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Cleanliness, Conservatism, and Climate Change: The Effects of Reminders
of Physical Cleansing on Reactions toward Climate Change

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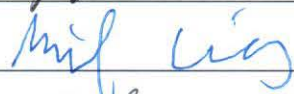
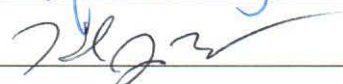
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by

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Abstract

A 2011 study demonstrated that the mere reminder of physical cleansing (through the presence of hand sanitizer) is enough to induce greater conservatism among individuals. It was attempted to replicate this study and to extend our knowledge of the effects of disgust beyond political ideology to the potential impact on climate change attitudes. Salisbury University students completed questionnaires either in the presence of hand sanitizer or not. No significant difference was found between political ideology or climate change attitudes as a function of condition. This paper explores the reasons behind these contradictory results by reexamining previously held notions, such as the evolution of the behavioral immune system and the stability of political ideology as a function of socioeconomic status.

Disgust, a universal and basic emotion, has largely been considered to be one of many key elements that make up the behavioral immune system (BIS; Inbar & Pizarro, 2016; Murray & Schaller, 2016; Oaten, Stevenson, & Case, 2009; Schaller & Duncan, 2007; Schaller & Park, 2011). More generally, the BIS is described as a “broad set of mechanisms that evolved for the purpose of defending us from disease” (Pizarro & Inbar, 2015, p. 163; see also Schaller & Duncan, 2007). Evidence for the emotion of disgust as a means of disease avoidance can be found in the distinctive facial expression (e.g., scrunched up nose and lips), as it prevents germs from entering the body (Susskind et al., 2008; see also Inbar & Pizarro, 2016). Moreover, in a meta-analysis, Curtis, de Barra, and Aunger (2011) use an empirically-based model to show that disgust motivates individual and group hygienic behaviors through social norms, thus further demonstrating how disgust helps to protect individuals from ailments (see also Inbar & Pizarro, 2016).

While it is theorized that the BIS evolved in order to protect ourselves from disease and sickness, there is now evidence to suggest that it has further progressed to respond to a wider variety of issues, such as those in the moral domain (Faulkner, Schaller, Park, & Duncan, 2004; Inbar, Pizarro, & Bloom, 2009; Schaller & Duncan, 2007). Schaller and Park (2011) theorize that the BIS can be activated by a large variety of superficial prompts that can lead to negative reactions to situations that don't actually pose the threat of disease and/or pathogen exposure/infection. According to Inbar and Pizarro (2016), two of the leading psychologists conducting research on disgust, there is an increasing body of evidence that shows that, “disgust seems to shape judgment in domains that, at first glance, appear unrelated to pathogen exposure, such as moral and political judgments” (p. 365; see also Hodson & Costello, 2007; Inbar, Pizarro, & Bloom, 2009, 2012; Inbar, Pizarro, Knobe, &

Bloom, 2009). Thus, there is a demonstrated relationship between disgust and conservative political attitudes (Inbar & Pizarro, 2016).

Moreover, Inbar, Pizarro, and Bloom (2009) used the Disgust Scale (DS; developed by Haidt, McCauley, & Rozin, 1994) to assess disgust sensitivity and its connection to individuals' overall political orientations. They discovered that individuals who identified as being more politically conservative were also more easily disgusted (conservatives had higher disgust sensitivity scores). In a meta-analysis by Terrizzi, Shook, and McDaniel (2013), the relationship between disgust and political orientation was supported. In particular, a study by Terrizzi, Shook, and Ventis (2010) measuring disgust reactivity, and in a large international study by Inbar, Pizarro, Iyer, and Haidt (2012) using the revised Disgust Scale (DS-R; modified by Olatunji et al., 2007) provided support for the relationship. Along similar lines, various researchers have found that when people, regardless of their political orientation, are feeling disgust, their attitudes shift toward moral conservatism (Feinberg, Antonenko, Willer, Horberg, & John, 2014; Helzer & Pizarro, 2011; Inbar, Pizarro, & Bloom, 2009, 2012).

In a review of literature that studied the link between disgust and political attitudes, Inbar and Pizarro (2016) claim that a study by Smith, Oxley, M. Hibbing, Alford, and J. Hibbing (2011) and a study by Tybur, Lieberman, and Griskevicius (2009) did not support the existence of the relationship between political orientation and disgust. However, it is clear from a reading of each study that this not the case. The study conducted by Tybur et al. (2009) does not make any overall conclusions regarding overall political ideology; in fact, political ideology or anything related to conservatism was not mentioned in the study at all. Rather, the authors studied a 3-domain model of disgust and its relation to individual

differences (such as sexuality and morality). The study conducted by Smith et al. (2011) actually supported the relationship between disgust and conservatism. The authors assert that people who have higher disgust sensitivity are more likely to demonstrate a more conservative political orientation.

