or wiping hands); second, contextual presentation of cleanliness cues (such as environmental prompts like wall slogans or trash bins); Third, sensory stimulation of environmental cleanliness (e.g., physical factors like fresh scents); Fourth, cognitive activation of cleanliness concepts (achieved through cleanliness vocabulary presentation or cleanliness-related sentence rearrangement tasks); Fifth, vicarious cleanliness experiences (e.g., indirect exposure via observing others washing hands in videos). Researchers often employ these paradigms to induce cleanliness priming effects, subsequently examining their moderating role on moral cognition or moral behavior [12, 13].

Regarding studies on the differential effects of cleanliness priming, Xu et al. (2014) employed a dual-path experimental design to compare the differential impacts of self-direct cleanliness (handwashing) versus vicarious cleanliness (observing others wash hands in videos) on alleviating guilt. The findings revealed that self-cleansing activation significantly reduced participants' guilt experiences compared to the vicarious cleansing condition. Consequently, participants exhibited lower prosocial behavior tendencies in a subsequent voluntary helping task (requiring participants to take a questionnaire home, complete it, and return it after three weeks). Notably, the willingness to help in the vicarious cleansing group was also significantly lower than in the control group, indicating that this activation method, though weaker, still

possesses guilt-reducing effects. Tobia (2015) further pointed out that the attribution object of cleansing activation (self/others) significantly influences subsequent moral judgments, essentially distinguishing cleansing activation into two subtypes: self-related (direct cleansing) and other-related (vicarious cleansing).

Leung (2013) employed different cleanliness manipulations to demonstrate that cognitive cleanliness priming induces more lenient moral judgments. However, this study exhibits significant limitations in experimental design: First, the absence of a full factorial design ($2(\text{Physical Cleanliness: Yes/No}) \times 2(\text{Cognitive Cleanliness: Yes/No})$) precludes systematic testing of the independent and interactive effects of both cleanliness priming types; Second, the operational definition of cognitive priming deviated from mainstream research paradigms—it did not activate the concept through semantic priming (e.g., presenting cleanliness-related words or sentences) but instead employed sensory stimulation via observing clean items (soap). This operational approach exhibits conceptual discrepancies with the standardized definition of cognitive cleanliness in existing literature.

In summary, different cleanliness operations exert distinct influences on moral judgments, particularly as Leung (2013) failed to differentiate between the effects of these two distinct cleanliness operations. Therefore, this study examines the relationship between cleanliness behavioral priming (with/without handwashing) and cleanliness cognitive priming (cleanliness-related vs. non-cleanliness-related vocabulary) with moral judgments, as well as whether participants can recognize the impact of cleanliness behavioral priming on experimental outcomes.

3. Experiment

3.1. Experiment Purpose and Hypothesis

This experiment employs the Stroop research paradigm (Meier & Robinson, 2004) to investigate the effects of different clean priming operations on moral judgments.

3.2. Research Methods

3.2.1. Participants

Sixteen college students were selected, comprising 6 males and 10 females.

3.2.2. Experimental Materials and Assessment

Manipulation of Cleanliness Priming: Cleanliness priming was manipulated through a hand sanitizer assessment task. The control group viewed the external packaging of the sanitizer. This task served to establish a reasonable context for hand hygiene. Participants were instructed to either wash their hands for 15 seconds or view the sanitizer packaging for 15 seconds.

Subsequently, participants who washed hands were assessed for hygiene behavior activation by rating their perceived effectiveness of the handwash on a 1–7 scale (“To what extent do you believe this handwash can clean hands?”), where 1 indicated “Not at all” and 7 indicated “Completely effective.”

Materials for Activating Cleanliness Cognition: Experimental materials included words related to cleaning and words unrelated to cleaning. First, a large number of two-character words representing clean concepts were selected from literature discussing clean-dirty metaphors. Clean-related words included bathing, rinsing, scrubbing, etc.; clean-unrelated words included rushing about, landing, moving around, etc. Both categories consisted of verbs.

Moral and Immoral Word Materials: The moral lexicon comprised two-character terms like “filial piety,” “forbearance,” and “integrity,” while the immoral lexicon included terms such as “obscenity,” “malice,” and “cruelty.” All words were rigorously selected from the high-frequency

word list of the Modern Chinese Frequency Dictionary to ensure statistical parity in baseline usage frequency between the two categories. During the valence assessment phase, a 0-6 Likert scale (0 = extremely immoral, 6 = extremely moral) was employed to construct the evaluation system. Further validation confirmed that the finalized moral and immoral words achieved matching across three key dimensions: First, no significant difference existed in their original dictionary-based word frequency statistics (t-test, $p > 0.05$); Second, the mean total stroke counts for both word sets showed no significant difference (t-test, $p > 0.05$); Third, the standard deviation distributions during the valence assessment phase exhibited homogeneity (Levene's test, $p > 0.05$). This multidimensional matching design effectively controlled potential confounding variables, providing a rigorous stimulus foundation for subsequent moral judgment experiments.

3.2.3. Experimental Design and Procedure

The experiment employed a 2 (cleaning behavior priming: handwashing vs. no handwashing) \times 2 (cleaning cognition priming: clean words vs. clean-irrelevant words) between-subjects design, with reaction time as the dependent variable.

