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## Accepted Manuscript

Prejudice towards gay men and a need for physical cleansing

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PREJUDICE TOWARDS GAY MEN AND A NEED FOR PHYSICAL CLEANSING  
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### Abstract

The results of four studies suggest that contamination concerns involved in prejudice towards male homosexuals may be expressed in the increased need for physical cleansing after an imagined contact with a homosexual man. Participants in Study 1 completed word fragments according to the theme of cleansing, and in Study 2, they chose a cleansing wipe more often after imagining using the mobile of a homosexual (vs. heterosexual) man. The need for cleansing was specific to the body parts engaged in the contact. In Study 3, participants evaluated hand and mouth cleansing products as more desirable after imagining using a mobile phone of a homosexual (vs. heterosexual) man. The specific need for cleansing, but not the accessibility of cleansing related words, was more pronounced among political conservatives (Study 4). The results are discussed with reference to the behavioral immune system hypothesis, research on moral disgust, and the embodiment literature.

Key words: prejudice, contamination, cleansing

## PREJUDICE TOWARDS GAY MEN AND A NEED FOR PHYSICAL CLEANSING.

*“What does your purity matter to me?”* Federico Garcia Lorca

Attributing impurity to people is a culturally universal way of expressing prejudice. The language of hostile propaganda associates targeted groups with contamination and uses the metaphor of physical cleansing to prescribe (and euphemize) the most desirable actions towards them (Keen, 1988). Homosexuals (especially male) are among the social groups that have been most persistently framed as “unclean,” and metaphorical prescription of cleansing has been used to justify discrimination against them (Herek, 2000). The laws of the Third Reich, for example, punished even homosexual fantasies. Male homosexuals were framed as “a plague”. Through the politics of “purifying the race” German gay men were imprisoned, stigmatized (by a pink triangle on prison uniforms), abused (castrated, subjected to medical experiments), and eventually killed (Steakley, 1982).

The existence of a metaphorical link between the rejection of a social group and physical cleansing suggests that prejudice towards such a group may be associated with bodily reactions to physical contamination (Lakoff & Johnson, 1999). This expectation is confirmed by psychological research. For instance, research has shown that prejudice towards homosexuals takes the specific form of feeling disgust (Cottrell & Neuberg, 2005), which is an emotional reaction to bodily contamination (Rozin, Haidt, & McCauley, 2000). Gay sexuality elicits disgust (Haidt, McCauley, & Rozin, 1994; Haidt, Rozin, McCauley, & Imada, 1997), and individual sensitivity to interpersonal disgust (Inbar, Pizarro, Knobe, & Bloom, 2009), core disgust and physical contamination concerns (Olatunji, 2008) predict anti-gay prejudice. Experimentally induced disgust increases dislike of homosexual men (Inbar, Pizarro, & Bloom, 2012; Terrizzi, Shook, & Ventis, 2010), and implicit preference of heterosexuals over homosexuals (Dasgupta, DeSteno, Williams, & Hunsinger, 2009). In addition, prejudice towards homosexuals is associated with the AIDS stigma, bodily

contamination by disease (e.g., Herek, 2002). Homosexuals are perceived as “blameworthy” victims of AIDS more than any other affected social group (Herek & Capitanio, 1999; Herek, 2002; Herek, Capitanio, & Widaman, 2003).

There is ample evidence that physical contamination concerns are involved in anti-gay prejudice. Nevertheless, to the best of our knowledge, no previous research has demonstrated that prejudice towards homosexuals may be experienced and expressed as a specific reaction to bodily contamination: the need for physical cleansing.

### **Psychological functions of physical cleansing**

Physical cleansing provides basic protection against physical contamination, and so the need for physical cleansing should increase when contamination is experienced. There are also reasons to believe that physical cleansing reduces more than just the sense of physical pollution. For example, psychological and anthropological literature indicates that concepts of physical and moral purity are intertwined (e.g., Graham, Haidt, & Nosek, 2009; Nussbaum, 2004). One illustration of this can be found in the Judeo-Christian tradition, within which contamination by bodily disease indicated the lack of moral purity and has been seen as punishment for moral transgressions. Cleansing rituals and physical purification have been used to reestablish moral purity and cure the disease (Kazen, 2010).

Psychological research shows that cues of physical impurity such as bad smell or dirt increase the severity of moral judgments (Schnall, Haidt, Clore, & Jordan, 2008b) and physical cleanness decreases it (Schnall, Benton, & Harvey, 2008a). Physical cleansing relieves the sense of contamination by moral transgressions (Zhong & Liljenquist, 2006), and physical purity gives people feeling of higher moral grounds and elicits more harsh moral judgments (Zhong, Strejcek, & Sivanathan, 2010) especially with regards to violations of sexual purity (Helzer & Pizarro, 2011).

Physical cleansing signifies more than an attempt to achieve moral purity. It extends beyond the moral domain and serves to create psychological distance from the past (cf. Lee & Schwarz, 2011). Physical cleansing is also used to create social distance. Anthropological literature indicates that across different cultures the body is used as a metaphor of society, and rituals related to physical purity represent desired states of the in-group and desired actions towards purity-threatening out-groups (Douglas, 1966). Hygiene and purification rituals build in-group cohesion (Dunbar, 1993), differentiate between in-groups and out-groups (or in-caste or out-caste), and legitimize social hierarchies (with low status groups labeled as “impure” or “untouchable”) (e.g., Curtis, de Barra, & Aunger, 2011). To sum up, physical cleansing seems to serve multiple psychological functions. It can be expected that the need for physical cleansing may be evoked by fear of physical as well as symbolic contamination.

### **Prejudice towards homosexuals and contamination concerns**

There are several reasons why prejudice towards homosexuals (especially male) may be expressed as a heightened need for physical cleansing. A need for physical cleansing may indicate a need to avoid physical or symbolic contamination. Research suggests that a social group defined by male homosexual orientation is construed as a threat to physical and moral purity. There are also reasons to think that this group is construed as a threat to the purity of the very essence defining heterosexuals as a social group.

It has been argued that homosexuality is associated with physical disgust because homosexuals violate traditional rules of “appropriate” sexual behaviors and threaten moral purity (e.g., Cottrell & Neuberg, 2005; Dasgupta et al., 2009; Horberg, Oveis, Keltner, & Cohen, 2009; Inbar et al., 2009; Inbar et al., 2012). Contamination in a moral rather than a physical sense underlies this explanation. According to this perspective, prejudice towards homosexuals involves a notion of symbolic contamination that causes reactions on a physical level.

Another explanation for why disgust is associated with homosexuality relies on the fact that disgust is an evolved emotional reaction that cues reactions to prevent physical contamination by pathogens (e.g., Curtis et al., 2011; Oaten, Stevenson & Case, 2009; Rozin et al., 2000). Thus, the association of anti-gay prejudice with disgust indicates that prejudice towards this group involves evolved psychological and physical mechanisms to prevent physical contamination.

According to this evolutionary perspective some forms of prejudice are driven by an evolved mechanism that allowed our ancestors to detect potentially threatening features of other people and respond in threat-reducing ways. The cost of infection by parasites, bacteria or viruses was one of the most important selection pressures faced by early humans (Kurzban & Leary, 2001). Therefore, natural selection has produced a behavioral immune system that comprises psychological and social mechanisms that facilitate the detection and avoidance of pathogens. In human societies, such evolved reactions are assumed to play a role in avoidance of people who are seen as a health threat, for instance because they bear atypical appearances or are unfamiliar and may therefore carry new germs or engage in practices that challenge hygienic and health standards of the in-group (e.g., Curtis et al., 2011; Neuberg, Kenrick, & Schaller, 2011; Schaller & Neuberg, 2011; Schaller & Park, 2011). This approach suggests that prejudice towards homosexuals may be expressed as the need for cleansing based on an atavistic mechanism aiming at reducing actual, physical contamination by germs because homosexuals are either seen as different and unfamiliar or because they are associated with the stigma of a disease (e.g., Herek et al., 2003).