With this being said, Inbar and Pizarro (2016) also correctly assert that a study by Tybur, Merriman, Caldwell, McDonald, and Navarrete (2010) did not support the existence of the relationship between disgust and a shift in political orientation. It is also worth noting that in the meta-analysis by Terrizzi et al. (2013), it was determined that the estimated population effect size for the relationship between disgust sensitivity using the DS-R and conservatism was $r = .25$. This means that in order to have an 80% chance (power = .8) of detecting the relationship, a study must have 120 participants ($n = 120$) (Inbar & Pizarro, 2016). Thus, both the study conducted by Helzer and Pizarro (that this study was based off of; 2011) and the current studies may be underpowered.

Interestingly, evidence suggests that the mere reminder of the need for physical cleansing (through the presence of hand sanitizer stations or 'employees must wash hands' signs) is enough for the shift toward moral conservatism to emerge (Helzer & Pizarro, 2011). The need for physical cleansing is likely a learned behavior taught by social institutions, but Helzer and Pizarro's (2011) study suggests that reminders of physical cleansing elicit subtle feelings of disgust; reminders of the need for physical cleansing and the emotion of disgust both prompt similar responses in regards to political orientation, specifically a demonstrated shift toward conservatism. It is theorized, then, that physical cleansing has evolved to keep us healthy, just as the BIS has, and feeling the emotion of disgust is a trigger that physical cleansing is needed.

However, previous research regarding reminders of physical cleansing and disgust has primarily focused on its effects on attitudes toward issues related to purity and sexuality (e.g., same-sex marriage, acceptance of homosexual individuals, abortion, sex education, etc.). The present study seeks to extend the findings related to disgust beyond issues of purity and sexuality to other issues where there is a divide between conservatives and liberals – namely, climate change. If the previously demonstrated effect of disgust also influences political attitudes toward climate change, then those who are reminded of physical cleansing will respond more conservatively. In order to understand if this effect occurs, first one must recognize what responding more conservatively to issues of climate change would look like.

In regards to climate change, specifically, conservatives are more likely to be skeptical of the scientific consensus regarding anthropogenic climate change, and are less likely to support climate change mitigation policies and efforts (Dunlap & McCright, 2008; Marquart-Pyatt, McCright, Dietz, & Dunlap, 2014; McCright & Dunlap, 2003, 2011; Ziegler, 2017). For example, Feinberg and Willer (2013) report that liberals tend to position themselves as “guardians of the environment” whereas conservatives generally “oppose reforms intended to protect the environment” (p. 56). Their results indicate that getting conservatives to view the environment in terms of purity (a moral value more likely to be held by conservatives) lead conservatives to share liberals’ pro-environmental attitudes. Thus, liberals’ have stronger pro-environmental attitudes because liberals, but not conservatives, view the environment in moral terms (p. 58; see also Wolsko, Ariceaga, & Seiden, 2016). With this being said, it is important to note that from a historical perspective, both conservatives’ positions regarding the environment and the definition of conservatism is very fluid, and the descriptions mentioned above only appeared after 1980. What we now

think of as “conservative” views of the environment is a product of shifts in the last 37 years, based on other (non-environmental) factors.

Research has also shown that compared to liberals, conservatives are less receptive to change, less open to experience, and are “more closed, fixed and certain in their views” (Mooney, 2012, p. 10; see also; Murray & Schaller, 2016; Schaller & Murray, 2008). Moreover, conservatives strive to maintain traditions and preserve the status quo, while according to a study by Koch, Imhoff, Dotsch, Unkelbach, and Alves (2016) the general public agrees that liberals strive to “overcome traditions” and change the present circumstances (p. 682). A potential explanation for this divergence is that conservatives have a stronger/more active BIS (Terrizzi, Shook, & McDaniel, 2013; see also Inbar, Pizarro, Iyer, & Haidt, 2012; Terrizzi, Shook, & Ventis, 2010). Conservatives don’t want things to change (so they remain ‘good’); liberals actively try to make things better through change. However, when reminded of physical cleansing, liberals are reminded of germs and disgust, thus making them feel threatened and less open to change. While they still may want to make things better, they tend to no longer want to gamble with the risks associated with change.

Eliciting disgust, and thereby activating the BIS, should have the effect of making the person feel insecure, unsafe, and possibly even threatened. In this state, the individual is more closed in his or her views and less open/flexible (in order to defend the individual from harm). Thus, when faced with the possibility of frightening, globally-relevant, and potentially life threatening situations caused by change (e.g., global climate change), the individual is more likely to deny/not accept the truth/reality of the change. As a consequence, the cost of a strong BIS is that potentially viable options to mitigate climate change could be avoided due to fear of harm (Terrizzi et al., 2013).

