A meta-analytic review of the association between disgust and homonegativity

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ABSTRACT

Researchers suggest that a disgust increases homonegative attitudes toward gay men. While a sizable number of studies have observed this association, to date, no one has attempted to meta-analytically review this corpus of research. The author of the current study addresses this gap by conducting a meta-analysis of published and unpublished work examining disgust and homonegativity. Fourteen articles (12 published, 2 unpublished) containing 17 studies were analysed (N = 7,322). The averaged effect size for disgust sensitivity studies was moderate-large (d = 0.64) and for disgust induction studies the effect was large (d = 0.77). Effect size heterogeneity was not evidenced. The results of the analysis, future directions, and recommendations based on the systematic review of the literature are outlined.

Keywords: Gay men, disgust, prejudice, homonegativity, emotions, meta-analysis

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DEDICATION

In memory of my mother Kay Kiss. I could not have done this without you.

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Some people are often negatively described as being "too emotional." However, from an evolutionary standpoint, it is argued that emotions serve an adaptive function that allows a person to successfully navigate fundamental life-tasks and interpersonal exchanges (Ekman, 1992). The specific emotion that arises (e.g., fear) is a behaviour that has been previously utilized as a successful social strategy or has an adaptive function that has contributed to the human species' continued survival (e.g., fleeing from danger). Emotions are also conceptualized as a cognitive process whereby people or situations are appraised and consequential judgments are produced. These judgments may be based on tangible personal threats – such as avoidance of disease – or may be more abstract, with a person's emotional reaction serving to maintain their conceptualization of morality or lawfulness (Ekman, 1992; Horberg, Oveis, & Keltner; 2011; Rozin, Haidt, & McCauley, 1998). Furthermore, these cognitive appraisals are automatic, subconscious, and argued to be out of a person's control (Rozin et al., 1998; Tapis et al., 2007).

Emotional reactions may be evoked by a single person or by social outgroups (e.g., races, cultures, sexual orientations; Rozin et al., 1998; Tapis et al., 2007). The assumption that specific groups of people can elicit distinctive emotions is rooted in the social functional framework of emotion (Keltner & Haidt, 1999). According to this framework, emotional reactions to outgroups are based upon threats to social cohabitation. In social settings, people must prioritize care, cooperation, and procreation with a finite group of people. Otherwise they risk exhaustion of available resources (e.g., food and shelter). These limited resources serve to generate exclusionary criteria such as rules, laws, and culture to determine the individuals to whom resources should and should not be allocated (Sakalli, 2002). Consequently, innate emotional reactions to certain outgroups occur when there is a tangible threat to the ingroup's survival. For example, the sweating and heartrate associated with anger may be induced by physical threats to

the social group thereby priming the ingroup to defend their resources using various means such as verbal threats and/or physical violence. Consequently, the ingroup's protective emotional reactions may be perceived as prejudice by an outgroup (Brewer & Brown, 1998; Cottrell & Neberg, 2005). Furthermore, certain outgroups may not be deemed threatening to resources (e.g., the elderly, the homeless) but, rather, are considered to be contagious because of novel pathogens perceived to be carried by these groups. Evolutionary psychology suggests that these emotional reactions are the result of natural selection and the innate instinct to avoid biological pathogens in order to increase the ingroup's chances at survival (Rozin & Fallon, 1987). For example, elderly people may be associated with death and sickness. Therefore, the subsequent emotional reactions to them may function to create an acceptable distance that minimizes the possibility of novel pathogens contaminating the health of the ingroup.

Considerable effort has been afforded to understand emotions in relation to prejudice; in the context of emotional reactions, prejudice refers to negative beliefs about others that may or may not be based on actual experience (Allport, 1979). Anger and happiness have been shown to exacerbate prejudicial judgements of racial outgroups (Bodenhausen, Sheppard, & Kramer, 1994; Tiedens & Linton, 2001). For example, Hugenberg and Bodenhausen (2003) computer-generated Black and White faces which were matched for facial structure and expression. The faces were animated so that their facial expressions would change over time from happy to hostile. European-American participants were tasked with watching the animations (2 White, 2 Black) and told to press a button when they saw a new facial expression. Additionally, they completed various measures of prejudice. The researchers observed that high prejudice scores were associated with faster recognition of a hostile Black face.

Emotional reactions can also be evoked by ingroup evaluations of unnamed or unspecified outgroups. For instance, DeSteno and colleagues (2004) induced emotions of anger, sadness, or a control state (no emotion) in a New York City community sample (N = 87). Researchers asked participants to write detailed autobiographical accounts from the past (i.e., a sad, angry, or neutral memory). Upon completion, a measure of automatic intergroup attitudes was completed that required participants to categorize photos of ingroup and outgroups as either positive or negative (both categorizations were predetermined by researchers). The reaction time for assigning photos to each predetermined category was measured. Those in the anger condition evidenced significantly slower reaction times to associate positive attributes to outgroups (DeSteno et al., 2004). Furthermore, it has been argued that ingroups imbue primary emotions (i.e., common emotions that are associated with both humans and non-humans such as happiness and sadness) to ingroups and outgroups. In contrast, secondary emotions (i.e., unique emotions that are associated with humans only such as remorse and appreciation) are attributed to ingroup members only (Leyens et al., 2007). These select studies illustrate that perceived outgroups can elicit specific emotional responses from ingroups. Additionally, it appears that members of an ingroup may attribute certain emotions to specific outgroups.

A significant number of studies on emotions and prejudice have evaluated sexual minority persons, with gay men being the most scrutinized. In the next section, attention will be paid to the emotion of disgust and its unique relationship with sexual minorities (in particular, gay men). Specifically, the theory of disgust and several factors that may contribute to the association between disgust and negativity attitudes towards gay men. Secondly, a review of contemporary models on homonegativity. Finally, a summary research examining the linkage

between homonegativity and disgust as an individual difference variable (i.e., disgust sensitivity) as well as an induced affective state (i.e., disgust induction).

Disgust

Disgust is commonly understood as the rejection of unpleasant stimuli based on sight, smell, or even mere thought. However, it is a complicated emotion because its elicitors may originate from a variety of sources, including bodily products, sexual behaviours, animals, interpersonal contact, and moral offenses (Rozin et al., 2008). A number of disgust domains have been identified, which are: 1) core; 2) animal-reminder; 3) interpersonal; and 4) moral (Haidt, McCauley & Rozin, 1994; Hodson et at., 2013; Tybur, Lieberman & Griskevicius, 2009). More recently, it has been posited that sexual disgust is an additional domain (Smith, 2012; Tyber et al., 2009). Lastly, it is important to note that all domains have theoretical overlap. This is due to the disparate conceptualizations of disgust and its domains within commonly used measures of disgust.

Core Disgust. This form of disgust (also conceptualized as *pathogen* disgust) refers to a biologically-based rejection response (e.g., gagging and vomiting) that serves as a protective function against potential sickness. Biologically, core disgust is tied to the stomach and digestive system and the need to reject objects that are inedible because they may cause sickness or death (Rozin, et al., 1997; Rozin et al., 2008). According to evolutionary psychology, core disgust is the product of natural selection; the instinct to avoid biological pathogens and increase one's likelihood of survival (Rozin & Fallon, 1987; Rozin et al., 1997).

Core disgust also can describe a person's refusal to consume or touch unpleasant or offensive objects because of where they have been previously (e.g., Haidt et al., 1997). Furthermore, objects that are initially considered neutral (e.g., a dinner plate) can become

imbued with disgust due to previous contact with something offensive; a process referred to as *contamination disgust* (Haidt et al., 1997; Olatunji & Sawchuck, 2005). For example, if a dinner plate that previously had faeces on it, people are unlikely to want to eat off of it even after it had been washed thoroughly. More importantly, core disgust may have ramifications for social interactions. Groups perceived to have been in contact with disgusting objects (e.g., wearing dirty clothing) or places (e.g., a garbage dump) may also be personally contaminated with disgusting attributes. Lastly, it should be noted that core disgust overlaps with a number of the other domains of disgust, due to the need to avoid novel pathogens.