Another approach suggesting that symbolic rejection of a social group may be co-experienced with bodily reactions to physical contamination can be found in embodiment research. Research indicates that representations of the self and in-groups overlap. In-group identification is expressed by including the in-group in the mental representation of the self

(e.g., Coats, Smith, Claypool, & Banner, 2000; Schubert & Otten, 2002; Tropp & Wright, 2001; Smith, 2008). In addition, similar others are included into one's representation of the bodily self. For example, Paladino, Mazzeuga, Pavani, and Schubert (2010) demonstrated that being stroked on a cheek while observing a stranger being stroked in synchrony increased perceived physical resemblance to and conformity with the stranger and the inclusion of the stranger in the self. These effects were mediated by the illusion of physical ownership and control over the stranger's face. Thus, there are reasons to believe that similar others who constitute an in-group may be included in representations of bodily self.

If representations of the physical self and the in-group overlap, than contact with an out-group that is construed as incompatible with the essence of the in-group may be experienced as physical contamination of one's body. Studies show that social categories defined by sexual orientations are seen as defined by different underlying essences and often perceived as different "natural kinds" (e.g., Haslam, Rothschild, & Ernst, 2002; Haslam & Levy, 2006). In addition, the more heterosexual people essentialize differences between the social categories defined by sexual orientations and believe that they are demarcated by clear-cut, not crossable boundaries and that profound differences exist in their underlying essences, the more they dislike and avoid homosexuals (Haslam & Levy, 2006). This suggests that sexual minorities may be construed as contaminating the essence of an in-group defined by a heterosexual orientation. Contaminating intergroup contact should produce a corresponding embodied state: the increase of a need for physical cleansing (Niedenthal, Barsalou, Winkielman, Krauth-Gruber, & Ric, 2005). Thus, prejudice towards homosexuals may be experienced with simulation of physical cleansing as a reaction to intergroup contamination.

### **Present studies**

The present research builds on previous findings that suggest that prejudice towards homosexuals (especially male) involves contamination concerns. Four studies examined a

novel hypothesis that such contamination concerns might be expressed in the increased need for physical cleansing following an imagined contact with a homosexual man. First, we tested the hypothesis that imagining a morally neutral act of using an ordinary object belonging to a homosexual man (e.g., a mobile phone) would increase the need for physical cleansing among heterosexuals.

There are several reasons to expect that imagining the contaminating act may increase the actual need for cleansing. Studies show that imagined intergroup contact has the same effects on prejudice as actual intergroup contact (e.g., Crisp & Turner, 2009; Crisp, Stathi, Turner, & Husnu, 2009). It has been also suggested that the object touched by a contaminating person assumes the same contaminating characteristics (e.g., Curtis et al., 2011). In addition, according to the intuitive logic of sympathetic magic that characterizes reasoning about contamination, imagining a contaminating action has also contaminating effect and may require the similar protective responses (Duncan, Schaller, & Park, 2009; Rozin, Millman, & Nemeroff, 1986). Finally, the embodiment literature suggests that an action that is imagined, though detached from the real-life, physical context, would nevertheless be supported by specific body states in modalities in which the action is embodied (e.g., Niedenthal et al., 2005).

Second, we also expected that the need for cleansing might be specific and particularly concern the body parts that were engaged in the imagined contaminating contact: hands and mouth. These body parts are the most exposed to contaminating contact in the experimental scenario. Moreover, the embodiment literature suggests that the simulated cleansing reactions are specific to modalities engaged in the symbolically contaminating acts (Lee & Schwarz, 2010).

Third, we expected that the increase in the specific need for cleansing after imagined contact with a homosexual man should be stronger among political conservatives than non-

conservatives. Studies suggest that the extent to which contamination concerns are implicated in anti-gay prejudice is greater for political conservatives than non-conservatives. Political conservatism is associated with greater preoccupation with moral and symbolic contamination and harsher attitudes towards sexual transgressions.

For example, research shows that conservatives base their moral judgments on concepts of purity more than liberals do (Graham et al., 2009). Political conservatives are more prone to sexual disgust (Tybur, Merriman, Hooper, McDonald, & Navarrete, 2010), and more likely to moralize and condemn homosexuality (Haidt & Hersh, 2001). Conservatives are more likely than liberals to essentialize differences between social categories defined by sexual orientations (e.g., Haslam & Levy, 2006; Keller, 2005). They are also more sensitive to disgust (e.g., Inbar et al., 2009) and threat of contamination by disease (e.g., Duncan et al., 2009). Conservative sexual ideology was shown to partially account for the link between physical disgust and prejudice towards homosexuals (Olatunji, 2008). A recent meta-analysis confirmed that fear of contamination (disgust sensitivity and vulnerability to disease) predicts affirmation of conservative value systems that promote strict adherence to social norms and social exclusivity (in-group homogeneity and out-group avoidance) (Terrizzi, Shook, & McDaniel, 2013).

These results suggest that contamination concerns involved in attitudes towards homosexuals should be more salient to political conservatives than non-conservatives. Thus, political conservatives, rather than non-conservatives, should experience a heightened specific need for physical cleansing after imagining a contact with a homosexual man.

### **Study 1**

Study 1 provided an initial test of the hypothesis that prejudice towards gay men may be expressed by an increased need for physical cleansing. We expected that such needs will be indicated by increased accessibility of the concept of physical cleansing after the imagined

intergroup contact. In Study 1, we differentiated the concept of physical cleansing as a purifying action from a concept of physical cleanness as a bodily state of purity, being free from dirt. Previous research suggests that cleansing and cleanness may have opposite consequences for subsequent judgment (e.g., Schnall et al., 2008a; Zhong et al., 2010).

We expected that imagined intergroup contact would increase accessibility of the concept of cleansing (as purifying action) because it increases contamination concerns and the need for physical cleansing. Predictions regarding the effect of imagined contact on the accessibility of the concept of cleanness (as bodily state) were less straightforward. On the one hand, imagined contact may produce the sense of contamination and reduce the accessibility of the concept of physical cleanness. Nevertheless, evoking concerns regarding physical cleanness may also have an opposite effect making the concept of cleanness more accessible through increasing its desirability.

## Method

Participants were 38 undergraduate students in the UK. Data from one participant were excluded due to the false recall indicated by answers to control questions. Twenty eight of the remaining participants were female, the mean age was 22.43 ( $SD = 6.07$ ; two participants did not report their ages).

**Procedure and materials.** Participants were randomly allocated to experimental ( $n = 19$ ) or control ( $n = 18$ ) conditions. The study was presented as an investigation of the relationship between the vividness of mental imagery and memory. Participants were asked to imagine a situation as vividly as possible and recall it after performing distracting tasks unrelated to the recall.

After the informed consent was taken, participants listened to a recording which asked them to imagine (as vividly as possible, with their eyes closed) that on their way to a job interview they got trapped in a malfunctioning elevator together with two other persons. They

were running late and the battery had run out in their mobile phone. They had to borrow and use a mobile phone of one of the persons trapped with them in the elevator to inform someone about their delay. The recordings in the control condition and in the experimental condition were almost identical differing only by presenting the two persons in the elevator as a heterosexual vs. homosexual couple (“young man and woman holding hands” vs. “two young men holding hands”). Participants were instructed to imagine that it was “the man” or “one of the men” whose phone they used.

Next, participants performed a word completion task. They converted strings of letters into meaningful words (Zhong & Liljenquist, 2006). Out of eight word fragments two (W\_\_H, S\_\_P) could be completed as cleansing related words (Wash, Soap) or unrelated words (e.g. Wish, Step) and two (\_\_RE, CLE\_\_) could be completed as cleanness related words (Pure, Clean) or unrelated words (e.g. Lure, Clear) (coded “1” when completion was related to the theme and “0” when it was unrelated or not completed). Means were computed to indicate how often word fragments were completed according to the theme. Two indices were computed representing the accessibility of the cleansing ( $M = 0.30$ ;  $SD = 0.34$ ) and the cleanness theme ( $M = 0.26$ ;  $SD = 0.33$ ).

