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Disgust: An Emotional Component of Conservative
Attitudes toward Transgender Individuals

A thesis submitted in partial fulfillment of the requirement
for the degree of Bachelor of Arts in Government from
The College of William and Mary

by

John Stuart

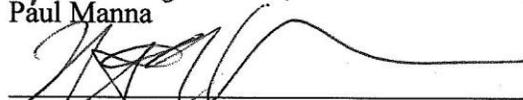
Accepted for Honors



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Williamsburg, VA
May 3, 2016

Abstract

Though disgust is one of the most basic of human feelings, recent research (Schaich Borg, Lieberman, and Kiehl, 2008; Tybur, Lieberman, and Griskevicius, 2009) has provided new insights into the cognition of this emotion. The present work incorporates these new findings as it examines the political implications of different types of disgust motivated by evolutionary pressures to avoid pathogens, enhance reproductive success, and deter freeloading social behavior. Prior research has linked political conservatism, opposition to gay marriage, and disgust sensitivity (Smith et al. 2011). However, the role disgust plays in political attitudes toward transgender individuals has not been investigated previously. My research shows that the role of disgust in political conservatism pertains not just to matters of sexual orientation, but gender identity as well. Using an undergraduate sample, the present study finds a gendered relationship, wherein females (but not males) with higher self-reported sexual disgust sensitivity and those with greater physiological reactivity to a sexually disgusting stimulus have greater transphobia and anti-transgender positions on legislation that affects transgender individuals. Skin conductance levels (SCLs) served as the physiological indicator of psychological arousal when various types of disgust were induced by means of video clips.

Literature Review

Self-report disgust measurement

Theorization on the nature of disgust as a human emotion goes back at least as far as Darwin (1872). Widely recognized as one of the most elemental human emotions (Rozin, Haidt, and McCauley, 2000), the aversive nature of disgust has received extensive theorization, especially by Rozin and colleagues (Haidt, McCauley, and Rozin, 1994; Haidt, Rozin, McCauley, and Imada, 1997; Rozin and Fallon, 1987; Rozin, Haidt, and McCauley, 2000; Rozin, Lowery, and Ebert, 1994; Rozin, Millman, and Nemeroff, 1986). The Disgust Scale (Haidt, et al., 1994) queries sensitivity on eight separate domains of disgust, utilizing a mixture of true-false and three-point disgust rating categories to capture responses to survey items. Though positing an evolutionary basis for the avoidance of microbial contamination for some of the most basic categories, Haidt et al.'s (1994) theorization for the DS expands beyond this to include a

conception of disgust as a defensive emotion deterring humans from reminders of their mortality and animalistic origins.

This school of thought underwent further refinements, with Rozin et al. (2000) grouping the eight domains of disgust into four overall groups. More abstract forms of disgust not concretely related to microbial contamination were thought to be "in the service of protecting the soul" (Rozin et al., 2000, p. 637). Olatunji et al. (2007) subsequently suggested methodological refinements to the DS which eliminated seven scale items and reduced the number of domains to three: core disgust, animal-reminder disgust, and contamination disgust. The modifications from Olatunji et al. (2007) resulted in what is referred to as the Disgust Scale-Revised (DS-R).

More recent research has called into question both theoretical and methodological aspects of the DS and DS-R. Functional magnetic resonance imaging research suggests that the emotion of disgust instead partitions neurologically into three separate but related domains: pathogen, sexual, and non-sexual moral disgust (Schaich Borg, Lieberman, and Kiehl 2008). Tybur et al. (2009) subsequently developed the Three Domain Disgust Scale (TDDS) as an instrument of self-report disgust sensitivity measurement that built upon the findings of Schaich Borg et al. (2008). Theoretical justification for the TDDS posits that evolutionary adaptationist pressures led to an aversion to disease-causing organisms (pathogen disgust), sexual activity negatively affecting likelihood of reproductive success (sexual disgust), and free-loading actions that drain the resources of a social group (moral disgust; Tybur et al. 2013).

Methodological issues compromise the DS (and the DS-R), though, due to the inclusion of true-false items to measure disgust sensitivity in individuals will more limited semantic conceptions of the emotion. This format may lead to the measurement of aversive emotions that

are not specifically disgust, though, especially for the animal-remainder domain of the DS and DS-R as noted by Tybur et al. (2009):

[M]any items ask participants to indicate the extent to which they agree or disagree with statements that can be characterized as creepy and uncanny (e.g., “I would go out of my way to avoid walking through a graveyard”; “it would bother me to sleep in a nice hotel room if I knew that a man had died of a heart attack in that room the night before”; “it would not upset me at all to watch a person with a glass eye take the eye out of the socket”; “it would bother me to be in a science class, and to see a human hand preserved in a jar”; “it would bother me tremendously to touch a dead body”). (p. 110)

These methodological issues therefore call into question the validity of past research on disgust and disgust sensitivity that make use of the DS and DS-R.

Of particular note for self-reported disgust sensitivity is the tendency for females to report higher levels of disgust sensitivity on average than males, across disgust sensitivity scales (Haidt et al., 1994; Olatunji et al., 2007, Tybur et al., 2009). This pattern holds overall for the TDSS; however, it is not uniform. Though still present for pathogen and moral disgust, higher female disgust sensitivity is most pronounced for sexual disgust (Tybur et al., 2009; Tybur et al., 2011). These differences are hypothesized to be due to women having "higher biological costs (e.g., time and energy costs, sexually transmitted disease risks, pregnancy risks) than men for making sexual 'mistakes'" (Tybur et al., 2009, p. 110). This may have implications for other social attitudes, with Tybur, Frankenhuis, and Pollet (2014) arguing that these higher reproductive costs help explain female tendencies to report both higher sexual sensitivity and higher levels of collectivism and religiosity than men as reported by Terrizzi, Clay, and Shook (2014).