Animal-reminder Disgust. This form of disgust is often seen as constituting its own domain (Haidt et al., 1994; Olatunji et al., 2007); however, it has also been collapsed into the theoretical framework of core disgust (Tybur et al., 2009). Animal-reminder disgust is evoked by a variety of prompts that imply that human beings are essentially animals; a linkage that people typically find aversive (Haidt et al., 1997; Hodson, Kteily, & Hoffarth, 2014). It is posited that human aversion towards animals is rooted in the fear of humans' unavoidable mortality. Heflick and Goldberg (2014) note that some humans have the innate conviction that they are immortal due to their conscious belief in a literal immortality (e.g., the afterlife). By subconsciously downplaying their own animalistic traits, human beings can manage death-related anxiety (Hodson et al., 2014). For example, numerous popular religions assert that animals cannot transcend into an afterlife; instead, only "chosen" humans are able to do so. Thus, some people may want to be considered transcendent beings and, thus, reject their creaturely attributes (Hodson et al., 2014; Rozin et al., 2008).

Animal-reminder disgust theoretically overlaps with core disgust because animals are associated with creaturely acts such as public urination and defecation, brutally killing other

creatures for sustenance (including cannibalism), and eating raw bloody flesh (i.e., humans require most meats to be cooked to be edible). Sexual practices by groups considered animalistic (e.g., anal intercourse) are considered repulsive and sexual gratification from these practices is often seen as abhorrent (Avilla, 2003; Hodson et al., 2014; Tybur et al., 2009). Thus, many cultures seek to regulate sexual practices by conflating hygiene and normative sexual intercourse (Haidt et al., 1994; Olatunji & Sawchuck, 2005). Furthermore, humans feel compelled to groom themselves to eliminate presumably disgusting smells such as body odor and foul breath as doing so may serve to distance themselves from their animal origins. If a person neglects hygiene, disgust may be evoked and those individuals may be considered more animalistic (Olatunji & Sawchuck, 2005).

Interpersonal Disgust. Psychological research has only begun to unravel the social ramifications of disgust – in particular, the relationship between disgust and negative evaluations of minorities or outgroups (Inbar, Pizarro, Knobe, & Bloom, 2009; Tybur et al., 2009). As previously noted, core disgust is the biological aversion to perceived potential contaminants that may cause illness (Haidt et al., 1997; Hodson et al., 2007). But disgust also may be induced by interpersonal contact with dissimilar groups of people (i.e., outgroups; Hodson et al., 2014; Olatunji & Sawchuck, 2005). Furthermore, once a disgusted state is invoked, a person may feel superiority over that specific group. The *Intergroup Emotions Theory* (IET; Devos, Silver, Mackie, & Smith, 1999) suggests that disgust may result from an ingroup's cognitive appraisals of an outgroup (e.g., an outgroup's cultural practices, traditions, etc.). For instance, disgust is elicited when the outgroup appears to have deviated from norms or customs (e.g., sexual or religious practices) sanctioned by the ingroup. Hodson et al. (2014) expand on the theory of IET by arguing that disgust can arise not only from cognitive appraisal but also at a visceral

subconscious level. Some groups may be considered disgusting for what they symbolize, what the group has been in contact with, or where they have been. In accordance with Hodson and associates' (2014) expansion of IET, disgust can be elicited without actively considering how the outgroup violates ingroup norms and values. Consequently, social groups develop cultural values and norms to facilitate ingroup homogeneity and outgroup exclusion to avoid interactions with outgroups (Schaller & Park, 2011). Primarily, IET may be used to understand interpersonal disgust due its focus on ingroup and outgroup dynamics. However, the theory may also be used to elucidate the other domains of disgust because all involve cognitive appraisals of an outgroup, but with a different primary focus (e.g., cleanliness, sexual activity, etc.).

The sensation of disgust that an ingroup holds towards an outgroup or minority can be further understood by the *behavioural immune system* (BIS; Schaller & Park, 2011). BIS is a psychological disgust mechanism that serves to protect an individual from certain social relations. Schaller and Park (2011) compared this mechanism to a mental alarm that is triggered when a person or group is perceived to be socially "deviant" or exhibits the potential for disease contamination. Historically, human beings are social creatures and have often lived in groups to increase their likelihood of survival. Within these groups, members may have certain diseases which are considered benign due to the group's prior or continued exposure. However, outgroups are considered to have novel pathogens that should be avoided to decrease the group's exposure to unfamiliar diseases (Duncan, Schallel, & Park, 2009; Terrizi, Shook, & McDaniel, 2013).

Moral Disgust. Disgust is also theorized to be linked with perceptions of morality/immorality in that certain moral transgressions may be considered disgusting (Olatunji & Sawchuck, 2005; Pizarro, Inbar, & Helion, 2011). Expanding upon this traditional view of moral disgust, Russell and Giner-Sorolla (2013) elucidated two distinct forms: *bodily moral*

disgust, which is evoked when "moral codes related to the body are violated" (p. 328) and *non-bodily moral disgust*, which focuses on social transgressions. Moral judgments are subconscious, rapid guttural reactions to people's behaviours, the valence of which can be positive or negative (Haidt, 2001). Pizarro et al. (2011) claim that experiencing disgust may lead to an increased severity of moral judgments. For instance, relatively benign moral violations (e.g., lying to a friend or being habitually late for work) tend to be evaluated more harshly by individuals who are easily disgusted (i.e., greater in disgust sensitivity) or when they are experiencing an induced state of disgust. Purity and sanctity have also been theorized within the moral domain of disgust. Specifically, purity – in this context - refers to the protection of the human body and soul through the adoption of certain values and principles (e.g., pre-martial celibacy, church attendance; Horberg, Overis, Ketler, & Cohen, 2009). Horberg et al. (2009) suggested that purity relates to moral concerns regarding one's character and social conduct. Purity is said to be violated when someone outwardly acts in a self-polluting, hedonistic, or ungodly manner (e.g., sex outside the confines of reproduction; Haidt & Joseph, 2007; Olatunji & Sawchuck, 2005; Rozin et al., 1999). Thus, when an individual's actions are deemed to violate the state of purity, disgust may be evoked.

Sexual Disgust. This form of disgust has previously been considered a sub-domain of animal-reminder disgust (Haidt et al., 1994). More recently, there has been evidence that sexual disgust should be treated as a separate category (Avilla, 2011; Tybur et al., 2009). For example, Avilla (2011) suggests that considering sexual disgust as a product of animal-reminder disgust is oversimplified. Rather, sexual disgust should be understood using human mating strategies as well as disgust towards certain sexual acts. First, humans select mates on the basis of their genetic quality and other required compatibilities (e.g., access to resources and lack of disease;

Avilla, 2011; Jennions, Moller, & Petrie, 2001). Therefore, when an individual assesses a prospective mate to be unsuitable for sexual reproduction, the individual actively avoids that person and a disgusted state is evoked by the mere idea of mating with them. Lastly, sexual contact involves the exchange of bodily fluids, such as vaginal secretions and semen, which may also trigger disgust. These excretions may carry infectious viruses and diseases which are considered to be novel pathogens. Thus, acts that are outside the boundaries of reproductive sex (e.g., oral sex or anal intercourse) may be deemed disgusting because they are non-reproductive and increase one's likelihood of being exposed to potential pathogens through bodily products.

Gay Men & Disgust

Gay men, specifically, have been the target of prejudice due to their sexual orientation and the numerous social stigmas associated with it (e.g., perceived sexual promiscuity, susceptibility to diseases such as HIV/AIDS, and engagement in "taboo" sexual practices such as anal intercourse). For instance, Herek (1998) assessed heterosexuals' views of gay men by examining their endorsement of statements that had the words "wrong," "disgusting," or "natural" (e.g., "Sex between two men is disgusting" or "I think male homosexuals are plain wrong"). The target group was also modified to include lesbian women (e.g., "I think lesbians are plain wrong"). Herek (1998) observed that gay men were commonly described as disgusting, an effect that did not carry over to lesbian women.

Few studies have attempted to elucidate *why* gay men elicit disgust. However, a review of the existing literature on homonegativity towards gay men suggests that certain widely held beliefs may account for gay men's ability to trigger disgust in certain persons. These are: 1) "sodomy" stigma; 2) gay men as vectors of disease; 3) gay men as destabilizers of

heteronormative values; and 4) gay men's purported inimicality to religion. Each of these putative triggers will be briefly discussed and linked with the domains of disgust.