Next, the participants engaged in a recall exercise that contained control questions: “How many people entered the lift with you?”, “What object did you need to borrow?”, and “Who did you borrow it from?”. Answers to these questions were used as indicators of whether the participants remembered the interaction correctly. The data of one participant who remembered borrowing a phone from a woman were excluded.

Funneled debriefing was used to detect suspicions of the true purpose of the study. None of the participants guessed the true purpose of the study. In the end, the participants were informed how the study could be affected if they were of homosexual orientation and

were asked to disclose information on their homosexual orientation to the experimenter confidentially after the study. None of the participants disclosed a homosexual orientation.

## Results

To examine the effect of the experimental manipulation on the word completion task we performed a mixed 2 (type of words completed: cleansing vs. cleanness; within subject factor) x 2 (condition: control vs. experimental) GLM. We entered participants' ages and gender into the analyses<sup>2</sup>. Participants' age was significantly related to the recognition of cleansing related words,  $r(33) = -.34$ ;  $p = .04$ . In addition, there were significant gender differences in completing cleanness related words,  $F(1, 35) = 5.06$ ,  $p = .03$ ,  $\eta_p^2 = .13$ . Women completed more words in accordance to the cleanness theme than men,  $M = 0.32$ ,  $SD = 0.34$  vs.  $M = 0.06$ ,  $SD = 0.17$ , respectively. This is consistent with results indicating that women are more sensitive to disgust than men are (Druschel & Sherman, 1999; Tybur, Bryan, Lieberman, Hooper, & Merriman, 2011) and that the link between disgust sensitivity and attitudes towards homosexual men may differ between man and women (Inbar et al., 2012; Olatunji, 2008). Studies have also found that women hold more positive attitudes towards gay people than men (Kite & Whitely, 1996). Thus, previous evidence and present results suggest that covarying participants' age and gender in analyses for Study 1 may reduce the within-group error variance and increase the power to find the hypothesized effect if one exists.

The results adjusted for participants' age and gender produced a significant effect of the type of words completed,  $F(1, 30) = 7.39$ ,  $p = .01$ ,  $\eta_p^2 = .20$ , which was qualified by an interaction with age,  $F(1, 30) = 6.70$ ,  $p = .02$ ,  $\eta_p^2 = .18$ , and the predicted interaction of the

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<sup>2</sup> Analyses in all studies were performed with statistically controlling for participants' gender and age. In all but one study these variables are related to the dependent variable. The results are consistent across the studies when age and gender are taken into account. Analyses without controlling for age and gender are discussed when they change patterns of results. They are presented in detail in the Supplementary Material.

type of words completed and experimental condition,  $F(1, 30) = 10.71, p = .003, \eta_p^2 = .26$ .

The interaction of the type of words completed and gender was marginally significant,  $F(1, 30) = 3.87, p = .06, \eta_p^2 = .11$ . There was no significant three-way interaction of gender with type of words completed and research condition,  $p = .89^3$ .

Words related to cleansing were more accessible,  $M = 0.42, SE = 0.09$ , when participants imagined borrowing a phone from a homosexual man than from a heterosexual man,  $M = 0.14, SE = 0.09$ . Cleanness related words were less accessible,  $M = 0.11, SE = 0.08$ , when participants imagined borrowing a phone from a homosexual man than from a heterosexual man,  $M = 0.30, SE = 0.09$  (Figure 1). Pairwise comparisons of the marginal estimated means that examined this interaction more closely indicated that the effect of experimental manipulation on the cleansing related words was in the predicted direction and significant,  $t(30) = 2.08, p = .05$ . The effect on words related to the theme of cleanness was not significant,  $t(30) = -1.46, p = .15$ .

### Discussion of Study 1

The results of Study 1 provided initial support for the hypothesis that imagining contact with a homosexual man may increase a need for physical cleansing. Participants who imagined that they used a mobile phone of a homosexual man generated significantly more cleansing-related words and less, although not significantly, cleanness related words than participants who imagined that they used a mobile phone of a heterosexual man. The contact was experienced as contaminating not because the borrowed phone belonged to another person but because it belonged to a homosexual rather than a heterosexual man.

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<sup>3</sup> Analyses without covariates revealed a significant interaction of the within subject factor with research condition,  $F(1, 35) = 7.81, p = .01, \eta_p^2 = .18$ . Pairwise comparisons indicated that the effect of experimental manipulation was not significant in case of the cleansing related words,  $t(35) = 1.03; p = .20$  and marginally significant in case of the cleanness related words,  $t(35) = -1.97; p = .06$  (see Supplementary Material).

Although the results of Study 1 supported our hypothesis that prejudice towards homosexual men may be expressed in the increased need for cleansing, the study had several shortcomings that made replication desirable. First, the sample was relatively small. Second, although we tried to differentiate between the concepts of cleansing and cleanness, and the results followed this logic, the meaning of the word *clean* that was used as the indicator of the cleanness concept activation may have been ambiguous. The same word used as a verb may be seen as pertaining to the concept of cleansing. The pattern of the results does not change when this ambiguous word is excluded from analyses. Nevertheless, the use of a word-completion task as measure of the dependent variable does not provide a firm basis for distinguishing between actual prejudiced responses and the simple activation of semantic associations contained in a culturally shared stereotype. Therefore, in Study 2 we examined whether imagined contact increases the need for physical cleansing using a more direct and unambiguous measure of the need for physical cleansing.

## Study 2

In Study 2 we wanted to replicate conceptually the results of Study 1 using a simple, behavioral measure. We examined how imagined intergroup contact affects choosing a cleansing product over a non-cleansing product. In addition, we examined the robustness and generalizability of the expected effect by conducting the study in a different cultural and societal context.

## Method

Participants were 66 Portuguese undergraduate students. Data from four persons were excluded because they did not provide the dependent measure. Data from three participants were excluded due to the false recall of borrowing the phone from a woman. Finally, data from four persons who disclosed homosexual orientation were excluded. Of the remaining 55

participants, 46 were female, the mean age was 21.61 ( $SD = 5.00$ ; one person did not provide information about age).

**Procedure and materials.** The study was presented as investigation of the relationship between hand-writing style and personality (Zhong & Liljenquist, 2006) and was conducted by an experimenter blind to the hypothesis. Participants were randomly allocated to experimental ( $n = 25$ ) and control ( $n = 30$ ) conditions. After responding to a questionnaire that allegedly contained personality measures, participants were asked to re-write a shortened Portuguese version of the story used in Study 1 in their own hand-writing. Again, the two stories were identical except for the short fragments that presented the two persons in the elevator as a heterosexual vs. homosexual couple.

Next, the participants were asked the same control questions that were asked in Study 1. Then, they were informed that this was the end of the study and they were thanked for their participation. The experimenter showed them two identical cardboard boxes from which they could choose their prize: a yellow pencil or a yellow hand disinfecting wipe (pretested to be equally desirable in a sample of 22 Portuguese participants,  $F(1, 21) = 0.05$ ,  $p = .83$ ). After the participants made their choice they were debriefed.

## Results

As the results in Table 1 show, the antiseptic wipe was chosen more often by participants who imagined using a mobile phone of a homosexual man than by participants who imagined borrowing a phone of a heterosexual person,  $\chi^2(1) = 4.29$ ,  $p = .04$ . The odds ratio of choosing a wipe for participants who imagined borrowing the phone from a gay man than from a heterosexual man was 3.5. The logistic regression using bootstrapping with 2000 resamples indicated a significant effect of research condition on prize choice, both when age and gender were included as covariates ( $b = -1.28$ ,  $p = .04$ ; Bias corrected Accelerated 95%

CI [-2.55; -0.32]) and when they were not ( $b = -1.25$ ,  $p = .03$ ; [-2.30, -0.49]). There were no significant effects or moderation by age or gender.