Disgust and political attitudes

Indeed, a growing body of literature has connected greater disgust sensitivity with more politically conservative attitudes. Inbar, Pizarro, and Bloom (2009) used variations on the DS to find a relationship between self-reported conservatism and disgust sensitivity, especially on issues relating to purity such as abortion and gay marriage. Subsequent work found a relationship between greater disgust sensitivity (DS-R) and more conservative voting, as well as a cross-cultural relationship in the same direction between disgust sensitivity and self-identified political conservatism (Inbar et al., 2012). Terrizzi, Shook, and Ventis (2010) also found greater disgust sensitivity (DS) to correlate with gay marriage opposition, as well as greater homophobia. Smith et al. (2011) likewise used the DS-R to find the same pattern when examining gay marriage opposition and disgust sensitivity. Additionally, experimental work has provided evidence for a causal relationship wherein the induction of disgust leads to more negative social and political attitudes toward gay men and lesbians (Adams, Stewart, and Blanchard 2014; Cunningham, Forestell, and Dickter 2013; Inbar, Pizarro, and Bloom 2012; Terrizzi et al. 2010).

Re-examining the relationship between disgust sensitivity and political conservatism using the TDDS, Tybur et al. (2010) failed to find a relationship between the domain of pathogen disgust, which the DS and DS-R broadly tap, and conservatism. Instead of pathogen disgust it was greater *sexual* disgust sensitivity that correlated with more conservatism on both politically and on various social attitude scales such as Right Wing Authoritarianism (Altemeyer, 1988), Social Dominance Orientation (Pratto, Sidanius, Stallworth, and Malle, 1994), and Religious Fundamentalism (Altemeyer and Hunsberger, 1992).

Political psychophysiology

The study of political psychology has increasingly incorporated physiological measurements as an indicator of psychological activation in the study of political attitudes. Given the fallibility of self-report measures (Nisbett and Wilson, 1977), various physiological indicators known to index psychological activation provide a useful, alternate means of investigating emotional arousal, including disgust.¹ For instance, increased sweat gland activation (electrodermal activity, EDA) and stronger blinking action (orbicularis oculi startle blink electromyogram) correlate with increased support for political policies associated with protections of social units (Oxley et al., 2008). EDA responses to disgusting (Aarøe, Peterson, and Arceneaux, 2013) and anxiety-inducing (Renshon, Lee, and Tingley, 2015) stimuli have informed the study of immigration attitudes. Higher EDA response to disgust stimuli have also correlated with political conservatism and gay marriage opposition (Smith et al., 2011).

Studies of political communication have likewise used EDA to measure greater responsiveness to negative, versus neutral or positive, news video content (Mutz and Reeves, 2005; Soroka and McAdams, 2015). Research is also starting to uncover neurological differences between liberals and conservatives (Ahn et al., 2014; Amodio et al., 2007; Kanai et al., 2011; Schreiber et al., 2013). As of yet, political psychophysiology research has yet to incorporate the findings of Schaich Borg et al. (2008) and Tybur et al. (2009), to measure physiological reactions to emotion-inducing stimuli for the separate domains of pathogen, sexual, and moral disgust. The present study seeks to rectify this.

¹ For a review of a variety of physiological measures and their use as psychological indicators of various emotional states, see Kreibig (2010).

Transphobia

Though the field of political psychophysiology research is small, the body of survey-based research on negative attitudes towards transgender² individuals is even smaller. Hill and Willoughby's (2005) Genderism and Transphobia Scale (GTS) represents the first effort to develop a measurement instrument for animosity towards those who engage in non-normative gender expression and identify as transgender. The GTS also seeks to measure tendencies toward verbal harassment and physical assault of transgender and gender non-conforming individuals. The three subscales of the GTS fail to show discriminant validity in factor analysis, which motivated the development of a shorter, validated nine-item self-report transphobia measure by Nagoshi et al. (2008). Items on this latter scale include statements such as "I believe that a person can never change their gender" and "I would be upset, if someone I'd known a long time revealed to me that they used to be another gender" with Likert-type agree-disagree response categories. Methodological weaknesses of the GTS that fail to support the division of the battery into subscales thus give reasons to favor the use of Nagoshi et al.'s (2008) shorter instrument when seeking to measure transphobia. Other investigations of attitudes toward transgender individuals investigate the influence of rigid gender roles beliefs, belief in a biological basis for transgender identity, attitudes towards gays and lesbians, and prior contact with LGBT individuals (Costa and Davies, 2012; Woodford et al., 2012; Norton and Herek, 2013). To the author's knowledge there has been no research to date on the potential interaction between disgust sensitivity and attitudes toward transgender individuals.

² In article, the term "transgender" will be used to refer to individuals who do not identify with the gender assigned to them at birth.

Theory

The proposed adaptationist purpose of sexual disgust suggests that it serves a mechanism for deterring individuals from engaging in behaviors and sexual relationships that negatively impact reproductive success (Schaich Borg et al., 2008; Tybur et al., 2009). Given this evolutionary psychological purpose of sexual disgust, I posit that sexual disgust plays a role in shaping cisgender³ attitudes toward transgender individuals. On a biological level, a transgender woman and a cisgender man (and vice versa) in a heterosexual relationship cannot reproduce by traditional means. As such, I expect that greater levels of sexual disgust will correlate with greater animosity towards transgender individuals. This expectation informs my first hypothesis.

H1: Transphobia will correlate more strongly with sexual disgust measures than with measures of the pathogen and moral disgust.

While I expect this animosity resulting from heightened sexual disgust sensitivity to manifest itself in terms of greater transphobia, I also expect there to be political implications of this relationship.

H2: Greater sexual disgust will translate into increasingly anti-transgender stances on political policies that affect transgender individuals.