"Sodomy" Stigma. Historically, anal intercourse (AI) has been a highly controversial practice. Although there is ample evidence that many heterosexuals engage in AI for sexual pleasure, the act has been traditionally problematized (Branfman & Ekberg Stiritz, 2012; McBride & Fortenberry, 2010; Owen et al., 2015). For example, AI is routinely referred to as *sodomy*, which describes both oral sex and AI with another person or animal (Jordan, 1997). Markedly negative evaluations of sodomy began to surface during the Medieval Inquisition (1184) when the sexual act was associated with hedonism and, consequently, witchcraft and Satanic worship. Additionally, sodomy was rejected by certain religions and anti-sodomy laws were enacted in several countries such as the United States and United Kingdom (McBride & Fortenberry, 2010). Some argue these laws were purposely created to punish gay men who were strongly associated with practicing AI (Branfman & Ekberg Stiritz, 2012). This is evidenced by gay men being referred to as "sodomites" and the consequential punishment for being a sodomite (Trumbach, 1977). Additionally, AI involves the penetration of the rectum with a penis, fingers, and/or toys and, thus, may be associated with faeces expelled from the anus (Melby, 2007). Numerous studies also have noted that AI is a high-risk sex act due to potential disease transmission via faeces and tearing of the anus (Baldwin & Baldwin, 2000; Gross et al., 2000).

While AI is a stigmatized sexual practice, particularly when engaged in by gay men, somewhat paradoxically, it appears to be a fairly commonplace behaviour among heterosexual men and women. To illustrate: Owen et al. (2015) evaluated the frequency of AI in a worldwide sample of sexually active heterosexuals under 25 years of age. These researchers noted that lifetime prevalence rates of AI among men and women were 22.7% and 21.5%, respectively.

This finding was mirrored in a study that assessed the practice of heterosexual AI in the United States. Using data from the National Survey of Family Growth, a nationally representative survey of men and women between the ages of 15 and 44, Leichliter et al. (2007) found that one-third of heterosexual men and women respondents reported having engaged in AI in their lifetime. The desirability of heterosexual AI also is evident when inspecting straight men's pornographic preferences. For example, in an online survey assessing men's sexually explicit media usage, Downing and colleagues (2016) observed that 67% of heterosexual men reported viewing Internet pornography that featured unprotected AI.[1]

The stigma associated with (some) gay men's practice of AI suggests that gay men may be derogated on the basis of their sexual behaviour rather than their sexual identity. For example, Inbar et al. (2009) observed that heterosexual participants became more negative towards gay men when disgust was induced using a faecal odor. Taking this finding into consideration, AI may be useful in understanding the relationship between disgust and attitudes toward gay men. For instance, core disgust towards gay men may be rationalized by the evolutionary need to reject physical pathogens (i.e., faecal matter is often associated with disease transmission). Furthermore, expelling faeces may be considered animal-like. Thus, the practice of AI and by extension gay men may be associated with animal-reminder disgust. Secondly, moral disgust may be linked to the perceived lack of purity associated with AI. Some people may believe that AI violates hygienic norms and, thus, is immoral, but it also may infringe on spiritual purity due to its demonization in certain religions. Thirdly, interpersonal disgust may be evoked in people who endorse the belief that gay men are at higher risk for certain faeces-related pathogens via AI and that it serves a risk to their ingroup's health. Lastly, the perceived non-reproductive function of AI may elicit sexual disgust.

Gay Men as Vectors of Disease. The gay liberation movement of the 1970s strove for increased acceptance of individuals who chose not to embrace the constraints of heteronormativity (Herek, 1999). Along with the motifs of freedom and acceptance, the movement was unabashedly sexual. The increased visibility of gay male sexuality sought to desensitize heterosexuals to images of same-sex desire. Instead, heterosexual disapproval of the gay community increased exponentially due to the emergence of HIV and the ensuing AIDS crisis in the 1980s; a crisis that was indelibly linked with gay men's "sexual promiscuity" (Herek, 1999). As a result, gay male sex and HIV were conflated. Herek, Capitanio and Widaman (2005) conducted a United States-based survey assessing attitudes towards gay men and HIV/AIDS. Tellingly, heterosexuals remained ignorant about the mechanisms of HIV transmission. To illustrate: heterosexual participants incorrectly believed that two HIV negative gay or bisexual men that have unprotected anal intercourse could result in one of those men becoming HIV positive. This finding suggests that some heterosexual participants believed the sexual coupling of men "creates" HIV. Additionally, Lawrence and Husfeldt (1990) showed heterosexual college students (N = 300) identical pictures of an ill person coded as having either leukemia or AIDS. These targets also were described as either heterosexual or homosexual. Participants then were instructed to complete a series of measures assessing interpersonal evaluation, prejudicial attitudes, and willingness to interact casually with the portrayed target. The results indicated that participants had greater prejudicial attitudes towards individuals with AIDS who were gay in comparison to targets coded as having leukemia (Lawrence & Husfeldt, 1990). More recently, Vincent, Peterson, and Parrott (2016) assessed a sample of American heterosexual men's (N = 194) attitudes towards AIDS and gay men. A positive association was

observed between AIDS-related stigma and homonegativity suggesting that specific negative attitudes towards gay men remain situated around HIV/AIDS.

Gay Men as Destabilizers of Heteronormative Values. The argument that heterosexuality is not simply a sexual orientation but, rather, a socially agreed-upon, normalized, and taken-for-granted set of behaviours is a concept referred to as *heteronormativity* (Jackson, 2006). Heteronormativity suggests that heterosexuality, in all its forms (e.g., marriage, opposite-sex coupling, family traditionalism, and monogamy), is "normal" and that other configurations of sexual orientation and desire are inferior and deviant (McNeill, 2013). Furthermore, heteronormativity is a dominant ideal that is simultaneously policed and maintained through daily social interactions.

Negativity towards gay men, therefore, may be attributed to their inability to fit into a heteronormative system. Attempts by gay men to "infiltrate" institutions that privilege heterosexuality (e.g., marriage) may threaten the dominant status of heterosexual persons and, consequently, trigger a disgust response. For instance, among a sample of heterosexual Americans (N = 236), Crawford, Inbar, and Maloney (2014) observed that greater disgust sensitivity predicted negative attitudes toward groups that threaten traditional sexual morality (e.g., gay men), and positive attitudes toward groups that uphold traditional sexual morality (e.g., anti-gay activists).

Perceived Inimicality to Religion. Whitley (2009) referred to religiosity as the degree to which individuals are actively involved with their specific religion (e.g., frequency of attendance at religious services). Whitley (2009) also contended that religion, by design, has inclusionary and exclusionary criteria that expressly or indirectly forbid same-sex desire on the basis of sacred scripture (e.g., the Old Testament or the Quran). Generally, it is evidenced that the stronger

individuals' endorsement of traditional religious beliefs, the greater their homonegative attitudes towards gay men. This association has been observed in different races and cultures (Hooghe et al., 2010; Hunsberger, Owusu, & Duck, 1999; Ward, 2005), and in both genders (although women usually report lower homonegativity compared to men; Scherer, Wu, & Haughey, 1991). Affiliation with a religion may explain why some individuals find gay men disgusting. For instance, certain individuals that self-identify as highly religious may be disgusted by gay men's intentions to participate in certain religious traditions because they do not view gay men as their equals (Hodson et al., 2014; Terrizzi Jr. et al., 2012).

Disgust directed towards gay men may be due to their perceived lack of purity because concepts such as purity and symbolic cleansing (e.g., baptism) play an important role in most popular religions (Terrizzi Jr. et al., 2012). Purity and sanctity also are crucial elements of moral disgust. Religious beliefs frequently frame gay men as abnormal and depraved and, thus, devoid of sanctimony (Devos, Silver, Mackie, & Smith, 1999; Helminiak, 2008).

Homonegativity

Considerable research has been devoted to assessing heterosexuals' attitudes and behaviours towards gay men. Previously, negative attitudes about, and behaviours toward, gay men have been conceptualized as *homophobia* in psychological literature (Herek, 1984; 2004; 2015; Morin & Garfinkle, 1978). However, this term has been deemed problematic for a number of reasons (e.g., Adam, 1998; Fyfe, 1982; Morrison, Parriag, & Morrison, 1999). To illustrate: Shields and Harriman (1984) argued that the phobia suffix suggests excessive fear; an affective state which does not necessarily capture heterosexual persons' feelings toward gay men. Thus, the term *homonegativity* has been recommended.

Researchers have demonstrated that homonegativity towards gay men correlates positively with the endorsement of political conservatism, religious fundamentalism, hypermasculinity, and belief in traditional sex and family roles (Herek, 2004; 2015). It also has been documented that participants reporting greater levels of homonegativity evidence more avoidant and aggressive behaviours toward gay targets (Clow & Olson, 2010; Jewell & Morrison, 2010; Roderick et al., 1998).