There is a global scientific consensus that climate change and global warming are real and are caused by human actions (Cook et al., 2016). However, there are still a minuscule percentage of scientists, and a larger portion of the general population that deny this frightening reality. The effects of climate change will threaten millions of lives, let alone resources, and have already begun to cause and escalate environmental, political, and social tensions. Considering the factors previously discussed, it is not surprising that the majority of climate change-deniers are conservatives (Dunlap & McCright, 2008; Marquart-Pyatt et al., 2014; McCright & Dunlap, 2003, 2011; Ziegler, 2017). In a nationally representative survey, it was found that “only about 18 percent of Republicans and Tea Party members accepted the scientific consensus that global warming is caused by humans” (Mooney, 2012, pp. 6-7). As Mooney states, “Conservatism, after all, means nothing if not supporting political and social stability and resisting change” (p. 11).

The current study consists of two experiments that replicate the methodology of Helzer and Pizarro’s (2011) study that provides evidence for reminders of physical cleansing as leading to shifts in political ideology. In both experiments we hypothesized that participants in the experimental condition (i.e., in the presence of a hand sanitizer dispenser) would respond more conservatively to the political ideology questions and to the climate change attitude questions than would participants in the control condition. Stated more explicitly, it is hypothesized that reminders of physical cleansing lead to a more politically conservative orientation, which leads to less urgent attitudes regarding climate change.

Experiment 1

Method

Participants. Seventy-one Salisbury University (SU) students (18 years or older; $M_{\text{age}} = 20.73$, $SD = 1.77$) participated in the study; 38 were females (53.5%), 32 were males (45.1%), and one was otherwise identified (1.4%). There were four freshmen (5.6%), 14 sophomores (19.7%), 21 juniors (29.6%), 31 seniors (43.7%), and one graduate student (1.4%). The most common majors were psychology (16.9%), biology (14.1%), communication arts (8.5%), political science (8.5%), and nursing (5.6%). Some participants did not report a minor (45.1%), but of those who did, psychology (7%), communication arts (4.2%), chemistry (4.2%), and art (4.2%) were the most common. Thirty-eight participants were randomly assigned to the control condition and 33 participants were randomly assigned to the experimental condition. There were no rewards used to encourage individuals to participate.

Materials. A mobile Purell hand sanitizer dispenser (PURELL [2720-01] TFX Touch Free Hand Sanitizer Dispenser, Dove Gray), floor stand (PURELL [2424-DS] TFX White Touch Free Floor Stand), and hand sanitizer (PURELL [5456-04] Advanced TFX Gel Instant Hand Sanitizer, 1200mL) served as the reminder of physical cleansing for the experiment.

Understanding attitudes toward world issues survey. The scales and questions used to measure attitudes in the survey all come from previously published and validated measures (with the exception of a single question measuring state disgust, which was written for this study). Attitudes towards climate change urgency (on a scale ranging from 5 (Strongly Agree) to 1 (Strongly Disagree)) were measured with a six-item scale developed as part of

the “Attitudes towards Climate Change and Science Instrument” (ACSI; Dijkstra & Goedhart, 2012). The ACSI questionnaire was also used to measure pro-environmental behaviors (eight items), and attitudes toward societal implications of science (seven items). Knowledge of climate change was assessed using an eight-item measure adapted from a study conducted by the Yale Project on Climate Change Communication (Leiserowitz, Smith, & Marlon, 2010).

Political attitudes in the moral, social, and fiscal domains (on a scale “ranging from 1 (*extremely conservative*) to 7 (*extremely liberal*)”) were measured using the same questions used by Helzer and Pizarro (2011, p. 518). Disgust sensitivity was assessed using the “Disgust Scale-Revised” (DS-R; Olatunji et al., 2007), “a widely used self-report measure that asks respondents to rate how disgusting they would find specific statements, and their agreement with disgust-relevant statements” (Inbar & Pizarro, 2016, p. 367). Demographic information was also collected (age, gender, year in school, major, double major, and minor). Awareness of the hand sanitizer dispenser was measured with a manipulation check on a scale of 0 to 5; responses of 0, 1, and 2 were considered to be unaware, and responses of 3, 4, and 5 were considered to be aware.

Procedure. Replicating Helzer and Pizarro’s (2011) methodology, the researcher placed the mobile hand sanitizer unit approximately 15 feet inside each building’s main entrance doors prior to beginning the experiment. Just as in Helzer and Pizarro’s study, there was nothing of note at the opposite (parallel) side of the hallway. The researcher asked every fifth individual that entered through the main doors if he or she was willing to complete a 10-minute survey about demographics and world issues, and confirmed he or she was an SU

student and was 18 years or older. If participants agreed to potentially participate, they were given an informed consent form.