Furthermore, I hypothesize this relationship between sexual disgust and anti-transgender attitudes to be gendered. The adaptationist pressures believed to motivate sexual disgust center on the enhancement of reproductive success. In terms of reproduction, cisgender women face higher costs than cisgender men do. The duration of pregnancy and the dangers of childbirth,

³ Those who identify with the gender assigned to them at birth (whereas transgender individuals do not).

especially historically, suggest that women should be more sensitive to sexual disgust and sexual behaviors unlikely to result in successful reproduction (Tybur et al., 2009).

H3: The relationships described in H1 and H2 will be stronger for females than for males.

Methods

Participants

Participants were undergraduates in government (political science) courses who received course credit for their participation. Study participants took an online omnibus survey containing questions for several research projects. For the present study, participants answered questions about their political attitudes, attitudes towards transgender individuals, behavior, and personality, followed by an in-person lab session where their physiological responses (EDA and ECG) were recorded in response to a variety of emotionally stimulating media, including short (20s-40s) video clips and still photos.⁴ A total of 165 participants completed the online survey. Of these, 148 then came in for the in-person lab session. Technical equipment issues resulted in inadmissible EDA data for 29 participants, 1 participant did not identify as male or female, and survey non-response required another 23 participants to be excluded, yielding a final N of 95.

⁴ Both portions of the current study were part of a larger omnibus protocol which collected data for separate studies in both the online survey and lab session portions. The greatest potential source of bias for the current study was the overall lab session protocol, which staggered the physiological data collection in the current study before or after the physiological data collection for a separate study which required conversational dyads. Testing did not reveal any problematic ordering effects. T-tests revealed statistically significant results on only the physiological data for the videos eliciting moral disgust ($p=0.056$) and re-running linear regressions featured in Table 1 changed no findings of statistical significance and no major effects on coefficient size.

Self-report measures

A variety of measures were collected through the online omnibus survey. For H1's dependent variable of transphobia, participants completed Nagoshi et al.'s (2008) nine-item self-report measure ($\alpha = 0.82$). As noted previously, items on the survey scale include statements such as "I believe that a person can never change their gender" and "I would be upset, if someone I'd known a long time revealed to me that they used to be another gender." Response categories were on a 7-point Likert type scale ranging from "completely disagree" to "completely agree." Responses to the scale items were then summed to create an indicator of overall transphobia for each respondent.

Respondents also answered a variety of political policy questions on a range of social issues including embryonic stem cell research, physician assisted suicide, abortion, marijuana legalization, and a variety of policies affecting the LGBT community. The latter included attitudes toward legalization of gay marriage by the Supreme Court, discrimination protections based on sexual orientation and gender identity (queried separately), transgender individuals openly serving in the military, and legislation requiring individuals to use the bathroom of the gender assigned to them at birth, referred to widely as "bathroom bills." Study participants indicated their support or opposition for these measures by means of a 5-point Likert type response categories ranging from "strongly oppose" to "strongly support." Responses to these last three questions pertaining to transgender individuals ($\alpha = 0.76$) were summed to create the second dependent variable, indexing a participant's support, or lack thereof, for political policies affecting transgender individuals. Support for bathroom bills as well as opposition to discrimination protections based on gender identity and open transgender service in the military represent anti-transgender positions on these policies.

The online survey also included the Three Domain Disgust Scale (Tybur, Lieberman, and Griskevicius, 2009) as a measure of self-report disgust sensitivity. This validated 21-item battery partitions into three separate measures of pathogen ($\alpha = 0.84$), sexual ($\alpha = 0.87$), and moral disgust ($\alpha = 0.84$). Response categories ranged from 0 to 6, anchored on each end by "not at all disgusting" and "extremely disgusting," respectively. The scale features seven items for each of the domain. Statements such as "Stepping on dog poop" and "Accidentally touching a person's bloody cut" typified the pathogen disgust domain; the sexual domain statements included "Hearing two strangers having sex" and "watching a pornographic video"; the moral disgust domain featured statements such as "Stealing from a neighbor" and "Forging someone's signature on a legal document." Participant responses were then summed for each disgust domain, yielding separate independent variables for each of the respective disgust domains.

Video stimuli

Given the limitations of self-report measures (Nisbett and Wilson, 1977), physiological measures as an indicator of psychological activation provide a complementary means of investigating the interplay between emotions and political attitudes. To this end, I recorded participants' electrodermal activity (EDA) and electrocardiographic (ECG) activity while they were exposed to a succession of 15 short video clips (duration 20s-40s) each separated by an inter-stimulus interval screen of 20s in length, featuring a white cross on an otherwise black screen. The order of the clips was randomized once and then presented in the same order to all participants. These clips were chosen with the purpose of inducing a variety of emotions in addition to each of the three disgust domains on the TDDS, in keeping with the stimuli selection procedure from past political psychophysiological studies (Oxley et al., 2008; Smith et al., 2011). Additionally, subsequent literature has tied political conservatism to a general negativity bias

(Dodd et al., 2012; Hibbing, Smith, and Alford, 2014). Thus the inclusion of stimuli to induce a wide range of emotions gains greater importance in order to ensure that the relationship between the physiological measures and conservative political attitudes can be isolated to a specific emotion, as opposed to a general conservative tendency towards greater reaction to negatively valenced stimuli.

Previous studies investigating the relationship between psychophysiological reactivity and support for politically conservative policies (as well as general political conservatism) have made use of photos, but not videos, for the purpose of eliciting disgust (Oxley et al., 2008, Smith et al., 2011). Though Smith et al. (2011)'s investigation also focused on disgust sensitivity, the conceptualization of disgust in that study rested on the DS-R paradigm. When instead analyzed in the theoretical framework of the TDDS, the photo stimuli used to elicit disgust in Smith et al. (2011) pertained most closely to pathogen disgust. If attempting to capture the disgust domains of the TDDS with photo stimuli, the domain of sexual disgust would be difficult to trigger without the use of highly graphic images. Use of such images raises ethical concerns and would likely face opposition from institutional review boards. Moreover, validating that psychophysiological arousal was due to disgust would also be difficult. The use of short video clips with non-graphic imagery is therefore an attractive alternative for emotion-inducing stimuli.