Empirical Work on Disgust and Homonegativity

Researchers have observed that greater disgust sensitivity (i.e., individuals' proneness to feeling disgusted) predicts negative attitudes towards gay men. The existing body of literature suggests that individuals who evidence higher disgust sensitivity are more likely to disapprove of gay-related political issues (e.g., gay marriage) or gay men as a social group (e.g., Hodson et al., 2013; Inbar et al., 2009; Lai, Haidt & Nosek, 2014).

In a recent study, Inbar et al. (2012) hypothesized that inducing a disgusted state in participants would negatively affect their attitudes towards gay men and lesbian women. These researchers randomly assigned heterosexual undergraduate students (N = 59) to either a noxious odor condition (i.e., a novelty stink scent that was sprayed into a trashcan located in the corner of a 600-square foot laboratory) or a no-smell control. Participants then completed feeling thermometers, which require participants to rate a category (e.g., gay men) from 0° (cold) to 100° (warm). Warmer ratings are likened to more positive attitudes. Results indicated that participants in the odor condition evaluated gay men less "warmly" than they did heterosexual men. The control group, however, did not differ in their evaluations of gay versus straight targets. Finally, the effect of the disgust induction did not generalize to other marginalized social groups such as elderly persons, African-American individuals, and lesbian women. The main

effect of disgust induction also was not moderated by political orientation (i.e., for both liberals and conservatives, exposure to a noxious odor decreased "warm" feelings toward gay men). Research pertaining to disgust induction in relation to homonegativity is rather novel, with extant studies using disparate methods to induce disgust (e.g., essays, photos, and video clips). The heterogeneity of methods used may account for why researchers have reported both statistically significant (e.g., Cunningham et al., 2013) and non-significant findings (e.g., Terrizzi Jr. et al., 2010).

Purpose of the Current Research

Although a previous meta-analysis was conducted investigating disgust and the severity of moral judgments (Landy & Goodwin, 2015), there has yet to be a review of studies assessing disgust in relation to homonegativity.[2] Thus, the purpose of the current study is to address this omission by systematically reviewing all the relevant literature on disgust (operationalized as either an individual difference variable or induced state) and homonegativity towards gay men.

Method

Literature Review

To locate research suitable for this meta-analysis, a number of scientific online databases were targeted. These databases included: PsycInfo, PsycArticles, and Google Scholar. The search keywords and terms that were utilized for all databases can be found in Table 1. A broad examination of available literature was necessary so an advanced full-text search was conducted. This approach locates the targeted keywords within the *entire* article rather than strictly the title and abstract. To ensure unpublished research was included in the meta-analysis, ISI Web of Science's unpublished thesis and dissertation database was utilized. Additionally, a general Google search was completed to identify research on personal portfolios, post-secondary

institutions' websites, and open-access journals that scientific databases may not index. Additionally, Researchgate.com (a social media portfolio for scientists) was investigated for both published and unpublished articles. Lastly, emails, requesting unpublished studies or findings, were sent to researchers who frequently published in the field of disgust in relation to prejudice.

This systematic review identified an initial pool of 54 articles. The following inclusion criteria then were applied:

1. Each study was required to measure homonegativity (or homophobia) using at least one or more of the following: a) a scale that assesses attitudes toward gay men. Herek (2000) provides evidence that the term homosexual is generally used to label gay men, rather than lesbian women. Thus, studies that employed scales measuring endorsement of the broad concept of "homosexuality" also were deemed suitable for inclusion in this meta-analysis; b) a feeling thermometer that assesses attitudes towards gay men; c) a measure of support for gay-related social issues (e.g., support for gay marriage or gay adoption); and d) an implicit measure of homonegativity such as the implicit association test (IAT). A complete list of the measures of homonegativity included in this meta-analysis is provided in Table 2.
2. Each study was required to assess disgust using measures that indicate a person's propensity to be disgusted (i.e., disgust sensitivity) and/or a method of disgust induction that was demonstrated to be efficacious on the basis of a manipulation check. Specifically, those experiencing induced disgust should evidence a significantly greater level of state disgust. As previously outlined, the emotion of disgust is theorized to have multiple domains: 1) core; 2) animal-reminder; 3) interpersonal; 4) moral; and 5) sexual (Avilla, 2011; Haidt et al., 1994; Olatunji et al.,

2007; Tybur et al., 2009). Certain disgust scales measure specific disgust domains, sub-domains, and/or provide a total disgust score (see Table 3 for included scales). In addition, domain/sub-domain specific scores were evaluated to determine if a specific domain is associated more strongly with homonegativity.

3. In each study, the sample of participants must consist primarily of heterosexual individuals. In the current meta-analysis, all of the studies that were used did not include participants that identified as non-heterosexual.

The application of these inclusion criteria resulted in 39 articles being removed (i.e., 15 articles containing 18 studies were kept). One of the retained articles was subsequently removed because the study's authors were unable to furnish the statistical details needed to compute an effect size. Thus, the final sample was 14 articles containing 17 studies (N = 7,322). Of the 14, two were unpublished. Thirteen of the articles originated from the United States and one article originated from Canada. Dates of publication ranged from 2008 to 2016. Details about each study are provided in Table 4.

Determining Effect Size

To conduct a meta-analysis of disgust and homonegativity towards gay men, statistical procedures for the included studies were standardized. To achieve this, mean difference tests (t and F), correlation coefficients (r), and regression coefficients (β) were converted to effect sizes (Cohen's d).

For studies using a comparison test of group means (e.g., t test), Wolf (1986) recommends that d be calculated by subtracting the sample's total mean scores for each group ($M_1 - M_2$), then dividing by the pooled standard deviation (SD_{pooled}). Cohen (1988) provides a formula to compute pooled SD:

$$SD_{pooled} = \frac{\sqrt{(SD_1^2 + SD_2^2)}}{2}$$

Once the SD_{pooled} is calculated, Cohen's *d* can be determined:

$$d = \frac{|M_1 - M_2|}{SD_{pooled}}$$

For studies using correlation coefficients (*r*) or beta coefficients (β), the following conversion formulas were used. For *r* to *d*, Friedman (1968) provides a commonly utilized equation for determining the standardized mean difference from the correlation coefficient *r*:

$$d = \frac{2r}{\sqrt{1 - r^2}}$$

Transforming regressions coefficients β to *d* requires a two-step approach. Peterson and Brown (2005) investigated 1,700 beta coefficients and correlation coefficients from published studies to determine an appropriate effect size transformation. The resulting equation produces a precise effect size from β in the form of a correlation coefficient (*r*):

$$r = \beta + .05\lambda$$

Where λ is treated as 1 when β is nonnegative and 0 when β is negative. Once β is transformed to *r*, Friedman's (1968) formula then may be employed.

For the current meta-analysis, positive *d* values will indicate that disgust is positively associated with homonegativity toward gay men whereas negative *d* values will denote an inverse association (i.e., as disgust increases, homonegativity decreases). With respect to interpreting the magnitude of the observed effect sizes, Cohen's (1988) thresholds are commonly used. These absolute values, which were expanded by Sawilowsky (2009), are: $d = .00$ (no effect), $d = .20$ (small effect), $d = .50$ (medium effect), $d = .80$ (large effect), $d = 1.2$ (very large effect), and $d = 2.0$ (huge effect).

The purpose of a meta-analysis is to determine the combined effect of the studies and assess if the effects of the individual studies differ appreciably. Moreover, researchers have to assess whether the individual effects observed in each study are similar enough that one can be certain the combined *d* will be an accurate description of the set of studies. Heterogeneity occurs when there is excessive variation between each study, which means they should not be compared. Combined effect sizes in meta-analysis are often heterogeneous (Higgins & Thompson, 2002) which then necessitates subgroup analyses (i.e., on the basis of specific grouping variables [e.g., type of sample], studies are partitioned into smaller clusters, and the homogeneity of each cluster is ascertained).

To analysis the combined effect sizes, a random-effects model was used. A random-effects model in a meta-analysis assumes that the homonegativity scores were derived from a random sample but lack a common effect size. Furthermore, it assumes that the studies included in the meta-analysis will systematically differ due to disparate experimental designs and utilize different population samples. Thus, a random-effects model is employed when variation across included studies is assumed. In comparison, a fixed-model is used when all studies have identical treatments (e.g., IQ scores, blood pressure) but the populations differ (Borenstein et al, 2010).