After reading the form and tacitly consenting to participate, those in the experimental condition were asked to “step over to the hand sanitizer dispenser to complete the questionnaire.” Those in the control condition were asked to “step over to the wall to complete the questionnaire”, while the experimenter gestured toward the empty side of the hallway. Consistent with the prior study (Helzer & Pizarro, 2011), participants were either placed in the control or experimental condition based on the time they were entering the building (e.g., participants who entered the building during the first hour of data collection were placed in the control condition; those who entered during the second hour were placed in the experimental condition, etc.). The orders of conditions for each round of data collection were randomly assigned (by a coin flip). The researcher then gave the participant a clipboard with a survey and a pen, instructing the participant, “please don’t put your name anywhere on it [the survey], as this is completely anonymous.” After completing the survey, all of the participants placed their responses in an envelope and received a full debriefing on a separate sheet of paper. Before leaving, the participants were thanked for their time and were also asked not to share the details of the study with anyone, as data collection was ongoing. Only one participant completed the survey at a time. After the participant was debriefed, or if he or she declined to participate, the researcher began to count to the next fifth person entering the building. As the previous participant had already left the area before the next one arrived, anonymity was maintained.

Data was collected in every major academic building on SU’s campus (Holloway Hall, Henson Science Hall, Perdue Hall, Guerrieri Academic Commons [GAC], Conway

Hall [TETC], Fulton Hall, and Devilbiss Hall) in order to ensure a representative sample of the student population was gathered. Each condition was run multiple times each day (in each academic building), with the order of the conditions being randomly determined and counter balanced across sessions. We began to count the individuals entering each building at five minutes after the hour and stopped 20 minutes before the hour. For example, we would begin counting individuals entering the building at 2:05pm, and we would stop at 2:40pm. Because we were collecting data in academic buildings, the majority of students entering and/or exiting each building were likely traveling to and from classes. We began five minutes after the hour to avoid those who were running late for class, and due to the duration of the survey, we stopped 20 minutes before the hour to ensure we would not cause any participants to be late for classes.

Results and Discussion

The urgency questionnaire ($\alpha = .90$), pro-environmental behaviors questionnaire ($\alpha = .74$), science questionnaire ($\alpha = .88$), and DS-R questionnaire ($\alpha = .87$) all demonstrated adequate reliability; however, the knowledge of climate change questionnaire ($\alpha = .34$) did not demonstrate adequate reliability. Participants' rating for the three political orientation items positively and significantly correlated, so the scores were averaged into one index, Cronbach's $\alpha = .79$. Contrary to the hypotheses, participants who reported their political attitudes in the presence of the hand sanitizer dispenser did not report significantly different political orientations ($M = 4.67$, $SD = 1.29$, $n = 33$), than did participants in the control condition ($M = 4.62$, $SD = 1.48$, $n = 36$), $t(67) = -0.11$, ns. An independent-samples t test was calculated comparing the mean urgency of climate change score of participants in the experimental condition ($M = 4.14$, $SD = 0.71$, $n = 33$) to those in the control condition ($M =$

3.92, $SD = 0.78$, $n = 38$). No significant difference was found ($t(69) = -1.29$, ns). The manipulation check at the end of the survey confirmed that participants in the control condition were unaware of the hand sanitizer dispenser ($M = 2.18$, $SD = 2.29$, $n = 38$), and that experimental participants were aware of its presence ($M = 3.76$, $SD = 1.70$, $n = 33$), $t(67.43) = -3.32$, $p = .001$.

The mean pro-environmental behaviors score of those in the experimental condition ($M = 3.56$, $SD = 0.59$, $n = 33$) was not significantly different from the mean pro-environmental behaviors score of those in the control condition ($M = 3.64$, $SD = 0.57$, $n = 38$), $t(69) = 0.61$, ns. The mean science score of those in the experimental condition ($M = 4.18$, $SD = 0.63$, $n = 33$) was not significantly different from the mean science score of those in the control condition ($M = 4.11$, $SD = 0.65$, $n = 38$), $t(69) = -0.50$, ns. The mean disgust sensitivity score of those in the experimental condition ($M = 57.75$, $SD = 15.56$, $n = 32$) was not significantly different from the mean disgust sensitivity score of those in the control condition ($M = 53.76$, $SD = 17.42$, $n = 38$), $t(68) = -1.01$, ns.