### **Discussion of Study 2**

The results of Study 2 replicate the findings of Study 1 in a different cultural and societal context using a behavioral measure of the need for cleansing. Participants who imagined borrowing a phone from a gay man chose cleansing wipes more often than participants who imagined borrowing a phone from a heterosexual man.

Despite the fact that desirability and attractiveness of the objects used in the study were pretested as comparable, in Study 2, in general, participants chose pencils more often than hand wipes. This may be explained by the fact that the study (but not the pre-test) was conducted shortly before the examination period. Regardless, despite this unexpected overall preference, we still found the hypothesized difference between conditions.

The results of Study 2 provide further support for our hypothesis that prejudice towards gay men is expressed in the need for cleansing. To examine the robustness and reliability of the effect of imagined contact on the need for cleansing we conducted Study 3. More importantly, in Study 3 we assessed the dependent variable in a way that allowed us to examine what body parts participants wanted to clean the most after they imagined contaminating contact.

### **Study 3**

In Study 3 we investigated whether imagined intergroup contact increases a specific desire for physical cleansing expressed by the preference for those products that are instrumental for cleaning the body parts involved in the imagined contact (Lee & Schwarz, 2010, Zhong & Liljenquist, 2006). The experiment was conducted in yet another cultural context.

### **Method**

Participants were 51 Polish undergraduate students. Data from one person were excluded from the analyses due to missing responses on the dependent measure. Forty one out of the remaining 50 participants were female, the mean age was 32.76 ( $SD = 7.09$ ; one person did not provide information about age).

**Procedure and materials.** The study used a procedure similar to that in Study 1. A Polish version of the same cover story was used and participants were asked to imagine the situation described by the scenario they listened to with their eyes closed. Participants were randomly allocated to experimental ( $n = 26$ ) and control ( $n = 24$ ) conditions and were asked to imagine a homosexual vs. heterosexual couple in the scenarios, respectively. Next, participants completed a product survey presented as an unrelated distraction task. Then they were thanked and debriefed. None of the participants guessed the purpose of the study, and none disclosed a homosexual orientation.

The product survey (Lee & Schwarz, 2010, Zhong & Liljenquist, 2006) asked participants to evaluate the desirability of 12 products using a scale from 1 (highly undesirable) to 7 (highly desirable). The products included disinfectant hand wash and mouthwash (specific cleansing products,  $r(48) = .32$ ,  $p = .03$ ,  $M = 3.49$ ,  $SD = 1.50$ ), shower gel, shampoo, cotton buds, foot talcum (other body cleansing products,  $\alpha = .83$ ,  $M = 3.68$ ,  $SD = 1.72$ ), bathroom disinfectant, air refresher, surface cleaner (household cleansing products,  $\alpha = .67$ ,  $M = 3.48$ ,  $SD = 1.79$ ), post-its, CDs and AA batteries (non-cleansing products,  $\alpha = .75$ ,  $M = 2.78$ ,  $SD = 1.66$ ).

## Results

In Study 3 age was significantly correlated with preference for household cleansing products,  $r(47) = .33$ ,  $p = .02$ . In addition, there was a marginally significant difference in preference for non-cleansing products between women and men,  $F(1,48) = 2.78$ ,  $p = .10$ ,  $\eta_p^2 = .06$  (see Supplementary Material). Thus, to determine whether the experimental manipulation

affected the preference for the specific hands and mouth cleansing products vs. other cleansing and non-cleansing products we performed a mixed GLM: 4 (product type: hand and mouth cleansing products vs. other body cleansing products vs. household cleansing products vs. non-cleansing products, within subject factor) x 2 (condition: control vs. experimental). As in previous studies, the results were adjusted for participants' age and gender. The Greenhouse-Geisser correction was used as Mauchly's test of sphericity was significant,  $p = .001$ . Results revealed a significant two way product-type by research condition interaction,  $F(2.13, 93.64) = 4.47, p = .01, \eta_p^2 = .09$ . The interactions of the within factor with age,  $p = .53$  and gender,  $p = .84$  were not significant. The three way interaction of the within factor, the research condition and gender was not significant,  $p = .22$ .

Pairwise comparisons indicated that the preference for the specific cleansing products was marginally stronger after participants imagined using a phone of a homosexual ( $M = 4.00, SE = 0.41$ ) vs. heterosexual person ( $M = 3.01, SE = 0.38$ ),  $t(44) = 1.78, p = .08$  (Figure 2). The difference between conditions was not significant for other categories of products,  $ps$  from .18 to .80.

To examine our specific hypothesis that participants should prefer specifically mouth and hands cleansing products after imagining borrowing a phone from a gay vs. heterosexual man, we conducted planned contrast analysis. We tested the specific hypothesis that the effect of condition (coded 2 and -2 for experimental and control condition, respectively) was significantly larger for the specific hand and mouth cleansing products than for the other cleansing products (body and household) and the non-cleansing products (coded 3 -1 -1 -1). As predicted, this contrast was significant,  $t(44) = 2.27, p = .03$ . The residual contrasts, which tested the effect of the manipulation on preference for cleansing products (without hand and mouth; only general body cleansing and household cleansing products) vs. the effect on preference for non-cleansing products (0 1 1 -2) was also significant,  $t(44) = 2.53, p = .016$ . As

this contrast was orthogonal to the one testing our specific hypothesis, it does not call into question the support for our hypothesis. The second orthogonal residual contrast testing differences between manipulation effects on preferences for general body vs. household cleansing products (0 1 -1 0) was not significant,  $|t| < 1$ .

### Discussion of Study 3

The results of Study 3 were consistent with the hypothesis that the increased need for cleansing after an imagined contaminating contact is specific to the body parts that were contaminated. Participants who imagined borrowing a mobile phone from a homosexual man evaluated hand cleansing gel and mouth-wash as more desirable than participants who imagined borrowing a mobile phone from a heterosexual man. Differences in product desirability between the experimental conditions was stronger for the specific cleansing products than for other cleansing or non-cleansing products as indicated by the planned contrast analysis.

To test hypotheses about how imagining contaminating contact might increase the specific need for cleansing we conducted Study 4. This study examined the hypothesis that the expected effect of imagined contact will be stronger among political conservatives vs. non-conservatives. As discussed previously, there are reasons to expect that the contamination concerns in anti-gay prejudice may be more salient for political conservatives than for non-conservatives.

### Study 4

We conducted Study 4 with a group of political activists linked to a conservative political party in Poland called Prawo i Sprawiedliwość (*Law and Justice*) and a matched sample of non-activists. Prawo i Sprawiedliwość represents a conservative political worldview with an emphasis on the importance of national and religious values. This party is also known for its unsympathetic stance towards the rights of sexual minorities (Forsythe,

2009). We predicted that political conservatives would prefer hand and mouth cleansing products after imagining using a mobile phone belonging to a homosexual vs. a heterosexual man more strongly than non-conservatives.

## Method

Participants were 41 political activists representing Prawo i Sprawiedliwość (PiS, *Law and Justice*) and 41 non-activists matched with respect to gender, age, and education. The non-activists were recruited from an international company that did not have a specific political orientation. Data from two non-activist participants were excluded due to missing responses on the dependent measures. Thirty nine participants were female (eighteen among political activists, one person did not provide information about gender). The mean age was 28.5 ( $SD = 4.76$ ).

**Procedure and materials.** The activists were recruited in the party headquarters in Warsaw, Poland. The non-activists were recruited from employees of an international insurance company in Warsaw, Poland. Participants in each group were randomly allocated to the research conditions (activists: experimental  $n = 20$ , control  $n = 21$ ; non-activists: experimental  $n = 20$ , control  $n = 19$ ). The same cover story as in Studies 1 and 3 was used. After informed consent was obtained, participants were asked to read and imagine, as clearly as possible, the same story that was used in Study 3. Next, they completed two tasks, a word completion task and a marketing survey of household products.