Though typically used to determine the heterogeneity of effect sizes, Cochran's *Q* may have low power when the number of studies being meta-analyzed is small (Higgin et al., 2003). Thus, I^2 will be used as a complementary test. I^2 indicates the fraction of variance across studies that is a result of heterogeneity using a percentile value where < 30% is low, 30-59% is moderate, 60-89% is substantial, and 90-100% is complete heterogeneity (Higgin et al., 2003).

The Comprehensive Meta-Analysis (CMA) version 3.0 software program (Borenstein et al., 1997–2014) was utilized to establish the $d_{average}$,, the 95% confidence interval (*CI*) for *d* and

all heterogeneity statistics (Q and I^2). The $d_{average}$ statistic delineates the magnitude of the effect (Wolf, 1986).

Results

The 14 studies produced 65 effect sizes; 58 pertaining to disgust sensitivity and 7 pertaining to disgust induction.[3] The effect sizes for each study are presented in Table 4. Out of the 7,322 participants, approximately 3,765 were women and 2,178 were men.[4] Undergraduate students constituted 1,739 of the total number of participants.

Disgust Induction

The averaged *d* value for studies examining the relationship between induced disgust and homonegativity was 0.77 (moderate to large effect), 95% *CI* = 0.10 to 1.44. As Cochran's $Q(4) = 4.37$ did not exceed the χ^2 critical value of 9.49 ($p = .05$), the null assumption of homogeneity was retained. The I^2 value was 8.39% suggesting that only a small amount of variance in the studies' effect sizes could be attributed to heterogeneity. The absence of heterogeneity, as tested by Cochran's Q and I^2, indicates that potential moderating factors such as method of disgust induction or measure of homonegativity do not need to be identified (i.e., it is unlikely that effect sizes will differ appreciably across subsets of studies).

Disgust Sensitivity

The averaged *d* value for studies investigating the relationship between disgust sensitivity and homonegativity was 0.64 (moderate effect), 95% *CI* = 0.47 to 0.82. Again, Cochran's $Q(12) = 12.38$ did not exceed the χ^2 critical value of 21.06 ($p = .05$) suggesting that the null hypothesis of homogeneity should be retained. The I^2 value was 3.04% which reveals that a very small proportion of variance in the studies' effect sizes could be attributed to heterogeneity. Akin to the findings for disgust induction, Cochran's Q and I^2 suggest that it is unlikely effect sizes will

differ appreciably across subsets of studies grouped on the basis of potential moderating variables (e.g., measure of disgust sensitivity, type of participant, or measure of homonegativity).

Difference in Observed Effect Sizes

To determine whether the *d* value for induced disgust differed from the *d* value for disgust sensitivity, Fisher's *r* to *z* was computed. The resultant value, $z = .36$, $p > .05$, suggests that the association between induced disgust and homonegative attitudes toward gay men does not differ significantly from the association between disgust sensitivity and homonegative attitudes toward gay men.

Discussion

The purpose of the current meta-analysis was to determine whether disgust, as an individual difference variable (i.e., disgust sensitivity) or induced state, is associated with homonegative attitudes towards gay men. A moderate to large effect size was obtained for studies that induced disgust in their participants whereas a moderate effect size was noted for studies that measured disgust sensitivity. As the averaged effect sizes were found to be homogeneous, it was not necessary to identify potential moderating variables through subset analyses. Such homogeneity is particularly noteworthy when taking into consideration the disparate measures of homonegativity and disgust used by the studies analysed. Thus, *regardless* of the measures of homonegativity or disgust employed, the positive association between disgust and negative attitudes towards gay men is apparent. It also should be noted that seven of the homonegativity measures used in this meta-analysis considered lesbian women in addition to gay men. Herek (1998; 2000) has demonstrated that heterosexual individuals have markedly less positive attitudes towards gay men in comparison to lesbian women. Therefore, the observed

effect sizes may be conservative estimates of the "true" relationship between disgust and homonegativity, when gay men are unambiguously the attitudinal targets.

Several limitations warrant discussion. First, the number of studies included in the meta-analysis was relatively small. Although the *d* values were averaged, an outlier *d* (high or low) may skew the overall effect observed. To illustrate: Cunningham et al. (2005) had three *d* values exceeding 2.00. When these values were removed, the resultant *d* for disgust induction was a modest 0.44. As research on disgust and homonegativity accumulates, further meta-analytic reviews will be needed to gauge whether the effect sizes reported herein are replicable.

Another limitation concerns the non-responsiveness of authors to requests for additional data. A very inclusive literature search was employed in this study, including not only scientific databases, but also thesis database searches and general Internet searches, which might contain results less likely to be published in peer-reviewed journals (e.g., null findings). To further increase the potential for inclusion of a diverse set of results, emails were sent to researchers who commonly published in the field of disgust and prejudice. Despite these efforts, only two unpublished articles were located. As positive results tend to be published in peer-reviewed journals (Egger et al., 1997), the susceptibility of this meta-analysis to the "file drawer" problem (i.e., the tendency for null findings to be buried) is unknown.

A third limitation concerns the use of Q and I^2 statistics to determine homogeneity. Studies have shown that these indices may have low power to assess heterogeneity when the number of studies included is small (Higgin et al., 2003). Unfortunately, no alternative measures of heterogeneity for meta-analyses containing a small number of studies have been universally adopted (Higgin et al., 2003).

The forth, and final, limitation is that the researcher did not code the included studies based on quality. Therefore, if the methodological rigour for a majority of the studies is low then, despite the large effect sizes that were reported, the "actual" association between disgust and homonegativity remains unclear. It should be noted, however, that coding for quality in a meta-analysis is considered somewhat controversial because it is argued to be a subjective process (Stroup et al., 2000).

Recommendations

Nine of the studies included in this meta-analysis neglected to utilize disgust subscales that measure specific domains and, instead, opted for total disgust scores. Further, there was a noticeable reliance on the Disgust Scale – Revised (DS-R). Problematically, the DS-R (Haidt et al., 1994; modified by Olatunji et al., 2007) focuses solely on pathogen-related avoidance thereby occluding the possible role that sexual and moral disgust play in homonegativity. The second most commonly used scale, the Disgust Sensitivity Scale (DSS; Haidt et al., 1994), similarly measures only core and animal-reminder disgust and, thus, has a pathogen focus. The Three Domain Disgust Scale (TDDS; Tybur et. al, 2009), which takes sexual and moral disgust into consideration, has been offered as an alterative; however, it remains underutilized. Lastly, the Intergroup Disgust Scale (ITG-DS; Hodson et al., 2013) has been developed to measure interpersonal disgust, which is theorized to be a factor contributing to homonegativity towards gay men. But, again, this scale has yet to be used extensively.

As previously discussed, the studies included in this meta-analysis employed numerous measures of homonegativity. (Indeed, 15 separate measures of homonegativity were utilized.) Examining the content of these instruments reveals that, in many cases, gay men in combination with lesbian women served as evaluative targets. However, the merging of the two groups in the

item content of measures may be problematic as evidenced by Inbar et al. (2009) who found that disgust induction affected attitudes toward gay men but not lesbian women.

Future Directions

The current meta-analysis reveals that disgust is associated with negative attitudes towards gay men. While a number of possible explanations for this association were elucidated, the question remains: *why* do heterosexuals who experience or are sensitive to disgust evidence greater prejudice toward gay men but not lesbian women or other minoritized social groups? What is it about gay men – as a social category – that links them to the affective state of disgust? Relatedly, although disgust can be evoked using disparate methods, is there a specific type of disgust induction that is most salient vis-à-vis homonegative attitudes toward gay men?

Another topic worthy of scrutiny concerns disgust and gay men's attitudes about their sexual practices and, more globally, themselves. Internalized homonegativity describes negative attitudes and behaviours that gay individuals adopt because of prolonged exposure to a homonegative or antigay environment (Mayfield, 2001; Meyer 1995). If disgust contributes to homonegative attitudes, it raises the question: can gay men experience internalized disgust? The research included in this meta-analysis assessed heterosexual participants in relation to disgust and homonegativity towards gay men. There may be value in examining this relationship using gay men as participants.

Conclusion

The current meta-analysis provides additional empirical evidence that disgust amplifies homonegativity towards gay men. Consequently, researchers in the current meta-analysis suggest that additional investigation is required to understand the association but this recommendation comes with a substantial caveat. Future research in the field must endeavour to understand the

complicated nature of the emotion of disgust *and its domains* rather than settling for the most commonly used measurements of disgust. The most used disgust scales focus entirely on pathogen related disgust, which is a myopic conceptualizing of the emotion. Additionally, studies that endeavour to measure attitudes towards gay men should select scales that specifically target gay men; not homosexuals or "gays". If research in disgust and homonegativity towards gay men continues to be generated at its current rate but retains these inconsistencies, the body of research produced will not be particularly insightful. Problematically, homonegativity remains a topical issue for gay men. Therefore, by furthering the understanding of how exactly disgust and its domains contributes homonegativity, it may aid psychologists generate clinical interventions aimed at reducing homonegativity towards gay men.