Because the relationship between reminders of physical cleansing and political conservatism was not supported, it is not surprising that there was also no demonstrated relationship between reminders of physical cleansing and less urgent attitudes toward climate change. Although we found no evidence to suggest that reminders of physical cleansing make people respond more conservatively or have less urgent attitudes toward climate change, our null results may have related to an overestimation of the duration of the effect. Thus, in Experiment 2, we assessed political ideology in a manner more consistent with Helzer and Pizarro's (2011) study.

Experiment 2

In another attempt to replicate Helzer and Pizarro's (2011) study and further assess potential changes in climate change urgency attitudes, a few modifications were made to the procedure and survey that was used in Experiment 1.

Method

Participants. Eighty-six SU students (18 years or older; $M_{age} = 19.49$, $SD = 2.84$) participated in the study; 54 were females (62.8%) and 32 were males (37.2%). There were 39 freshmen (45.3%), 23 sophomores (26.7%), 14 juniors (16.3%), and 10 seniors (11.6%). The most common majors were biology (10.5%), nursing (9.3%), psychology (7%), exercise science (7%), and communication arts (5.8%). It is also worth noting that 3.5% of participants majored in environmental studies. The majority of participants did not report a minor (57%), but of those who did, Spanish (5.8%) and psychology (5.8%) were the most common. Forty-five participants were randomly assigned to the control condition and 41 participants were randomly assigned to the experimental condition. There were no rewards used to encourage individuals to participate.

Materials. This experiment used the same hand sanitizer unit (touch-free hand sanitizer dispenser and floor stand) described in Experiment 1.

Understanding attitudes toward world issues survey. The survey used in Experiment 1 was shortened and a few items were reordered for this experiment. In keeping with Helzer and Pizarro's (2011) experiment, participants identified their "political attitudes in the moral, social, and fiscal domains on a scale ranging from 1 (*extremely conservative*) to 7 (*extremely liberal*)" (p. 518). Attitudes towards climate change urgency were measured with a six-item scale developed as part of the ACSI (Dijkstra & Goedhart, 2012). Demographic information

was also collected (age, gender, year in school, major, double major, and minor) to gather demographic information, as well as a manipulation check that was modified from Experiment 1 (in attempt to improve the confusion anecdotally reported to the researcher) that participants in the first study experienced. It was reworded into a statement (as opposed to a question) and the response scale was written out.

Procedure. Data was collected in SU's academic library (GAC), as opposed to a single specialized academic building, in order to ensure a representative sample of the student population was gathered. Each condition was run multiple times for three days, with the order of the conditions being randomly determined and counter balanced across sessions. The mobile hand sanitizer unit was placed in the same location as in Experiment 1 (approximately 15 feet inside GAC's main entrance). The researcher asked every fifth individual that entered through the main doors if he or she was willing to complete a two-minute survey (as compared to a 10-minute survey in Experiment 1) about demographics and world issues, and confirmed he or she was an SU student and was 18 years or older. Those in the experimental condition were asked to "step over to the hand sanitizer dispenser to complete the questionnaire," and the researcher then used the hand sanitizer unit as the participants were beginning the survey. The procedure was otherwise the same as in Experiment 1.

Results and Discussion

Participants' rating for the three political orientation items positively and significantly correlated, so we averaged them into one index, Cronbach's $\alpha = .80$. An independent-samples t test was calculated comparing the mean urgency score of participants in the experimental condition ($M = 4.07$, $SD = 0.81$, $n = 41$) to those in the control condition ($M =$

4.02, $SD = 0.71$, $n = 45$). No significant difference was found ($t(84) = -0.26$, ns). As in Experiment 1, participants who reported their political attitudes in the presence of the hand sanitizer dispenser did not report significantly different political orientations ($M = 4.75$, $SD = 1.33$, $n = 39$) than did participants in the control condition ($M = 4.51$, $SD = 1.30$, $n = 45$), $t(82) = -0.84$, ns. The manipulation check at the end of the survey confirmed that participants in the control condition were unaware of the hand sanitizer dispenser ($M = 1.91$, $SD = 1.66$, $n = 45$), and that experimental participants were aware of its presence ($M = 3.34$, $SD = 1.61$, $n = 41$), $t(84) = -4.05$, $p < .001$.

In Experiment 2, we built upon Experiment 1 by altering the survey to first measure political ideology, followed by a measure of attitudes towards the urgency of climate change of conservatism. Additionally, the experimenter operated the hand sanitizer unit in the experimental condition to ensure the participants (in the experimental condition) were aware of the unit. It is interesting to note that some participants in the experimental condition still reported being “unaware” of the hand sanitizer unit (9 participants, 22%). We still found no relationship between reminders of physical cleansing and political conservatism. Further, we again demonstrated that political conservatism does not appear to relate to less urgent attitudes toward climate change or general disgust sensitivity in the context of reminders of physical cleansing.