The word completion task was modeled on the task used in Study 1 (coded and computed as in Study 1) and was adapted to Polish. Participants were asked to complete twelve word fragments out of which four (U\_\_ C, W \_\_ RAC, \_\_ NA, \_\_ DLO) could be completed as cleansing related words *umyć* (to cleanse), *wyprać* (to wash), *wanna* (bathtub), *mydło* (soap) or as un-related words *utyć* (to put on weight), *wygrać* (to win), *panna* (maiden), *bydło* (herd). Three word fragments ( B \_\_ DNY, \_\_ ORA, \_\_ MIOT ) could be completed

according to the impurity theme *brudny* (dirty), *chora* (sick), and *wymiot* (vomit), or in an unrelated way *błądny* (erroneous), *zmora* (nightmare), *namiot* (tent). The cleanness theme from Study 1 was replaced by the less ambiguous impurity theme. We examined whether the concept of physical cleansing (as a purifying action) as well as the concept of contamination (as an impure bodily state) are activated during the ‘contaminating’ intergroup contact. We predicted that both concepts would be more accessible after participants imagined borrowing a phone from a gay man than from a heterosexual man.

Next, as in Study 3, participants evaluated the desirability of the specific hand and mouth cleaning products,  $r(77) = .38, p < .001, M = 3.34, SD = 1.76$ ; body cleaning products,  $\alpha = .75, M = 3.22, SD = 1.55$ ; household cleaning products,  $\alpha = .66, M = 2.99, SD = 1.36$ , non-cleansing products (batteries and cds only because desirability of post its did not correlate significantly with the two other products),  $r(77) = .37, p = .001, M = 2.90, SD = 1.65$ . Participants were then thanked and debriefed. Funneled debriefing was used and none of the participants guessed the real purpose of the study<sup>4</sup>.

## Results

### *Concept accessibility: cleansing and impurity*

To examine whether the experimental manipulation increased the accessibility of impurity and cleansing related words, we conducted a mixed 2 (words completion theme: cleansing vs. impurity, within subject factor) x 2 (research condition: control vs. experimental condition) x 2 (group: political activists vs. non activists) GLM with participants’ age and

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<sup>4</sup> Study 4 also included indices of individual sensitivity to disgust and vulnerability to disease. The index of disgust sensitivity was composed of 6 randomly chosen items of the Disgust Sensitivity Scale (The DS-R, Haidt, McCauley, & Rozin, 1994, modified by Olatunji et al., 2007;  $\alpha = .65$ ). The index of disease vulnerability was composed of 6 randomly chosen items of the Vulnerability to Disease Scale (Duncan et al., 2009,  $\alpha = .52$ ). For the sake of simplicity of presentation we do not include analyses that covaried the effects of these variables, but they are presented in Supplementary Material. The pattern of results regarding the main hypotheses remains the same in those analyses.

gender entered as covariates. Participants' age was related to the frequency of completing cleansing,  $r(78) = -.24, p = .03$  and impurity related words,  $r(78) = -.20, p = .07$  (marginally significant). Nevertheless, to be consistent with the previous studies, we entered both age and gender in the analysis. The results of analyses without age and gender entered as covariates were very similar to those presented here (see Supplementary Material).

The analyses produced a significant between subjects effect of the manipulation,  $F(1, 71) = 10.65, p = .002, \eta_p^2 = .13$ . There were no significant interaction of the within factor with age,  $p = .86$  or gender,  $p = .35$ , no significant interaction of the within factor and the research condition and gender,  $p = .96$  or significant interaction of the within factor and the research condition, participants group and gender,  $p = .78$ . Participants completed both word fragments, related to the action of cleansing and the state of physical impurity, more often after imagining borrowing a phone from a homosexual,  $M = 0.37, SE = .03$ , than heterosexual man,  $M = 0.24, SE = .03$ . The two way interaction between group and experimental condition was not significant,  $F(1, 71) = 1.82, p = .18, \eta_p^2 = .03$ . The three way interaction between word completion theme, experimental condition, and participant group was not significant,  $F(1, 71) = 2.05, p = .16, \eta_p^2 = .03$ .

Pairwise planned comparisons revealed that there was a significant difference in the way conservative activists completed the impurity and cleansing related words across the research conditions. Conservatives completed more impurity related words after imagined contact with a homosexual man,  $M = 0.28, SE = 0.06$  than with a heterosexual man,  $M = 0.07, SE = 0.05, t(71) = 2.78, p = .01$ . Political conservatives also completed more cleansing related words after imagining contact with a homosexual man,  $M = 0.57, SE = 0.06$  than with a heterosexual man,  $M = 0.44, SE = 0.05$ . This difference was marginally significant,  $t(71) = 1.68, p = .098$ . Non-activists completed the cleansing related words more often after imagining contact with a homosexual man,  $M = 0.50, SE = 0.06$  than heterosexual man,  $M =$

0.36,  $SE = 0.06$ . This difference was marginally significant,  $t(71) = 1.85, p = .069$ . Among non-activists, the difference in the frequency of completion of impurity related words between homosexual and heterosexual targets of the story was not significant,  $t < 1$  (Figure 3).

***Product preference: specific need for cleansing***

To examine whether the experimental manipulation affected the specific need for cleansing differently among conservatives and non-conservatives we conducted a mixed 4 (product type: hands and mouth cleansing products vs. other body cleansing products vs. household cleansing products vs. non-cleansing products, within subject factor) x 2 (condition: control vs. experimental) x 2 (political activists vs. non-activists) GLM. In Study 4 participants' age was significantly related to preference for household,  $r(77) = -.34, p = .002$  and body cleansing products,  $r(77) = -.25, p = .03$ . There were no significant differences with respect to product type preferences between genders,  $ps$  from .24 to .82. Nevertheless, to be consistent with the other studies, we entered participants' age and gender into the analyses. Analyses without covariates yielded the same results (see Supplementary Material).

A Greenhouse-Geisser correction was used because Mauchly's test of sphericity was significant,  $p = .001$ . The results indicate a significant two way interaction of product type by condition,  $F(2.35, 164.46) = 4.28, p = .01, \eta_p^2 = .06$  and as predicted, by a significant three-way product type by condition by group interaction,  $F(2.35, 164.46) = 3.07, p = .04, \eta_p^2 = .04$ . There was also a significant between subject effect of a group,  $F(1, 70) = 11.09, p = .001, \eta_p^2 = .14$ . Political conservatives preferred all products more,  $M = 3.51, SE = 0.16$ , in comparison to non-conservatives,  $M = 2.75, SE = 0.16$ . The interactions of the product type with age  $p = .12$  and gender,  $p = .71$  were not significant. The interactions with gender were not significant for product type and conditions,  $p = .69$  or product type, conditions and group,  $p = .25$ .

Pairwise comparisons conducted to examine the product type by conditions interaction indicated that the preference for hand cleansing gel and mouth-wash was significantly stronger when participants were asked to imagine borrowing a mobile phone from a homosexual ( $M = 3.86$ ,  $SE = 0.26$ ) than from a heterosexual man ( $M = 2.91$ ,  $SE = 0.25$ ),  $t(70) = 2.60$ ,  $p = .01$ . Preferences for all other product types did not differ between conditions,  $t$ s  $< 1.39$ ,  $p$ s  $> .17$ .

The results for pairwise comparisons decomposing the hypothesized three-way interaction of product type by condition by group indicated that political conservatives showed a stronger preference for specific cleansing products after imagined contact with a homosexual ( $M = 4.73$ ,  $SE = 0.38$ ) vs. a heterosexual man ( $M = 3.15$ ,  $SE = 0.35$ ),  $t(70) = 3.09$ ,  $p = .003$ . No other differences were significant,  $p$ s from .14 (non-activists showed marginally significant decreased preference for non-cleansing products after imagined contact with a homosexual) to .99 (Figure 4).