Notes

1. Available research suggests that individuals may overstate the popularity of AI among gay men. For example, in an online survey of men who have sex with men (MSM), Rosenberger et al. (2011) observed that AI between MSM was relatively low compared to other sex acts such as oral sex and mutual masturbation (receptive AI: 35.5%; insertive AI: 33.8%).
2. Studies assessing moral judgment of gay men were not included in the analysis. Moral judgments relate to individuals' cognitive appraisals of others' behaviours (e.g., swearing, cheating on an exam). The severity of these judgments may differ according to the specific social group enacting them. However, these moral judgments target enacted behaviours rather than overall attitudes towards the group.
3. Gender effects were not analyzed because only two studies provided mean difference tests (*t* and *F*), correlation coefficients (*r*), and/or regression coefficients (β) separately for men and women.
4. Kam and colleagues (2016) and Avilla (Study 5; 2011) did not report the proportion of participants by gender. This combined omission resulted in 1,379 participants being unaccounted for in the gender analysis.

References

Adam, B. D. (1998). Theorizing homophobia. *Sexualities, 1*(4), 387-404.

Allport G. W. (1954). *The nature of prejudice.* New York, NY: Perseus Books.

Avilla, R. D. (2011). *Prejudice and disgust: Pursuing a unified understanding*. (Unpublished doctoral dissertation). University of California, Davis, United States.

Baldwin, J. I., & Baldwin, J. D. (2000). Heterosexual anal intercourse: an understudied, high-risk sexual behavior. *Archives of Sexual Behavior, 29*(4), 357-373.

Bodenhausen, G. V., Sheppard, L. A., & Kramer, G. P. (1994). Negative affect and social judgment: The differential impact of anger and sadness. *European Journal of Social Psychology, 24*(1), 45-62.

Borenstein, M., Hedges, L. V., Higgins, J. P. T., & Rothstein, H. R. (2007 – 2014). Comprehensive meta-analysis (CMA) software. Retrieved from http://www.meta-analysis.com

Borenstein, M., Hedges, L. V., Higgins, J., & Rothstein, H. R. (2010). A basic introduction to fixed-effect and random-effects models for meta-analysis. *Research Synthesis Methods, 1*(2), 97-111.

Branfman, J., & Ekberg Stiritz, S. (2012). Teaching men's anal pleasure: Challenging gender norms with “Prostage” education. *American Journal of Sexuality Education, 7*(4), 404-428.

Brewer, M. B., & Brown, R. (1998). Intergroup Relations. In D. T. Gilbert & S. T. Fiske(Eds.), *The handbook of social psychology* (4th ed., Vol. 2, pp. 554-594). New York, NY: McGraw, Hill. Ekman, P. (1992). An argument for basic emotions. *Cognition & Emotion, 6*(3-4), 169-200.

Clow, K. A., & Olson, J. M. (2010). Conceptual-motor compatibility and homonegativity: Approaching and avoiding words associated with homosexuality. *Canadian Journal of Behavioural Science, 42*(4), 222-233.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences (2nd* (edth ed.). Hillsdale, N.J.: Erlbaum

Cottrell, C. A., & Neuberg, S. L. (2005). Different emotional reactions to different groups: a sociofunctional threat-based approach to" prejudice". *Journal of Personality and Social Psychology, 88*(5), 770-779.

Cunningham, E., Forestell, C. A., & Dickter, C. L. (2013). Induced disgust affects implicit and explicit responses toward gay men and lesbians. *European Journal of Social Psychology, 43*(5), 362-369.

Crawford, J. T., Inbar, Y., & Maloney, V. (2014). Disgust sensitivity selectively predicts attitudes toward groups that threaten (or uphold) traditional sexual morality. *Personality and Individual Differences, 70*, 218-223.

Dasgupta, N., DeSteno, D., Williams, L. A., & Hunsinger, M. (2009). Fanning the flames of prejudice: the influence of specific incidental emotions on implicit prejudice. *Emotion, 9*(4), 585-591.

DeSteno, D., Dasgupta, N., Bartlett, M. Y., & Cajdric, A. (2004). Prejudice from thin air: The effect of emotion on automatic intergroup attitudes. *Psychological Science, 15*(5), 319-324.

Devos, T., Silver, L. A., Mackie, D. M., & Smith, E. R. (2002). *Experiencing intergroup emotions*. In D. M. Mackie & E. R. Smith (Eds.), From prejudice to intergroup emotions:

Differentiated reactions to social groups (pp. 111-134). Philadelphia, PA: Psychology Press.

Downing, M. J., Schrimshaw, E. W., Scheinmann, R., Antebi-Gruszka, N., & Hirshfield, S. (2016). Sexually explicit media use by sexual identity: A comparative analysis of gay, bisexual, and heterosexual men in the United States. *Archives of Sexual Behavior*, 1-14.

Duncan, L. A., Schaller, M., & Park, J. H. (2009). Perceived vulnerability to disease: Development and validation of a 15-item self-report instrument. *Personality and Individual Differences, 47*(6), 541-546.

Ekman, P. (1992). An argument for basic emotions. *Cognition & Emotion, 6*(3-4), 169-200.

Egger, M., Smith, G. D., Schneider, M., & Minder, C. (1997). Bias in meta-analysis detected by a simple, graphical test. *BMJ: British Medical Journal, 315*(7109), 629-634.

Friedman, H. (1968). Magnitude of experimental effect and a table for its rapid estimation. *Psychological Bulletin, 70*(4), 245-251.

Fyfe, B. (1983). "Homophobia" or homosexual bias reconsidered. *Archives of Sexual Behavior, 12*(6), 549-554.

Greenwald, A. G., McGhee, D. E., & Schwartz, J. L. (1998). Measuring individual differences in implicit cognition: the implicit association test. *Journal of Personality and Social Psychology, 74*(6), 1464-1480.

Gross, M., Holte, S. E., Marmor, M., Mwatha, A., Koblin, B. A., & Mayer, K. H. (2000). Anal Sex Among HIV-Seronegative Women at High Risk of HIV Exposure. *JAIDS Journal of Acquired Immune Deficiency Syndromes*, 24(4), 393-398.

Haidt, J. (2001). The emotional dog and its rational tail: a social intuitionist approach to moral judgment. *Psychological Review, 108*(4), 814-834.

Haidt, J., & Joseph, C. (2007). The moral mind: How five sets of innate intuitions guide the development of many culture-specific virtues, and perhaps even modules. *The Innate Mind, 3*, 367-391.

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.

Haidt, J. (2004). *The disgust scale home page*. Retrieved, from http://people.virginia.edu/)jdh6n/disgustscale.html

Haidt, J., Rozin, P., McCauley, C., & Imada, S. (1997). Body, psyche, and culture: The relationship between disgust and morality. *Psychology and Developing Societies, 9*(1), 107-131.

Helminiak, D. A. (2008). Confounding the divine and the spiritual: Challenges to a psychology of spirituality. *Pastoral Psychology, 57*(3-4), 161-182.

Heflick, N. A., & Goldenberg, J. L. (2014). Dehumanization: A threat and solution to terror management. In P. G. Bain, J. Vaes, & J.-Ph. Leyens (Eds.), *Humanness and dehumanization* (pp. 111-126). London, UK: Psychology Press.

Herek, G. M. (1984). Beyond" homophobia": A social psychological perspective on attitudes toward lesbians and gay men. *Journal of Homosexuality, 10*(1-2), 1-21.

Herek G. M. (1988). Heterosexuals' attitudes toward lesbians and gay men: correlates and gender differences. *Journal of Sex Research. 25*, 451–477.

Herek, G. M. (1999). AIDS and stigma. *American Behavioral Scientist, 42*(7), 1106-1116.

Herek, G. M. (2000). Sexual Prejudice and Gender: Do Heterosexuals' Attitudes Toward Lesbians and Gay Men Differ?. *Journal of Social Issues, 56*(2), 251-266.

Herek, G. M. (2004). Beyond "homophobia": Thinking about sexual prejudice and stigma in the twenty-first century. *Sexuality Research & Social Policy, 1*(2), 6-24.