General Discussion

Using moral, social, and fiscal domains as a measure of political orientation, we twice found no evidence to support our hypothesis. Results were consistent across samples. These results cast doubt on the hypothesis that reminders of physical cleansing produce the same effect (shift towards political conservatism) as eliciting the emotion of disgust, and they

clarify the lack of a relationship between attitudes toward the urgency of climate change and conservatism as a function of being reminded of physical cleansing. While the populations' original political orientation was not the same (Helzer & Pizarro: Control $M = 4.93$; current experiments: Control $M = 4.57$ [Experiment 1: $M = 4.62$, Experiment 2: $M = 4.51$]), if the relationship between reminders of physical cleansing and conservatism truly exists, we should still see an equivalent, or at the very least, a similar shift towards conservatism. However, Helzer and Pizarro demonstrated a significant shift towards conservatism (Experimental $M = 4.30$), but the current studies actually found a slight shift toward liberalism (current experiments: Experimental $M = 4.71$). Even though neither shift was statistically significant (Experiment 1: $M = 4.67$, Experiment 2: $M = 4.75$), it is still important to note that not only did the current studies not support the existence of the relationship, but it actually showed movement in the opposite direction.

There are multiple possible explanations for the differences between our results and the findings of Helzer and Pizarro (2011). First, our measures of political orientation may not have accurately gauged political conservatism; however, we find this unlikely because Helzer and Pizarro used the same measures of political ideology. Second, our experiments may not have had a big enough sample size to find the relationship, with the effect size based on the meta-analysis discussed earlier (Inbar & Pizarro, 2016; Terrizzi et al., 2013), but this is also unlikely considering that Helzer and Pizarro (2011) had an even smaller sample size than the current experiments and still found evidence to support this relationship. Third, a Type II error may have been committed in the current study, or a Type I error may have been committed in Helzer and Pizarro's study; as follows, it is possible that their initial study

overestimated the relationship between reminders of physical cleansing (the presence of hand sanitizer) and political conservatism.

It may also be important to note that Helzer and Pizarro conducted their study in 2010-2011, while the current study was conducted in 2017. As hand sanitizer units have become increasingly popular, especially on college campuses where the spread of viruses like the flu is rapid, it is possible that the impact may have diminished. If one hardly sees a hand sanitizer unit, it may be processed at a different level than if one sees them all the time. It is also possible that given the current political climate, individuals have become more 'set in their views', and thus less susceptible to change. This is disputed by Inbar, Pizarro, Iyer, and Haidt (2012) in an international study showed the relationship between disgust sensitivity and political orientation remained significant across national borders (p. 542); however, it is important to note that Inbar et al. (2012) conducted their study prior to the 2016 political environment. Another possibility is that climate change is not a personal issue, being too general and non-specific for people to worry about it, thus possibly explaining why the hypothesized effect on climate change attitudes was not found. However, this does not explain why the current study was unable to replicate the conservative shift demonstrated in Helzer and Pizarro's (2011) study.

Moreover, it is possible that there is a relationship between reminders of physical cleansing and disgust, but only for specific populations. Between the current studies' population and Helzer and Pizarro's (2011) population, there is only one major difference readily apparent. While each of the studies in question utilize undergraduate students as participants, the target population in Helzer and Pizarro's study is of a higher socioeconomic status than those in the current studies' target population. People of a higher socioeconomic

status tend to be more conservative (Mooney, 2012, p. 66). One can assume that the parents of the students (at Cornell University and SU) instilled their political views in their children. When individuals enter college, however, they begin to form their own political ideology. Yet, when reminded of physical cleansing, students have a “subconscious negative (or ‘affective’) response”, which “guides the type of memories and associations that are called into the conscious mind based on a network of emotionally laden associations and concepts” (Mooney, 2012, p. 32). Thus, they “retrieve thoughts that are consistent with their previous beliefs,” and revert back to their original political orientation, as instilled by their parents. The students in Helzer and Pizarro’s (2011) study thus reverted back to their original conservative political leanings, while the students in the current study reverted back to their original (less conservative) liberal political leanings. Another possibility is that because Cornell University is generally a more liberal campus than Salisbury University, they are able to demonstrate a larger shift than a campus starting out as initially more conservative, similar to the law of initial values and the ceiling effect.

This study draws attention to the importance of future research to examine the role of differences in populations in the influence of reminders of physical cleansing on political orientation. Future research is also needed to study if knowledge of the phenomenon alters its effects. In addition, it would be interesting to examine whether there exists an emotion/stimulus that causes a more liberal response (a shift to the left of the political ideology scale). Moreover, given that the link between feeling the emotion of disgust and a shift towards conservatism is strongly supported across various studies, it would be interesting to research how inducing feelings of disgust affects climate change attitudes and conservatism (as opposed to reminders of physical cleansing which gets to disgust in a

roundabout kind of way). Because the link between disgust and political orientation has been repeatedly demonstrated in numerous studies, it might follow that reminders of physical cleansing are simply not enough to elicit the shift in political orientation; however, if one is to elicit disgust instead of reminders of physical cleansing, the hypotheses for the current studies may be supported.