We performed the planned contrast analyses to test our specific hypothesis that the effect of the manipulation (coded -4 and 4 for the control and experimental condition) on preference for the specific hand and mouth-wash products as compared to the other product types (the 3 -1 -1 -1 contrast for specific cleansing products, other body cleansing products, household cleansing products and non-cleansing products, respectively) was larger for conservative activists vs. non-conservatives (coded 4, -4), without assuming any gender differences. This contrast was significant,  $t(70) = 3.94$ ,  $p < .001$ . The residual contrasts were not significant (coded 0, 1, 1, -2 testing the effect of the manipulation and group on preference for other cleansing products vs. non-cleansing product,  $t < 1$ ; and coded 0, 1, -1, 0 testing the effect of the manipulation and group on preference for body vs. household cleansing products,  $t(70) = -1.65$ ,  $p = .103$ ). We also tested whether the group by condition interaction was stronger for preference for the specific cleansing products than for the non-

specific (body and household) cleansing products, without taking into account preferences for non-cleansing products (2 -1 -1 0). This contrast was also significant,  $t(70) = 3.77, p < .001$ .

#### **Discussion of Study 4**

The results of Study 4 replicate the findings of the previous studies, and they provide additional evidence that imagined contact with a homosexual man increases the specific need for physical cleansing. The novel contribution of Study 4 is the finding that this effect is moderated by the people's political worldview. The specific need for physical cleansing after imagined contact with a gay man was stronger among political conservatives, a group that holds stronger prejudice towards gay people, has stronger contamination fears, and that essentializes differences between homosexuals and heterosexuals more than non-conservatives.

The results of Study 4 are less unequivocal with respect to the expectation that political conservatism would moderate accessibility of cleansing and impurity related concepts. While the accessibility of the impurity concept was higher after imagining contact with a homosexual man only among the conservative political activists, not among non-activists, the accessibility of the cleansing concept was higher after imagining contact with a homosexual man among both, the activists and the non-activists. It seems that, as mentioned in the discussion of Study 1, the word completion task may confound behaviorally relevant attitudes such as prejudice in the form of a cleansing response with the accessibility of stereotype related knowledge.

#### **General Discussion**

Previous research has found links between anti-gay prejudice and feelings of physical contamination (e.g., Dasgupta et al., 2009; Herek, 2002; Inbar et al., 2012). The present studies clarify the nature of this link. They are the first, to the best of our knowledge, to show that for heterosexuals the need for physical cleansing is increased after imagined contact with

a male homosexual. These results suggest that prejudice towards homosexuals may be embodied in physical reactions to contamination such as a need for physical cleansing.

More precisely, the results of four studies demonstrate that for heterosexuals, imagined physical contact with a neutral object (a mobile phone) belonging to a gay (vs. heterosexual) man increases the need for physical cleansing. This effect was replicated in three different cultural and societal contexts, in different languages and in student and non-student populations, using different operationalizations of the dependent variable including a behavioral measure.

Moreover, the results of Studies 3 and 4 showed that this need is specific to the body parts engaged in the 'contaminating' contact. After imagining using a mobile phone belonging to a homosexual (vs. heterosexual) man, participants completed more word fragments according to the cleansing theme (Study 1) or chose hand cleansing wipes more often (Study 2). They also evaluated hand cleansing gel and mouth-wash as more desirable, that is, the effect was stronger for these specific products than for other cleansing or non-cleansing products (Study 3 and 4).

We argue that these results occurred because the imagined mobile phone acquired the contaminating properties of the out-group membership (e.g., Curtis et al., 2011; Rozin et al., 1986). The need for cleansing increased after imagined contact with a homosexual vs. a heterosexual man. This suggests that the sense of contamination resulted from some type of intergroup process, not an interpersonal process per se. There are several possible explanations of why a social category defined by male homosexual orientation may be associated with a need for cleansing.

First, imagined contact with a homosexual man may evoke the need to clean as means to prevent disease. Male homosexuality is associated with the stigma of disease (e.g., Herek et al., 2003). Thus, homosexuals as a group may be construed as health threat. Groups perceived

as health threat are avoided, disliked, or excluded as a function of the atavistic behavioral immune system (e.g., Neuberg et al., 2011; Schaller & Neuberg, 2012; Schaller & Park, 2011). This interpretation is supported by a recent finding that physical cleansing of one's hands reduces the link between vulnerability to disease and prejudice towards groups heuristically associated with disease when people are told that physical cleansing prevents contamination by germs (Huang, Sedlovskaya, Ackerman, & Bargh, 2011). Huang et al. did not use homosexuals as a target group, but the present results could be interpreted as indicating that increased need for physical cleansing (of hands and mouth) after imagined intergroup contact results from the activation of a disease avoiding evolved mechanism that is part of anti-gay prejudice.

Moreover, people may want to clean after imagined contact with a homosexual man not only to avoid disease but also to prevent moral contamination. Although hygienic behaviors are among the most basic in the repertoire of behavioral reactions to protect against physical contamination, for humans, the social and cultural environment is an additional and particularly relevant domain in which contamination can take place. Studies demonstrate that physical cleansing is an effective way to alleviate various unpleasant psychological states, including a sense of symbolic contamination (e.g., Lee & Schwarz, 2011).

Studies show that anti-gay prejudice is associated with a stigma of moral impurity and moral disgust (e.g., Cottrell & Neuberg, 2005; Dasgupta et al., 2009; Inbar et al., 2012). Consistent with these findings, the present studies found that the specific need for cleansing after imagined contact with a homosexual man is stronger among political conservatives than non-conservatives. This may be because conservatives are more prone to sexual disgust (Inbar et al., 2009; Tybur et al., 2010) than non-conservatives, and they are more likely to condemn homosexuality on moral bases (Haidt & Hersh, 2001).

Based on literature on the embodiment of social identity, we propose a third explanation that is compatible with the previous two and compliments the concepts of physical and moral contamination avoidance. Some research suggests that anti-gay prejudice is not only a matter of moral indignation. Studies show that those who do not make moral judgments about sexuality seem less prejudiced. People who believe that homosexuality is not a matter of morality because homosexuals have little choice over their sexual preferences which are determined by natural causes (e.g., genes), show less dislike and less avoidance of homosexuals (Haslam & Levy, 2006; Jayaratne et al., 2006) compared to those who do not believe that homosexuality may be biologically determined. Nevertheless, even in the context of developing awareness that sexual orientation is not a matter of deliberate choice, prejudice toward homosexuals persists. Studies show that people who believe that social categories defined by sexual orientations are underlined by different group essences are more prejudiced towards gay people (e.g., Haslam et al., 2002; Haslam & Levy, 2006).

Thus, anti-gay prejudice may persist in contexts that do not moralize homosexuality because it still involves the notion that the homosexual out-group may contaminate the essence of the heterosexual in-group. This suggests that heterosexual people may want to clean their bodies not only to reduce physical or moral contamination but also to reduce in-group contamination. Symbolic contamination of an in-group may be experienced with reaction to physical contamination of the self because mental representations of the in-group and the self (also bodily) overlap (e.g., Paladino et al., 2010). This embodiment-based explanation suggests that the association of homosexuals with disease and disgust may be a consequence, rather than the reason for construing this group as contamination. In-group contamination experienced as bodily contamination may evoke disgust and produce associations of the contaminating out-group with disease and moral transgression.

The conceptualization of moral disgust and disease attribution as a consequence of, rather than reasons for, construing a social group as contamination emphasizes the changeable, context dependent nature of anti-gay prejudice and may have implications for prejudice reduction. If visceral, bodily reactions are seen as associated with a social group because of its inherent properties (e.g., health threatening aspects of its members), it may be difficult to reduce such prejudices. Atavistic reactions, those that are uninformed by judgment and are inflexible, are difficult to change; however, even if prejudice may be tied to evolved, experiential knowledge structures, it is still determined in part by socio-cultural and situational contexts and may therefore be malleable.