Herek, G. M. (2015). Beyond "homophobia": Thinking more clearly about stigma, prejudice, and sexual orientation. *American Journal of Orthopsychiatry, 85*(5S), S29-S37.

Herek, G. M., Capitanio, J. P., & Widaman, K. F. (2002). HIV-related stigma and knowledge in the United States: prevalence and trends, 1991–1999. *American Journal of Public Health, 92*(3), 371-377.

Higgins, J. P., & Thompson, S. G. (2002). Quantifying heterogeneity in a meta-analysis. *Statistics in Medicine, 21*(11), 1539-1558.

Higgins, J. P., Thompson, S. G., Deeks, J. J., & Altman, D. G. (2003). Measuring inconsistency in meta-analyses. *BMJ: British Medical Journal, 327*(7414), 557-560.

Hodson, G., Choma, B. L., Boisvert, J., Hafer, C. L., MacInnis, C. C., & Costello, K. (2013). The role of intergroup disgust in predicting negative outgroup evaluations. *Journal of Experimental Social Psychology, 49*(2), 195-205.

Hodson, G., Choma, B. L., Boisvert, J., Hafer, C. L., MacInnis, C. C., & Costello, K. (2013). The role of intergroup disgust in predicting negative outgroup evaluations. *Journal of Experimental Social Psychology, 49*(2), 195-205.

Hodson, G., & Costello, K. (2007). Interpersonal disgust, ideological orientations, and dehumanization as predictors of intergroup attitudes. *Psychological Science, 18*(8), 691-698.

Hodson, G., Kteily, N. S., & Hoffarth, M. R. (2014). Of filthy pigs and subhuman mongrels: Dehumanization, disgust, and intergroup prejudice. *Testing Psychometrics Methodology in Applied Psychology, 21*, 267-284.

Hooghe, M., Claes, E., Harell, A., Quintelier, E., & Dejaeghere, Y. (2010). Anti-gay sentiment among adolescents in Belgium and Canada: A comparative investigation into the role of gender and religion. *Journal of Homosexuality, 57*(3), 384-400.

Hudson, W. W., & Ricketts, W. A. (1980). A strategy for the measurement of homophobia. *Journal of Homosexuality, 5*(4), 357-372.

Hugenberg, K., & Bodenhausen, G. V. (2003). Facing prejudice: Implicit prejudice and the perception of facial threat. *Psychological Science, 14*(6), 640-643.

Hunsberger, B., Owusu, V., & Duck, R. (1999). Religion and prejudice in Ghana and Canada: Religious fundamentalism, right-wing. *The International Journal for the Psychology of Religion, 9*(3), 181-194.

Inbar, Y., Pizarro, D. A., & Bloom, P. (2012). Disgusting smells cause decreased liking of gay men. *Emotion, 12*(1), 23-27.

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., Knobe, J., & Bloom, P. (2009). Disgust sensitivity predicts intuitive disapproval of gays. *Emotion, 9*(3), 435-439.

Jackson, S. (2006). Gender, sexuality and heterosexuality: The complexity (and limits) of heteronormativity. *Feminist Theory, 7*(1), 105-121.

Jennions, M. D., Moller, A. P., & Petrie, M. (2001). Sexually selected traits and adult survival: a meta-analysis. *The Quarterly Review of Biology, 76*(1), 3-36.

Jewell, L. M., & Morrison, M. A. (2010). "But there'sa million jokes about everybody...": Prevalence of, and reasons for, directing negative behaviors toward gay men on a Canadian university campus. *Journal of Interpersonal Violence, 25*(11), 2094-2112.

Jordan, M.D. (1997). *The invention of sodomy in Christian theology*. University of Chicago Press, Chicago.

Kam, C. D., & Estes, B. A. (2016). Disgust sensitivity and public demand for protection. *The Journal of Politics*, 78(2), 481-496.

Keltner, D., & Haidt, J. (1999). Social functions of emotions at four levels of analysis. *Cognition & Emotion, 13*(5), 505-521.

Lai, C. K., Haidt, J., & Nosek, B. A. (2014). Moral elevation reduces prejudice against gay men. *Cognition & Emotion, 28*(5), 781-794.

Landy, J. F., & Goodwin, G. P. (2015). Does incidental disgust amplify moral judgment? A meta-analytic review of experimental evidence. *Perspectives on Psychological Science, 10*(4), 518-536.

Lawrence, J. S., & Husfeldt, B. A. (1990) The Stigma of AIDS: Fears of the disease and prejudice towards gay men. *Journal of Homosexuality, 3*, 85-102.

Leichliter, J. S., Chandra, A., Liddon, N., Fenton, K. A., & Aral, S. O. (2007). Prevalence and correlates of heterosexual anal and oral sex in adolescents and adults in the United States. *Journal of Infectious Diseases, 196*(12), 1852-1859.

Leyens, J. P., Demoulin, S., Vaes, J., Gaunt, R., & Paladino, M. P. (2007). Infra-humanization: The wall of group differences. *Social Issues and Policy Review, 1*(1), 139-172.

Melby, T. (2007). Anal sex: an extraordinary taboo. *Contemporary Sexuality, 41*(11), 1–5.

McBride, K. R., & Fortenberry, J. D. (2010). Heterosexual anal sexuality and anal sex behaviors: A review. *Journal of Sex Research, 47*(2-3), 123-136.

McNeill, T. (2013). Sex education and the promotion of heteronormativity. *Sexualities, 16*(7), 826-846.

Morin, S. F., & Garfinkle, E. M. (1978). Male homophobia. *Journal of Social Issues, 34*(1), 29-47.

Morrison, T. G., Parriag, A. V., & Morrison, M. A. (1999). The psychometric properties of the homonegativity scale. *Journal of Homosexuality, 37*(2), 111–126.

Olatunji, B. O., Moretz, M. W., McKay, D., Bjorklund, F., de Jong, P. J., Haidt, J., ... & Page, A. C. (2009). Confirming the three-factor structure of the disgust scale—revised in eight countries. *Journal of Cross-Cultural Psychology, 40*(2), 234-255.

Olatunji, B. O., & Sawchuk, C. N. (2005). Disgust: Characteristic features, social manifestations, and clinical implications. *Journal of Social and Clinical Psychology, 24*(7), 932-962.

Olatunji, B. O., Williams, N. L., Tolin, D. F., Abramowitz, J. S., Sawchuk, C. N., Lohr, J. M., & Elwood, L. S. (2007). The Disgust Scale: item analysis, factor structure, and suggestions for refinement. *Psychological Assessment, 19*(3), 281-297.

Owen, B. N., Brock, P. M., Butler, A. R., Pickles, M., Brisson, M., Baggaley, R. F., & Boily, M. C. (2015). Prevalence and frequency of heterosexual anal intercourse among young people: a systematic review and meta-analysis. *AIDS and Behavior, 19*(7), 1338-1360.

Nosek, B. A., Greenwald, A. G., & Banaji, M. R. (2007). The Implicit Association Test at age 7: A methodological and conceptual review. *Automatic Processes in Social Thinking and Behavior*, 265-292.

Peterson, R. A., & Brown, S. P. (2005). On the use of beta coefficients in meta-analysis. *Journal of Applied Psychology, 90*(1), 175-181.

Pizarro, D., Inbar, Y., & Helion, C. (2011). On disgust and moral judgment. *Emotion Review, 3*(3), 267-268.

Roderick, T., McCammon, S. L., Long, T. E., & Allred, L. J. (1998). Behavioral aspects of homonegativity. *Journal of Homosexuality, 36*(1), 79-88.

Rosenberger, J. G., Reece, M., Schick, V., Herbenick, D., Novak, D. S., Van Der Pol, B., & Fortenberry, J. D. (2011). Sexual behaviors and situational characteristics of most recent male-partnered sexual event among gay and bisexually identified men in the United States. *The Journal of Sexual Medicine, 8*(11), 3040-3050.

Rozin, P., & Fallon, A. E. (1987). A perspective on disgust. *Psychological Review, 94*(1), 23-41.

Rozin, P., Haidt, J., McCauley, C. R., & Imada, S. (1997). The cultural evolution of disgust. In H. M. Macbeth (Ed.), *Food preferences and taste: Continuity and change* (pp. 65–82). Oxford,England: Berghahn

Rozin, P., & Fallon, A. E. (1987). A perspective on disgust. *Psychological review, 94*(1), 23-41.