First, participants were split into two groups. One group was informed they were participating in a product evaluation task for a hand sanitizer. This task served to introduce a plausible hand-cleaning context. As instructed, they were asked to wash their hands with the sanitizer for 15 seconds. Subsequently, participants rated their experience of handwashing on a scale from 1 (completely unacceptable) to 7 (completely acceptable). The other group was shown the sanitizer packaging for 15 seconds.

Programming was conducted using E-Prime 2.0 software. Practice phase: Participants classified 10 non-experimental moral words and 10 non-experimental immoral words, with immediate feedback provided to reinforce operational understanding. The main experimental phase employed a between-subjects balanced design, controlling response key assignments via two instruction versions: participants were instructed to press "F" for immoral words and "J" for moral words. Word presentation sequences were randomly generated by the computer, and no feedback was provided during this phase. The specific experimental procedure is as follows: Each trial begins with a 500ms fixation point "+" at the screen center, followed by a 150ms presentation of either a clean-related or clean-irrelevant word as an initial stimulus, then a 100ms blank screen mask. Subsequently, the target word (moral/immoral) appears at the screen center, requiring participants to complete the classification judgment within a 3000ms time limit. If no response is made within the time limit, the target word automatically disappears and is recorded as an omission response. A 500ms blank screen interval is inserted between each trial to eliminate visual persistence effects.

Finally, participants were asked to provide demographic information and given the opportunity to report any observations or experiences during the survey. None reported any suspicions regarding an association between hand hygiene and moral word judgments.

3.3. Experimental Results and Analysis

Table 1. Reaction Times and Standard Deviations (ms) for Moral Judgments Under Cleanliness-Related Priming and Cleanliness-Related Cognitive Priming

Cleanliness Cognition Activation	Moral Words		Immoral Words	
	Wash Hands	Do Not Wash Hands	Wash Hands	Do Not Wash Hands
Cleanliness-Related Words	607.00±70.64	623.25±20.35	609.25±27.22	891.25±76.39
Non-Hygiene-Related Words	840.00±103.20	813.50±67.59	539.75±28.30	891.00±32.20

A two-factor between-subjects ANOVA was conducted on reaction times for moral word judgments: 2 (clean behavior priming: handwashing vs. no handwashing) × 2 (clean cognition priming: clean-related words vs. clean-irrelevant words). Results indicated that the main effect of clean behavior was not significant, $F(1, 12) = 0.02$, $p > 0.05$, $\eta^2 = 0.002$, suggesting no significant difference in moral word reaction times between participants who washed their hands and those who did not. A significant main effect of cleanliness cognitive priming was found, $F(1, 12) = 33.56$, $p < 0.05$, $\eta^2 = 0.74$, indicating that participants responded faster to moral words under cleanliness-related word priming than under cleanliness-irrelevant word priming; The interaction between clean behavior priming and clean cognition priming was not significant, $F(1, 12) = 0.34$, $p > 0.05$, indicating no significant difference in moral word judgments between the two priming conditions.

A two-way between-subjects ANOVA (2 (Clean Behavior Priming: Handwashing vs. No Handwashing) × 2 (Clean Cognitive Priming: Clean-Related Words vs. Clean-Irrelevant Words)) was conducted on reaction times for immoral words. Results showed that the main effect of clean cognition priming was not significant, $F(1, 12) = 2.30$, $p > 0.05$, $\eta^2 = 0.16$, indicating no significant difference in reaction times for judging immoral words under clean word priming versus clean-irrelevant word priming. The main effect of clean behavior priming was significant, $F(1, 12) = 190.79$, $p < 0.05$, $\eta^2 = 0.94$, indicating that participants judged immoral words faster after handwashing than after not washing hands; The interaction between clean behavior priming and clean cognition priming was not significant, $F(1, 12) = 0.16$, $p > 0.05$, indicating no significant difference in judgments of immoral words based on the interaction of clean behavior priming and clean cognition priming.

4. Conclusion

The experimental results indicate that in the judgment of moral words, clean cognitive priming significantly influences moral word judgments, and no significant interaction exists between clean cognitive priming and clean behavioral priming. This distinguishes the effects of clean cognitive priming from those of clean behavioral priming, demonstrating that clean cognitive priming exhibits a significant association with moral words. This aligns with previous research findings, which reveal a strong connection between moral concepts and clean concepts [4, 11, 14]. Conversely, judgments of immoral words yielded opposite results, indicating a significant association between immoral word judgments and cleansing behavior—contrary to previous findings [4, 14]. Cleansing enhances sensitivity to subsequent immoral stimuli, as evidenced by faster and more accurate responses to immoral words after handwashing. Thus, while moral concepts are strongly linked to cleanliness, different cleansing priming procedures exert distinct effects on moral judgments.

Clean priming is closely linked to moral judgment. When judging moral words, clean cognitive priming yields faster judgments and shorter reaction times than clean behavioral priming. Conversely, when judging immoral words, clean behavioral priming yields faster judgments and shorter reaction times than clean cognitive priming. Thus, different clean priming manipulations influence the direction of moral judgments.

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