The recruitment of archaic cleansing responses may depend on what social groups in given social and cultural contexts are construed as in-group contamination. For example, recent studies show that differences between social categories can be essentialized or de-essentialized depending on social contexts (Morton, Hornsey, & Postmes, 2009). In addition, research has shown that the same social group may be associated with disgust or not depending on whether membership in this group is seen as a matter of individual choice and changeable. More specifically, processing information about homeless people activated the parts of the brain related to experiencing physical disgust only when this social group was essentialized (seen as not a matter of choice and not changeable, Krendl, Moran, & Ambady, 2012). Results of Study 4 indirectly support the idea that this principle might be generalizable to other groups such as homosexuals. This suggests that reducing the sense of intergroup contamination by de-essentializing intergroup differences could weaken the involvement of contamination concerns and atavistic responses in the experience of intergroup contact. Further studies are needed to better understand the link between prejudice, contamination and physical cleansing. Such studies may result in applied suggestions for prejudice reduction.

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Table 1

*Observed and expected frequencies of prize choice distribution across the research conditions, Study 2 (N = 55)*

		Condition		
		Heterosexual	Homosexual	
Prize	Pencil	Count	20	16
	Expected count	16.4	19.6	
Wipe	Count	5	14	
	Expected count	8.6	10.4	

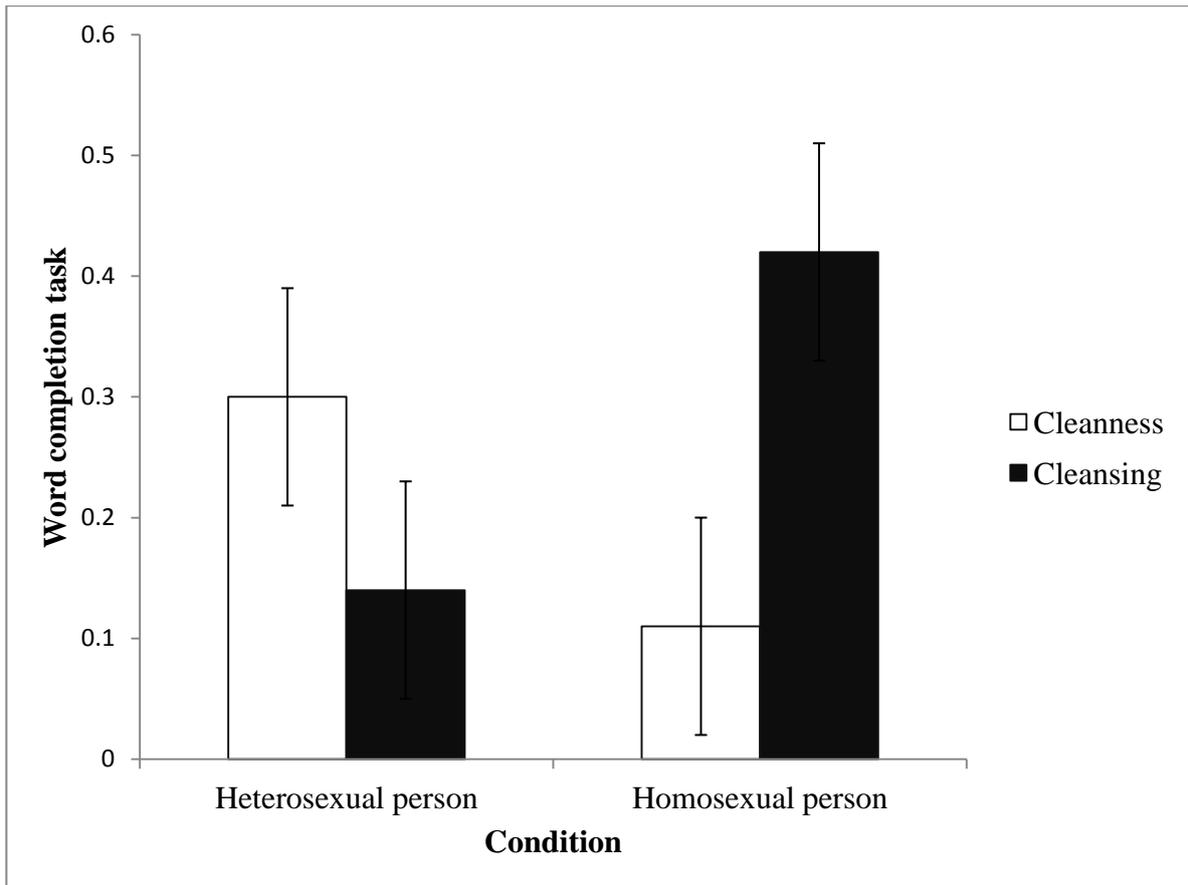


Figure 1.

Word completion task across conditions, Study 1 ( $N = 37$ ). Bars represent the mean frequency of word fragments completion according to the cleansing and cleanness theme. In all Figures bars represent estimated marginal means. Error bars represent standard errors.

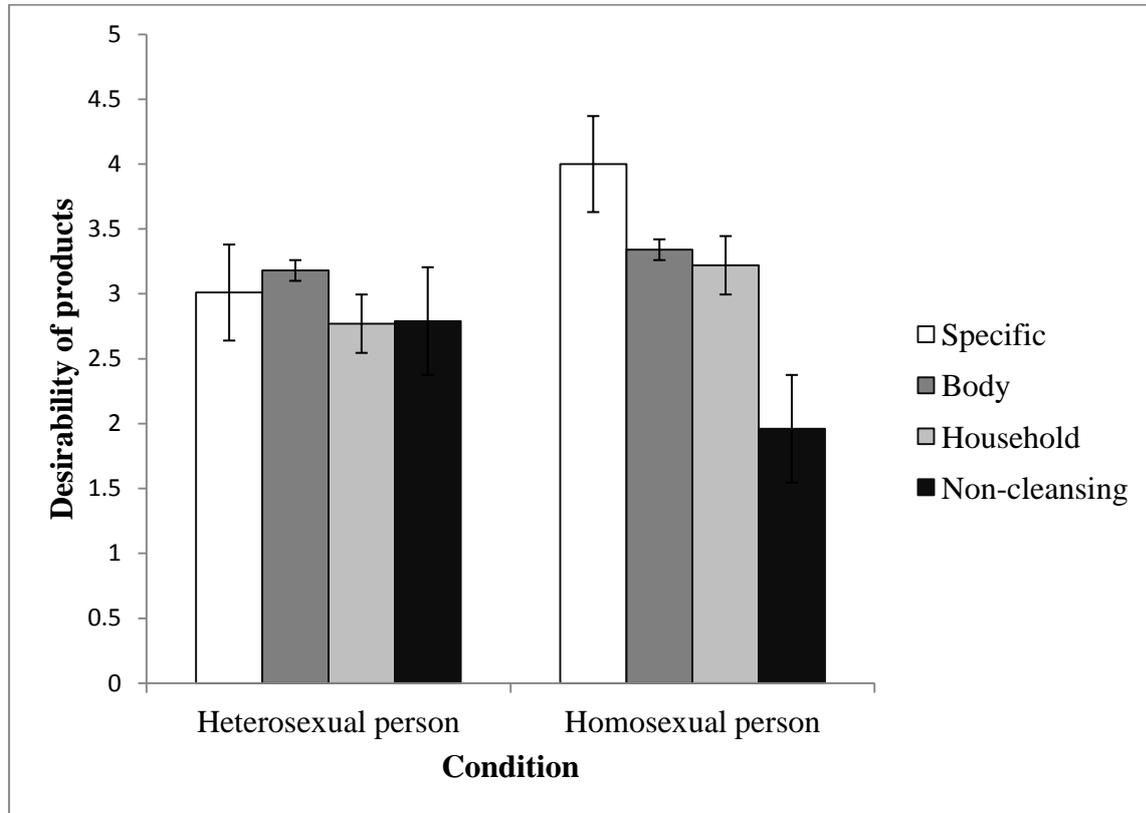


Figure 2.

Preference for cleansing and non-cleansing products across research conditions, Study 3 ( $N = 50$ ).