The video clips included in the present study were chosen due to their previous use in past emotional elicitation work (Gross and Levenson, 1995; Fredrickson and Branigan, 2005; Schaefer et al., 2010; Soleymani et al., 2012) and/or their topical connection to a relevant disgust domain. Each disgust domain was induced by means of two separate video clips to ensure more robust physiological measurement of the relevant domain. The videos for each of the three domains are discussed here; Appendix A contains a full list of the video clips used in the present study. The

first video clip for pathogen disgust came from BBC One's *Vet Safari* and featured a maggot-infested wound on a wildebeest, in keeping with the domain's theorized function of disease and infection avoidance (Tybur et al, 2009). The second video for eliciting pathogen disgust was taken from the movie *Trainspotting*, wherein the main character searches within a filthy toilet for a lost object.

Theorization on sexual disgust posits its existence as an evolutionary adaptation to encourage the avoidance of behaviors that negatively impact reproduction (Tybur et al., 2009). The video clip used to elicit sexual disgust came from the documentary *Animal Passions*, which dealt with "zoophiles," i.e. those who enjoy the practice of bestiality. The clip shown to participants featured several individuals discussing their affinity for this practice. The inability of bestiality to result in viable human offspring makes it a suitable choice for the elicitation of sexual disgust. The second video clip used to induce sexual disgust was an intended prime for this disgust domain in Smith (2012), though lack of IRB approval for the stimuli precluded its use in that study. The video clip in question was an advertisement for the film *Employee of the Month*, though it did not feature footage from the film. In the ad, an elderly woman passionately kissed a young male grocery store employee after he put her groceries in her car. Given the near-certainty that a woman of such advanced age would have already undergone menopause, the amorous behavior between the two individuals in the video would have no hope of leading to the conception of a child. This in turn provides the conceptual justification for the inclusion of this video as a sexual disgust stimulus.

The final domain of moral disgust censures freeloading behavior that incurs costs on other actors in a social group (Tybur et al., 2009). To this end, the first moral disgust video features news footage covering the mugging of a 101-year-old woman by a much larger, younger

man. The man is seen repeatedly punching the woman before stealing her purse. The second moral disgust clip contains portions of an ABC News interview by Dan Abrams with convicted serial killer Tommy Lynn Sells discussing the latter's crimes. Though far beyond the magnitude of the anti-social actions presented in the moral disgust items of the TDDS, homicide was included as a stimulus in an fMRI study (Schaich Borg, Lieberman, and Kiehl, 2008) which determined the distinct neurological partitioning of the various disgust domains.

Physiological measures

To measure participants' EDA, a pair of Ag/AgCl electrodes were placed on the middle phalanges of the index and ring fingers of participant's non-dominant hands (van Dooren, de Vries, and Janssen, 2011). These electrodes connected to a wireless transmitter attached to the wrist of the non-dominant hand. ECG was measured by means of three Ag/AgCl electrodes placed on the inner ankles, and right forearm. Data was recorded using the software program *AcqKnowledge* and digitized at a rate of 2Hz. All physiological recording equipment came from BIOPAC Systems, Inc. of Goleta, CA. The software program SuperLab was used for presentation of the stimuli, and interfaced with *AcqKnowledge* through a StimTracker unit. Participants wore over the ear headphones while watching the videos, with the exception of a single participant whose use of hearing aids required the use of external speakers instead. During stimuli presentation participants sat in a dark room by themselves, in order to ensure immersion in the stimuli to the fullest extent possible. Recording equipment and interfaced computers were located in an adjacent room.

Of the two physiological measures recorded, the present study focuses on EDA. An example of raw skin conductance level (SCL, a term for tonic EDA) data collected during delivery of one of the video stimuli is shown in Figure 1. The grey section of the graph denotes