References

- Cook, J., Oreskes, N., Doran, P. T., Anderegg, W. R. L., Verheggen, B., Maibach, E. W., ...
Rice, K. (2016). Consensus on consensus: A synthesis of consensus estimates on
human-caused global warming. *Environmental Research Letters*, 11(4).
doi:10.1088/1748-9326/11/4/048002
- Curtis, V., de Barra, M., & Aunger, R. (2011). Disgust as an adaptive system for disease
avoidance behaviour. *Philosophical Transactions of the Royal Society of London.
Series B, Biological Sciences*, 366(1563), 389-401.
- Dijkstra, E. M., & Goedhart, M. J. (2012). Development and validation of the ACSI:
Measuring students' science attitudes, pro-environmental behaviour, climate change
attitudes and knowledge. *Environmental Education Research*, 18(6), 733-749.
doi:10.1080/13504622.2012.662213
- Dunlap, R. E., & McCright, A. M. (2008). A widening gap: Republican and democratic
views on climate change. *Environment*, 50(5), 26-35.
- Faulkner, J., Schaller, M., Park, J. H., & Duncan, L. A. (2004). Evolved disease-avoidance
mechanisms and contemporary xenophobic attitudes. *Group Processes and
Intergroup Relations*, 7(4), 333-353. doi:10.1177/1368430204046142
- Feinberg, M., & Willer, R. (2013). The moral roots of environmental attitudes. *Psychological
Science*, 24(1), 56-62. doi:10.1177/0956797612449177
- Feinberg, M., Antonenko, O., Willer, R., Horberg, E., & John, O. P. (2014). Gut check:
Reappraisal of disgust helps explain liberal-conservative differences on issues of
purity. *Emotion*, 14(3), 513-521. doi:10.1037/a0033727

- Haidt, J., McCauley, C., & Rozin, P. (1994). Individual differences in sensitivity to disgust: A scale sampling seven domains of disgust elicitors. *Personality and Individual Differences*, 16(5), 701-713. doi:10.1016/0191-8869(94)90212-7
- Helzer, E. G., & Pizarro, D. A. (2011). Dirty liberals! Reminders of physical cleanliness influence moral and political attitudes. *Psychological Science*, 22(4), 517-522. doi:10.1177/0956797611402514
- Hodson, G., & Costello, K. (2007). Interpersonal disgust, ideological orientations, and dehumanization as predictors of intergroup attitudes. *Psychological Science*, 18(8), 691–698. doi:10.1111/j.1467-9280.2007.01962.x
- Inbar, Y., & Pizarro, D. A. (2016). Pathogens and politics: Current research and new questions. *Social and Personality Psychology Compass*, 10(6), 365-374. doi:10.1111/spc3.12250
- Inbar, Y., Pizarro, D. A., & Bloom, P. (2009). Conservatives are more easily disgusted than liberals. *Cognition and Emotion*, 23(4), 714-725.
- Inbar, Y., Pizarro, D. A., & Bloom, P. (2012). Disgusting smells cause decreased liking of gay men. *Emotion*, 12(1), 23-27. doi:10.1037/a0023984
- Inbar, Y., Pizarro, D. A., Iyer, R., & Haidt, J. (2012). Disgust sensitivity, political conservatism, and voting. *Social Psychology and Personality Science*, 3(5), 537-544. doi:10.1177/1948550611429024
- Inbar, Y., Pizarro, D. A., Knobe, J., & Bloom, P. (2009). Disgust sensitivity predicts intuitive disapproval of gays. *Emotion*, 9(3), 435–439. doi:10.1037/a0015960
- Koch, A., Imhoff, R., Dotsch, R., Unkelbach, C., & Alves, H. (2016). The ABC of stereotypes about groups: Agency/socioeconomic success, conservative-progressive

beliefs, and communion. *Journal of Personality and Social Psychology*, 110(5), 675-709.

Leiserowitz, A. A., Smith, N., & Marlon, J. R. (2010). *Americans' knowledge of climate change*. Yale University. New Haven, CT: Yale Project on Climate Change Communication.