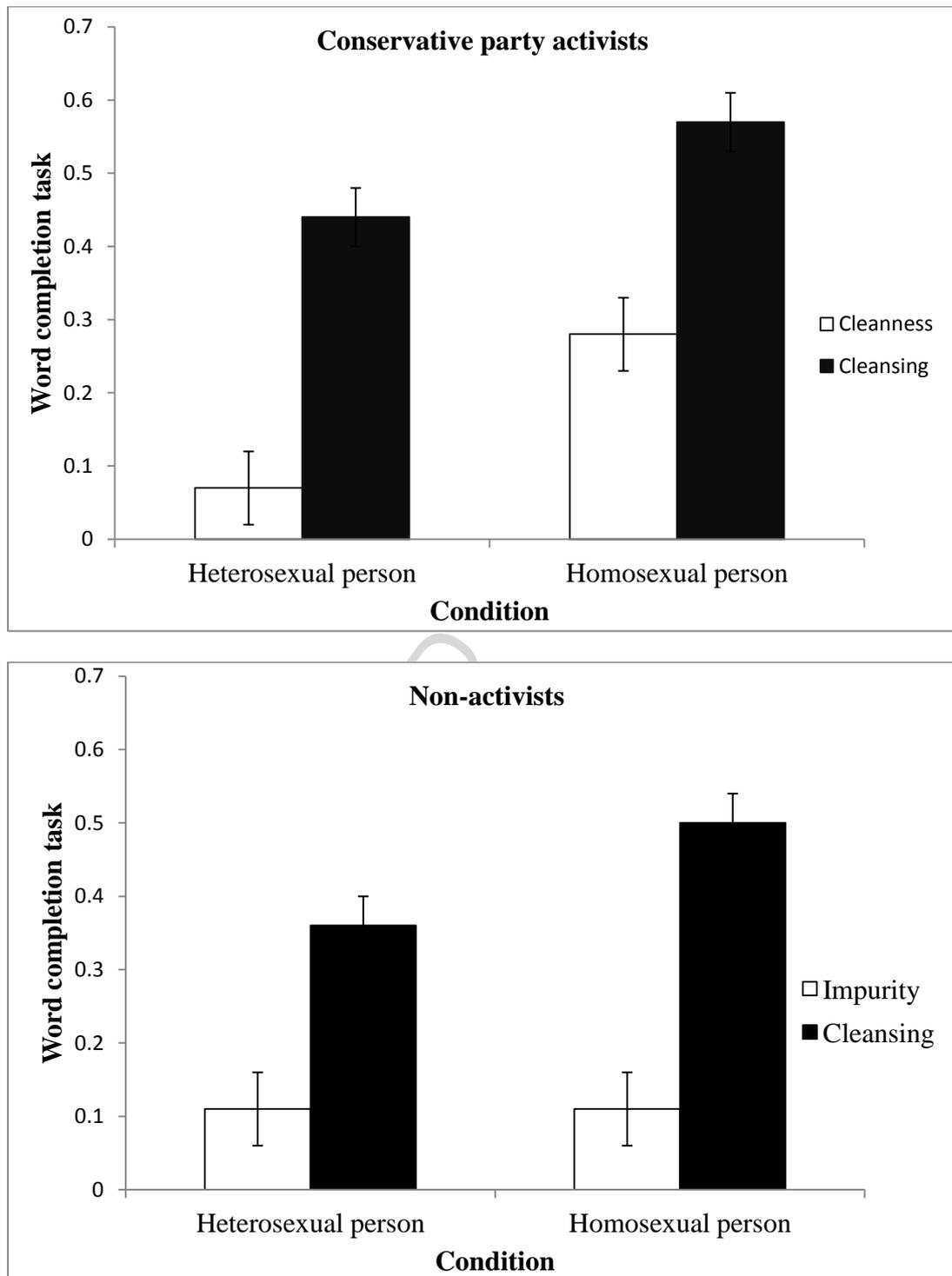


Figure 3.

Word completion across research conditions among conservative party activists and non-activists, Study 4 ( $N = 80$ ).

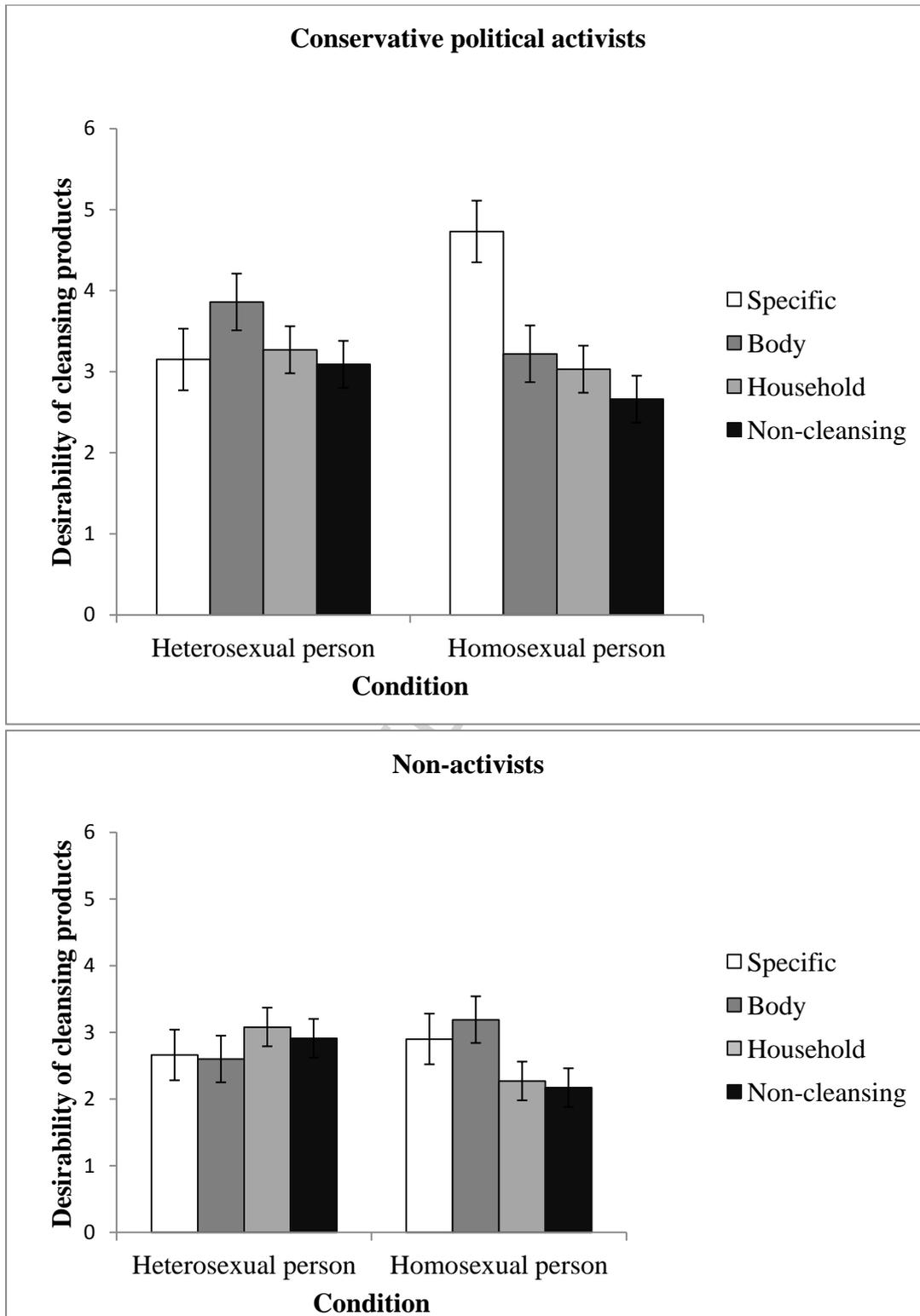


Figure 4.

Preference for cleansing and non-cleansing products across research conditions among activists of conservative political party and non-activists, Study 4 ( $N = 80$ ).

### Highlights

- Imagined contact with gay men increases need of physical cleansing
- This need is specific to body parts engaged in the contact
- This specific need is stronger among political conservatives.
- Manuscript finds and explains link between prejudice and physical contamination
- Manuscript proposes a novel perspective on previous findings