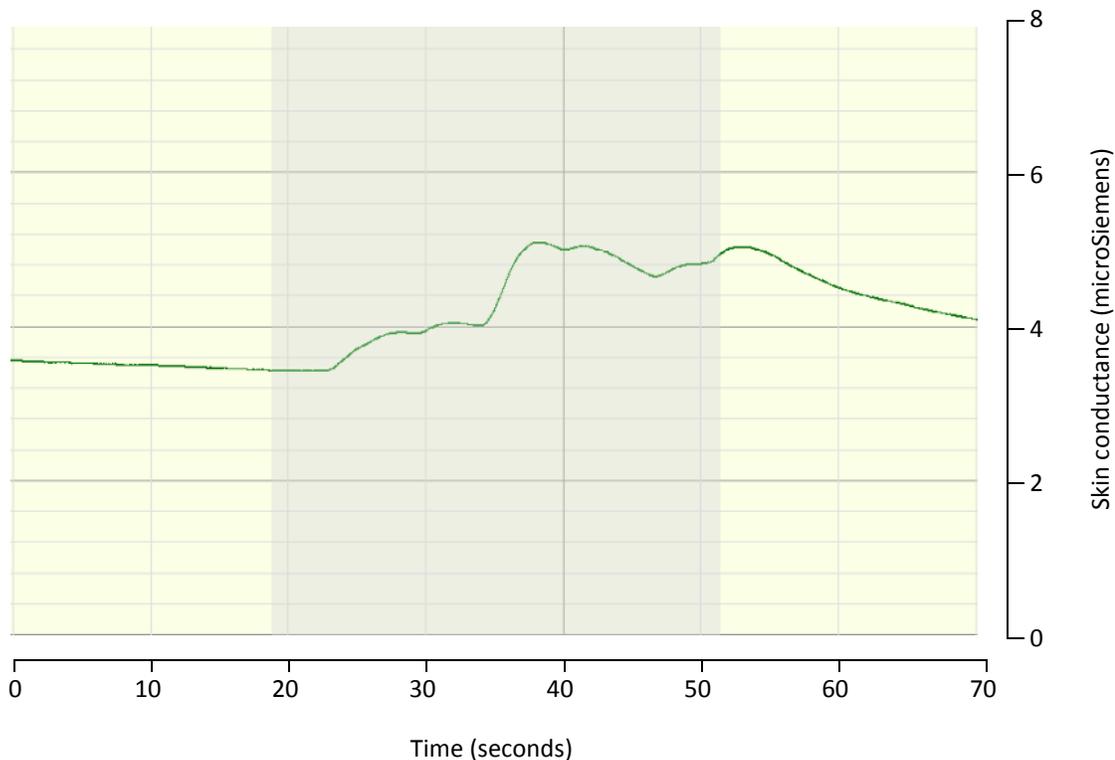


Figure 1. Example of unprocessed skin conductance data for a participant. Shaded portion in grey denotes the duration of stimulus delivery for one of the sexual disgust stimuli, the video clip featuring "zoophiles" (those who enjoy bestiality). Unshaded portions denote inter-stimulus intervals immediately preceding and proceeding the stimulus.

the duration of the bestiality video presentation, while the yellow portions on either side represent inter-stimulus intervals (ISIs). To capture physiological arousal to the video stimuli, the mean SCL for each participant during each video was computed, as were the mean SCLs of the immediately preceding 10 seconds of each ISI for each participant. The former was then divided by the latter, yielding proportional change in mean SCL from the ISI baseline to the video stimulus in question. The baseline mean for each stimulus used only the second half of each immediately preceding ISI due to concerns about contamination from heightened SCL levels at the start of ISIs that followed particularly arousing stimuli, as seen in the right-hand yellow portion of Figure 1 which corresponds to the ISI following the bestiality video. Using proportional skin conductance change controls for natural variation in absolute SCLs between

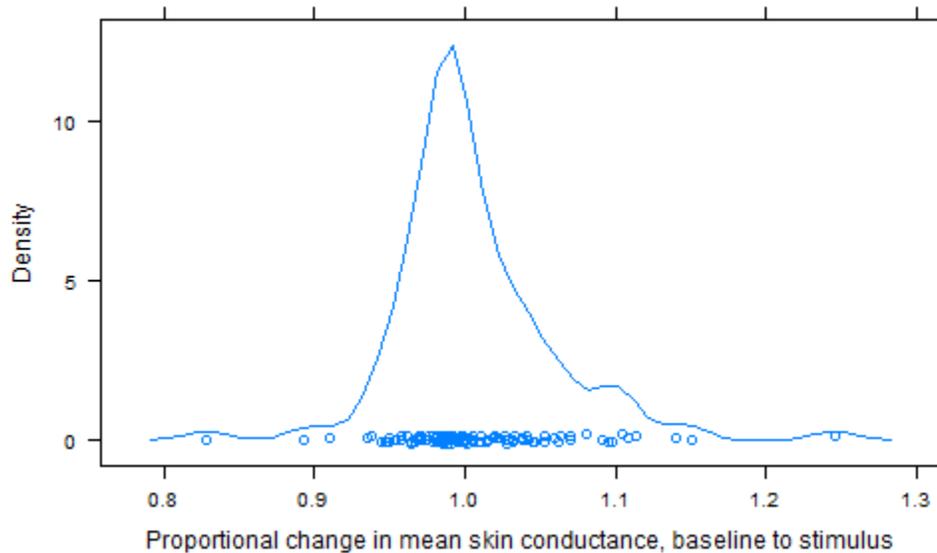


Figure 2. Kernel density plot of proportional change in mean skin conductance, baseline to stimulus. Baseline mean averaged from the ten seconds of the inter-stimulus interval immediately preceding the onset of stimulus delivery, stimulus mean taken from duration of stimulus delivery.

participants. Figure 2 displays a kernel density plot of these proportional changes to skin conductance in response to the bestiality video stimulus. Once proportional changes were computed, those for each disgust domain's pair of videos were then averaged together to create an indicator variable of psychophysiological sensitivity for each disgust domain, for each participant.

Results

The general hypothesis for this study was that higher sexual disgust sensitivity would correlate with greater transphobia and more anti-transgender positions on political policies affecting transgender individuals. Moreover, these relationships should be stronger for women than for men due to the higher reproductive costs the former face. The following section will consider specific findings relating to these overall hypotheses. First I will discuss findings from initial analyses of the data. An examination of the relationship between transphobia and sexual

disgust sensitivity, both self-report and physiological, will follow. After this I will examine the impact that these sexual disgust measures had on participants' attitudes towards transgender-related political policies.

Testing for a correlation between self-report and physiological measures for each of the disgust domains failed to find any statistically significant relationships. Initial analyses of the relationship between SCL responses to the sexual disgust stimuli and the dependent variables yielded inconclusive results. Separate analyses of the two sexual disgust stimuli revealed more promising findings for the video on bestiality than for the video featuring a passionate kiss between a young male employee and an elderly female shopper in a grocery store parking lot. A re-examination of the literature revealed that Tybur et al. (2009, p. 109) considered several thematically similar scenarios as potential items for the TDDS, including "seeing a 25-year-old man and a 65-year-old woman out on a date" and "kissing someone you find physically unattractive". Factor analysis showed both loading more strongly on the pathogen disgust factor than the sexual disgust factor, across two studies involving geographically separate samples. For these reasons, the following results sections feature analyses which exclude the SCL responses to the kissing video from the physiological measure of sexual disgust sensitivity. As such the sole measure of physiological sexual disgust sensitivity is the SCL responses to the bestiality video.