<http://environment.yale.edu/climate/files/ClimateChangeKnowledge2010.pdf>

Marquart-Pyatt, S. T., McCright, A. M., Dietz, T., & Dunlap, R. E. (2014). Politics eclipses climate extremes for climate change perceptions. *Global Environmental Change*, 29, 246-257. doi:10.1016/j.gloenvcha.2014.10.004

McCright, A. M., & Dunlap, R. E. (2003). Defeating Kyoto: The conservative movement's impact on U.S. climate change policy. *Social Problems*, 50(3), 348-373. doi:10.1525/sp.2003.50.3.348

McCright, A. M., & Dunlap, R. E. (2011). Cool dudes: The denial of climate change among conservative white males in the United States. *Global Environmental Change*, 21(4), 1163-1172. doi:10.1016/j.gloenvcha.2011.06.003

Mooney, C. (2012). *The Republican brain: The science of why they deny science - and reality*. Hoboken, NJ: Wiley.

Murray, D. R., & Schaller, M. (2016). The behavioral immune system: Implications for social cognition, social interaction, and social influence. *Advances in Experimental Social Psychology*, 53, 75-129. doi:10.1016/bs.aesp.2015.09.002

Oaten, M., Stevenson, R. J., & Case, T. I. (2009). Disgust as a disease avoidance mechanism. *Psychological Bulletin*, 135(2), 303-321. doi:10.1037/a0014823

- Olatunji, B. O., Williams, N. L., Tolin, D. F., Sawchuk, C. N., Abramowitz, J. S., Lohr, J. M., & Elwood, L. (2007). The disgust scale: Item analysis, factor structure, and suggestions for refinement. *Psychological Assessment, 19*(3), 281–297.
doi:10.1037/1040-3590.19.3.281
- Pizarro, D. A., & Inbar, Y. (2015). Explaining the influence of disgust on political judgment: A disease-avoidance account. In J. P. Forgas, K. Fiedler, & W. D. Crano (Eds.), *Social psychology and politics* (pp. 163-172). New York, NY: Psychology Press.
- Schaller, M., & Duncan, L. A. (2007). The behavioral immune system: Its evolution and social psychological implications. In J. P. Forgas, M. G. Haselton, & W. von Hippel (Eds.), *Evolution and the social mind: Evolutionary psychology and social cognition* (pp. 293-307). New York, NY: Psychology Press.
- Schaller, M., & Murray, D. R. (2008). Pathogens, personality, and culture: Disease prevalence predicts worldwide variability in sociosexuality, extraversion, and openness to experience. *Journal of Personality and Social Psychology, 95*(1), 212–221. doi:10.1037/0022-3514.95.1.212
- Schaller, M., & Park, J. H. (2011). The behavioral immune system (and why it matters). *Current Directions in Psychological Science, 20*(2), 99-103.
doi:10.1177/0963721411402596
- Smith, K. B., Oxley, D., Hibbing, M. V., Alford, J. R., & Hibbing, J. R. (2011). Disgust sensitivity and the neurophysiology of left-right political orientations. *PLOS One, 6*(10), e25552. doi:10.1371/journal.pone.0025552

- Susskind, J. M., Lee, D. H., Cusi, A., Feiman, R., Grabski, W., & Anderson, A. K. (2008). Expressing fear enhances sensory acquisition. *Nature Neuroscience*, *11*(7), 843–850. doi:10.1038/nn.2138
- Terrizzi, J. A., Shook, N. J., & McDaniel, M. A. (2013). The behavioral immune system and social conservatism: A meta-analysis. *Evolution and Human Behavior*, *34*(2), 99–108. doi:10.1016/j.evolhumbehav.2012.10.003
- Terrizzi, J. A., Shook, N. J., & Ventis, W. L. (2010). Disgust: A predictor of social conservatism and prejudicial attitudes toward homosexuals. *Personality and Individual Differences*, *49*(6), 587–592. doi:10.1016/j.paid.2010.05.024
- Tybur, J. M., Lieberman, D., & Griskevicius, V. (2009). Microbes, mating, and morality: Individual differences in three functional domains of disgust. *Journal of Personality and Social Psychology*, *97*(1), 103–122. doi:10.1037/a0015474
- Tybur, J. M., Merriman, L. A., Caldwell, A. E., McDonald, M. M., & Navarrete, C. D. (2010). Extending the behavioral immune system to political psychology: Are political conservatism and disgust sensitivity really related? *Evolutionary Psychology*, *8*(4), 599–616. doi:10.1177/147470491000800406
- Wolsko, C., Ariceaga, H., & Seiden, J. (2016). Red, white, and blue enough to be green: Effects of moral framing on climate change attitudes and conservation behaviors. *Journal of Experimental Social Psychology*, *65*, 7–19. doi:10.1016/j.jesp.2016.02.005
- Ziegler, A. (2017). Political orientation, environmental values, and climate change beliefs and attitudes: An empirical cross country analysis. *Energy Economics*, *63*, 144–153. doi:10.1016/j.eneco.2017.01.022