Transphobia

H1 held that greater sexual disgust sensitivity would correlate positively with greater transphobia. Initial analysis of the relationship between the three self-reported disgust domains from the TDDS and participants' responses on Nagoshi et al.'s (2008) transphobia scale yielded preliminary confirmation of H1. In a linear regression model, the sexual disgust subscale of the TDDS was the only one of the three self-report disgust domains to have both a relationship in the

expected direction with the transphobia measure and a p-value near traditional levels of statistical significance, at 0.07. To test H3's assertion that the above correlation would be stronger for females than for males, an analysis of variance (ANOVA) test first found a significant interaction between self-reported sexual disgust and gender ($F = 6.46$; $p < 0.05$) on the transphobia measure. Separate regressions of transphobia on self-reported sexual disgust by gender revealed resounding evidence in support of H3's argument of a stronger female sexual disgust-transphobia relationship, as shown in Figure 3. For females, the size of the correlation coefficient increased and maintained statistical significance. Conversely, the sexual disgust-transphobia relationship all but disappeared for males, with the correlation coefficient decreasing to almost zero and statistical significance vanishing.

The above findings held in more complex linear models that regressed transphobia on the three self-report sexual disgust domains, the SCL variables for each disgust domain, and a variety of standard demographic variables including age, race, income, and gender. These were done for males and females together (with gender included as a control variable) and for the two genders separately. The results of these regressions are presented in Table 1. Between the linear regression model containing both genders and the separate ones for females and males, the size of the self-report sexual disgust variable coefficient increased in size and statistical significance for females while the opposite occurred for males. In terms of substantive significance, the standardized coefficient for self-report sexual disgust sensitivity and transphobia for females was sizable (0.483) and understandably less so for males (0.084). For a full table of standardized coefficients for the models shown in Table 1, see Appendix B.

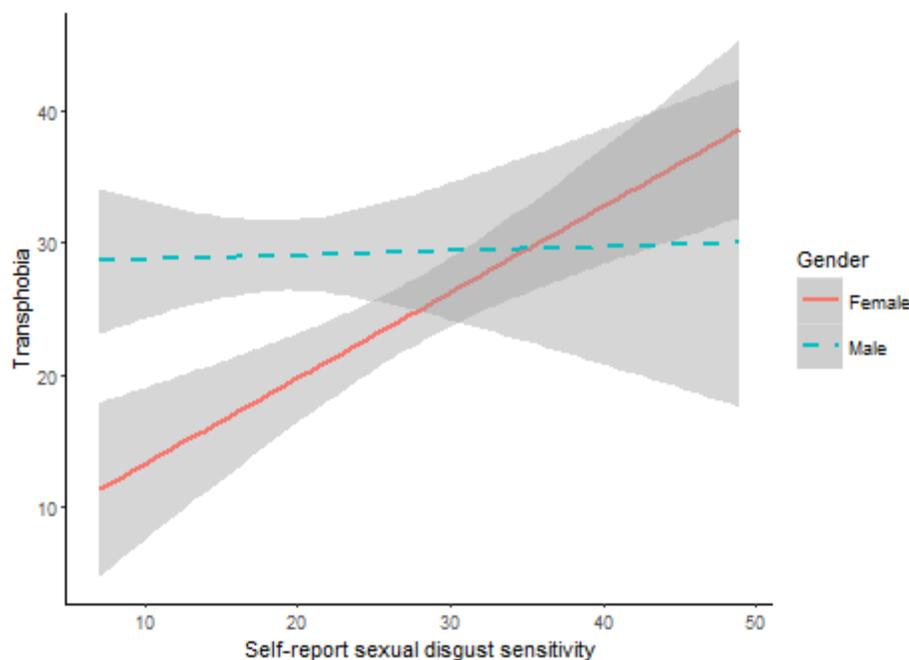


Figure 3. Fitted regression lines, transphobia on sexual disgust sensitivity by gender. The figure above shows a strong positive correlation between self-reported sexual disgust sensitivity and transphobia for females and an almost non-existent relationship between the two measures for males. Bivariate correlations shown, coefficient for females is 0.67, $p < 0.0001$. Coefficient for males is 0.01, $p = 0.89$.

Examining the physiological measures of the various disgust domain sensitivities as they related to transphobia and my hypotheses yielded mixed findings. The regression results in Table 1 show a positive correlation between increased physiological sexual disgust sensitivity (greater SCL changes from the baseline) and higher levels of transphobia, supporting H1. At 0.105, the p -value was encouraging, though not statistically significant. Examining any gendered effects to support H3, though, was less encouraging. An ANOVA of the skin conductance changes to the sexually disgusting stimulus and gender did not yield a statistically significant interaction term. With respect to the regression results by separate genders, the correlation between the SCL measure of sexual disgust and transphobia was in the expected direction for females. However, the male correlation coefficient for these two measures was in the opposite of the expected direction. Even more problematic, the p -value of 0.15 for the female-only correlation was higher than the p -value of 0.12 for the male-only correlation in the wrong direction.

Table 1. Relationship of self-report and physiological disgust sensitivity to transphobia and anti-transgender political policy positions, by gender and combined. Higher values of variables indicate greater disgust sensitivity, greater transphobia, and more anti-transgender stances on political policies. In addition to independent variables listed in left-hand columns, all regressions controlled for age, race, and income. Unstandardized coefficients, standard errors in parentheses.

		Transphobia			Anti-transgender political policy positions		
		Both	Females	Males	Both	Females	Males
Self-report disgust sensitivity (TDDS)	Pathogen	0.186 (0.240)	-0.121 (0.344)	0.407 (0.342)	0.002 (0.046)	-0.084 (0.065)	0.080 (0.072)
	Sexual	0.516 (0.196)*	0.749 (0.268)**	0.143 (0.323)	0.068 (0.038)	0.140 (0.051)**	-0.072 (0.068)
	Moral	-0.238 (0.180)	-0.252 (0.235)	-0.128 (0.285)	0.001 (0.035)	0.025 (0.044)	-0.033 (0.060)
Physiological disgust sensitivity (SCL)	Pathogen	14.653 (28.394)	54.257 (47.332)	-39.386 (37.811)	1.801 (5.466)	10.558 (8.927)	-3.169 (7.964)
	Sexual	40.739 (24.832)	52.193 (35.854)	-67.079 (41.700)	9.533 (4.781)*	11.738 (6.763)	-3.839 (8.783)
	Moral	-17.172 (32.198)	-3.889 (50.351)	-88.078 (43.987)	5.578 (6.199)	0.775 (9.497)	1.452 (9.265)
	Gender	-9.033 (3.157)**			-1.354 (0.608)*		
	Constant	-50.610 (57.132)	-160.390 (82.426)	211.535 (95.965)*	-40.871 (10.999)***	-49.131 (15.546)**	-13.003 (20.213)
	N	95	56	39	95	56	39

Signif. codes: '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Political Attitudes

The central premise of H2 was that sexual disgust sensitivity would have a positive relationship with anti-transgender positions on political policies that impact transgender individuals. Self-report disgust sensitivity displayed a similar pattern with policy attitudes as occurred with transphobia. As seen in Table 1, a positive relationship between sexual disgust sensitivity and anti-transgender policy attitudes was statistically significant at the level of $p = 0.1$ for the sample overall; however, when examining the genders separately the relationship increased in terms of both correlation size and statistical significance for females while the inverse happened for males. Indeed, the coefficient for males was statistically insignificant and in the opposite of the expected direction. To convey substantive effects of the relationship for females, the standardized coefficient was sizable at 0.478 ($p < 0.01$). As with transphobia, an ANOVA found a significant interaction ($F = 17.09$, $p < 0.01$) between self-report sexual disgust sensitivity and gender on transgender-related political policy attitudes.

Analysis of the physiological data also supported the hypothesized link between sexual disgust sensitivity and anti-transgender political attitudes, with a stronger relationship for females than males. Figure 4 presents mean SCL changes for females and males in response to the bestiality sexual disgust prime, separated into opposition and non-opposition to bathroom bills. While men overall displayed greater SCL responses to the stimulus, any variation in these responses ended up having no bearing on bathroom bill attitudes. Conversely, though females on average had a smaller physiological reaction than males to the stimulus, variation in the female SCL responses did have a meaningful connection to attitudes on bathroom bills; females opposed to bathroom bills (a pro-transgender position) had a lower levels of physiological reaction to the sexual disgust stimulus, on average, than did females who did not oppose bathroom bills.

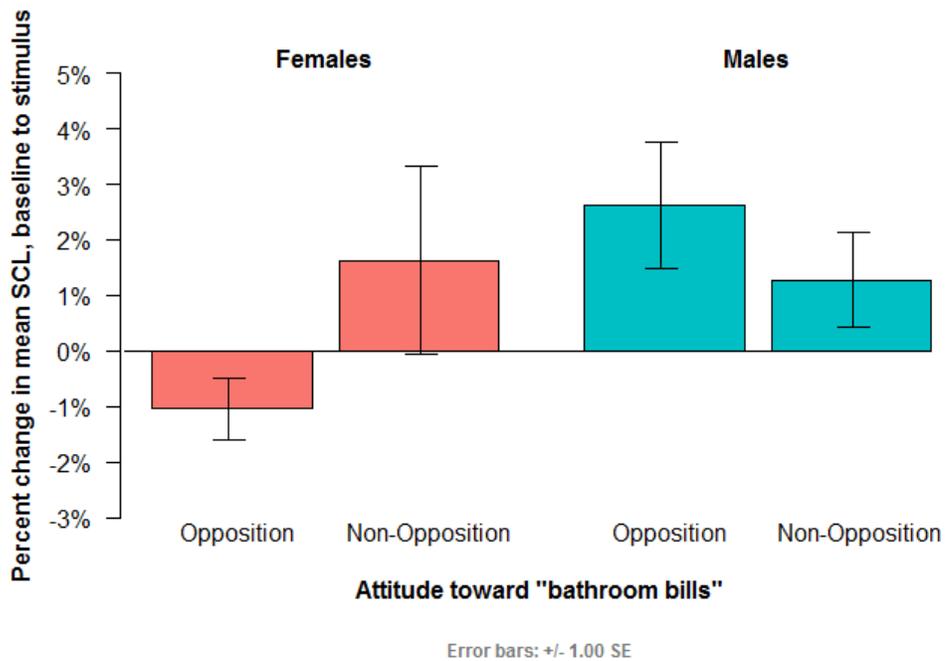


Figure 4. Percent change in skin conductance levels (SCL) by gender and attitude toward "bathroom bills", baseline to sexual disgust stimulus. The mean SCL responses to the bestiality video reveal a gender-based dichotomy. Females who do not oppose bathroom bills (the anti-transgender position) show greater response to the video than those who oppose bathroom bills (pro-transgender response). Difference of means t-test: $t = 1.506$, $p = 0.145$. While the difference of means is in the opposite, unexpected direction for males, difference of means t-test has less statistical significance with $t = 0.945$, $p = 0.351$.

Examining the physiological data in relation to the attitudes of participants on all three transgender-related political policies provides further support for a relationship between sexual disgust sensitivity and transgender-related attitudes. The results of the linear regression model in Table 1 with both genders and the transgender political policy index as the dependent variable show a positive and statistically significant relationship between higher SCL changes to the sexual disgust prime and more anti-transgender policy attitudes. Separate examinations of the genders reveal support for H3. The coefficient on the sexual disgust measure increased for women, with a p-value below 0.1, while the much smaller coefficient for males was in the opposite of the expected direction and lacked statistical significance. Regarding effect sizes, the

standardized coefficient on the measure for females was 0.252, with the measure having explanatory power independent of the self-report sexual disgust measure also included in the regression.

Discussion and Conclusion

Though unfortunate, the lack of a basic correlational relationship between self-reported disgust sensitivity and physiological responses to stimuli for each of the disgust domains in the TDDS are in keeping with past, unsuccessful efforts to find such a relationship between self-report disgust sensitivity and physiological disgust responses (Stark et al. 2005; de Jong, van Overveld, and Peters 2011; Smith et al. 2011; Whitton et al. 2014). Moreover, the only two studies reporting statistically significant correlations between self-report and physiological disgust responses differed from the current study in several ways. First, Olatunji et al. (2008) used the DS-R for self-reported disgust sensitivity and to inform their stimuli selection. Physiological measures also differed in focusing on facial electromyography of the levator labii region as well as and heart rate. Second, Olatunji et al. (2012) only included pathogen disgust stimuli to compare against TDDS responses to all three domains.

The results of the study provide strong support for a relationship between greater self-reported disgust sensitivity and more negative attitudes towards transgender individuals, both regarding transphobia as well as attitudes on relevant political policies. Statistically significant effects with large standardized coefficients predominated for females, while both of these results were lacking for males. ANOVAs likewise found the gendered interactions to be statistically significant. The lack of random assignment, treatment conditions and control groups prevent causal inference in the present study, though.

The physiological data provided weaker, though still encouraging support for the above relationships as well. Relationships between physiological disgust sensitivity and the dependent variables were independent from self-report disgust sensitivity measures, demonstrating the utility of psychophysiological data as a complement to self-report measures. Despite this, the lack of external ratings on the videos hampers the internal validity for the study. The initial selection of the kissing scene between the elderly female and younger male as a sexual disgust stimulus and subsequent exclusion corresponding physiological data for the physiological analysis of sexual disgust sensitivity also impedes internal validity.

To improve upon the research design, other video clips may serve as better sexual disgust primes. Incest in particular is a promising theme, due to its use as a sexual disgust prime for the fMRI investigation (Schaich Borg et al., 2008) which led to the development of the TDSS (Tybur et al., 2009). Additionally, ample reality show footage on the topic exists. Other physiological measures may be better suited to capturing disgust reactions, such as levator labii EMG. Additionally, the findings of this study, though promising overall, would undoubtedly benefit from experimental research designs making use of a non-undergraduate and/or more ideologically diverse sample to test the causal mechanisms underlying the hypothesized relationships in the current study.

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Appendix A: Emotional elicitation videos

Video	Emotion	Description	Previous use in literature	If from literature, edited for length
Maggots (BBC One's <i>Vet Safari</i>)	Pathogen disgust	A veterinarian examines a wildebeest's maggot-infested wound.	NA	
<i>Trainspotting</i>	Pathogen disgust	The main character searches within a filthy toilet for a lost object	Schaefer et al. (2010)	Yes
<i>Animal Passions</i>	Sexual disgust	"Zoophiles" discuss their affinity for the practice of bestiality	NA	
<i>Employee of the Month</i>	Sexual disgust	Elderly woman passionately kisses a young male grocery store employee.	Smith (2012)	Yes
Newsreel of mugging	Moral disgust	Man mugs a 101-year-old woman.	NA	
Serial killer interview (ABC News)	Moral disgust	Tommy Lynn Sells discusses his crimes.	NA	
<i>The Champ</i>	Sadness	Young boy crying over the body of his recently deceased father.	Gross and Levenson (1995)	Yes
<i>Cliffhanger</i>	Anxiety	The main character attempts to save woman dangling precariously from suspended climbing rope.	Fredrickson and Branigan (2005); Renshon, Lee, and Tingley (2015)	Yes
Cat bloopers	Joy	Blooper reel containing cats engaging in various actions.	Soleymani et al. (2012)	Yes
<i>The Thin Red Line</i>	Joy	Soldiers playfully interact with locals in a seaside village.	Soleymani et al. (2012)	No
<i>Love Actually</i>	Joy	Wedding scene, impromptu performance of the Beatles's song "All You Need Is Love."	Soleymani et al. (2012)	Yes
<i>The Shining</i>	Fear	The main character attacks the door of the room containing his wife and son with an ax.	Soleymani et al. (2012)	No
Weather report	Neutral	A weather forecast for New York City from Accuweather.com.	Soleymani et al. (2012)	Yes
<i>Blue</i>	Neutral	A man ruffles through papers at a desk, a woman walks through an outdoor archway.	Schaefer et al. (2010)	Yes
Laundry	Neutral	Wash cycle starting on a washing machine.	Smith (2012)	Yes

Appendix B

Table 2. Standardized coefficients, relationship of self-report and physiological disgust sensitivity to transphobia and anti-transgender political policy positions, by gender and combined. Higher values of variables indicate greater disgust sensitivity, greater transphobia, and stronger anti-transgender political policy positions. In addition to independent variables listed in left-hand columns, all regressions controlled for age, race, and income. Models including both genders included gender as a control as well.

		Transphobia			Anti-transgender political attitudes		
		Both	Females	Males	Both	Females	Males
Self-report disgust sensitivity (TDDS)	Pathogen	0.101	-0.063	0.230	0.005	-0.230	0.225
	Sexual	0.373*	0.481**	0.084	0.253 .	0.478**	-0.210
	Moral	-0.157	-0.169	-0.082	0.002	0.088	-0.106
Physiological disgust sensitivity (SCL)	Pathogen	0.054	0.160	-0.197	0.034	0.165	-0.079
	Sexual	0.167	0.212	-0.288	0.202*	0.252 .	-0.082
	Moral	-0.055	-0.011	-0.352 .	0.092	0.012	0.029

Signif. codes: ‘***’ 0.01 ‘**’ 0.05 ‘.’ 0.1 ‘ ’ 1