Rozin, P., Haidt, J., & McCauley, C. R. (2008). Disgust. In M. Lewis, & J. M. Haviland-Jones (Eds.), *Handbook of emotions* (pp. 637–653) (2nd ed.). New York: Guilford Press.

Rozin, P., Lowery, L., Imada, S., & Haidt, J. (1999). The CAD triad hypothesis: a mapping between three moral emotions (contempt, anger, disgust) and three moral codes (community, autonomy, divinity). *Journal of Personality and Social Psychology, 76*(4), 574-586.

Russell, P. S., & Giner-Sorolla, R. (2013). Bodily moral disgust: what it is, how it is different from anger, and why it is an unreasoned emotion. *Psychological Bulletin, 139*(2), 328-351.

Sakalli, N. (2002). Application of the attribution-value model of prejudice to homosexuality. *The Journal of Social Psychology, 142*(2), 264-271.

Sawilowsky, S. S. (2009). Very large and huge effect sizes. *Journal of Modern Applied Statistical Methods, 8*, 597e599

Schaller, M., & Park, J. H. (2011). The behavioral immune system (and why it matters). *Current Directions in Psychological Science, 20*(2), 99-103.

Scherer, Y. K., Wu, Y. W. B., & Haughey, B. P. (1991). AIDS and Homophobia Among Women. *Journal of Homosexuality, 21*(4), 17-28.

Shields, S. A., & Harriman, R. E. (1984). Fear of male homosexuality: Cardiac responses of low and high homonegative males. *Journal of Homosexuality*, *10*(1-2), 53-67.

Smith, A. R. (2012). *The effects of pathogen and moral disgust on implicit and explicit attitudes regarding male homosexuality*. (Unpublished doctoral dissertation). University of Miami, Florida, United States.

Stroup, D. F., Berlin, J. A., Morton, S. C., Olkin, I., Williamson, G. D., Rennie, D., ... & Thacker, S. B. (2000). Meta-analysis of observational studies in epidemiology: a proposal for reporting. *Jama, 283*(15), 2008-2012.

Tapias, M. P., Glaser, J., Keltner, D., Vasquez, K., & Wickens, T. (2007). Emotion and prejudice: Specific emotions toward outgroups. *Group Processes & Intergroup Relations, 10*(1), 27-39.

Tiedens, L. Z., & Linton, S. (2001). Judgment under emotional certainty and uncertainty: the effects of specific emotions on information processing. *Journal of Personality and Social Psychology*, *81*(6), 973-988.

Terrizzi Jr, 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.

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.

Terrizzi Jr, J. A., Shook, N. J., & Ventis, W. L. (2012). Religious conservatism: An evolutionarily evoked disease-avoidance strategy. *Religion, Brain & Behavior, 2(*2), 105-120.

Trumbach, R. (1977). "London's Sodomites: Homosexual behavior and Western culture in the 18th century". *Journal of Social History. 11*(1), 1-33.

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.

Vincent, W., Peterson, J. L., & Parrott, D. J. (2016). The association between AIDS-related stigma and aggression toward gay men and lesbians. *Aggressive Behavior, 42*(6), 542-554.

Ward, E. G. (2005). Homophobia, hypermasculinity and the US black church. *Culture, Health & Sexuality*, *7*(5), 493-504.

Whitley Jr, B. E. (2009). Religiosity and attitudes toward lesbians and gay men: A meta-analysis. *International Journal for the Psychology of Religion, 19*(1), 21-38.

Wolf, F. M. (1986). *Meta-analysis: Quantitative methods for research synthesis*. Newbury Park, CA: Sage.

Wright, L. W., Adams, H. E., & Bernat, J. (1999). Development and validation of the homophobia scale. *Journal of Psychopathology and Behavioral Assessment, 21*(4), 337-347.

Table 1
Search Queries used for all Search Databases.

Search Keywords and Terms
Disgust Sensitivity
Disgust Induction
Disgust AND Gay Men
Disgust AND Prejudice
Disgust AND Homonegativity
Disgust AND Homophobia
Disgust AND Gay Adoption
Disgust AND Gay Marriage
Disgust AND Gay Rights
Disgust AND Conservatism
Disgust AND Religion
Evoking Disgust
Incidental Disgust

Table 2
Measures of Homonegativity towards Gay Men

Measure	Focus
Attitude Thermometer (Hodson et al., 2013)	Homosexuals
Attitudes toward Gay Men - Short Scale (ATG-S; Herek 1994; 1998)	Gay men
Attitudes toward Lesbians and Gays (ATLG; Herek 1994; 1998)	Gay men/Lesbian women
The Homophobia Scale (Wright, Adams & Bernat, 1999)	Homosexuals
The Index of Attitudes towards Homosexuals (IAH; Hudson & Ricketts, 1980)	Homosexuals
Feeling Thermometer (Avilla, 2011)	Gay men
Feeling Thermometer (Crawford, Inbar & Maloney, 2014)	Gay men/Lesbian women
Feeling Thermometer (Cunningham, et al., 2002)	Gay men
Feeling Thermometer (Inbar, Pizarro & Bloom, 2012)	Gay men
Gay-Straight Implicit Associations Test (Gay-straight IAT; Nosek, Banaji & Greenwald, 2006)	Gay men/Lesbian women
Political Issues (Inbar, Pizarro & Bloom, 2009)	Gay marriage
Sexualities Implicit Associations Test (Sexualities IAT; Greenwald, McGhee, & Schwartz, 1998)	Homosexuals
Support for Public Policy (Kam & Estes, 2016)	Gay marriage
Universal Measure of Bias – Gay (Latner et al., 2008)	Gay men/Lesbian women

Table 3
Measures of Disgust

Measure	Domains	Sub-Domains
Direct Disgust towards Gay Men (Smith, 2012)	Core	-
	Interpersonal	-
	Sexual	-
Disgust Sensitivity Scale (DSS; Haidt, McCauley & Rozin, 1994)	Core	Food*
		Animals*
		Body products*
	Animal-Reminder*	Sex
		Personal hygiene*
		Envelope violations*
		Death*
Disgust Sensitivity Scale II (DSS-II; Haidt, 2004)	Core	
	Animal-reminder*	
	Interpersonal	
Disgust Scale – Revised (DS-R; Haidt, McCauley, & Rozin, 1994; modified by Olatunji et al., 2007)	Core	-
	Animal-Reminder*	-
	Contamination	-
Intergroup Disgust Sensitivity (ITG-DS; Hodson, et al., 2003)	Intergroup	-
Three Domain Disgust Scale (TDDS; Tybur, Lieberman & Griskevicius, 2009)	Pathogen	-
	Sexual	-
	Moral	-

* Refers to domains and sub-domains that were not considered in the retained studies.

Table 4
List of Retained Studies

Study	Type	Disgust Measure (and/or) Disgust Induction[a]	Outcome Measure	*N*	*d*
Avilla (2001) – Study 1[b]	Sensitivity	Disgust Sensitivity Scale II - Core - Interpersonal	Feeling Thermometer (Gay men)	224	0.29 0.30 0.28
Avilla (2001) – Study 3[b]	Sensitivity	Disgust Sensitivity Scale II - Core - Interpersonal	Attitudes Towards Gay Men	77	1.63 1.89 1.54
Avilla (2001) – Study 5[b]	Sensitivity	Disgust Scale – Revised Core	Feeling Thermometer (Gay men)	116	0.41
Crawford, Inbar & Maloney (2013)	Sensitivity	Disgust Scale - Revised	Feeling Thermometer (Gay men/lesbian women)	236	0.41
Cunningham, Forestell & Dickter, (2013)	Induction	Body Odor	Attitudes Towards Lesbians and Gay Men Feeling Thermometer (Gay men/lesbian women)	146	2.38 3.76
		Cheese Odor	Attitudes Towards Lesbians and Gay Men Feeling Thermometer (Gay men/lesbian women)		0.02 2.38
Dasgupta, et al. (2009) – Study 2	Induction	Photos	Implicit Associations Test (Sexualities)	130	0.61
Hodson, et al. (2013) – Study 1-5	Sensitivity	Interpersonal Disgust Scale	Feeling Thermometer (Gay men/lesbian women) Attitudes Towards Lesbians and Gay Men	708 119	0.61 0.68
Inbar, et al. (2009) – Study 2	Sensitivity	Disgust Sensitivity Scale	Implicit Associations Test (Gay-Straight)	91	0.88
Inbar & Pizarro (2012)	Induction	Faeces Odor	Feeling Thermometer (Gay men) Implicit Associations Test (Gay-Straight)	61	0.23 0.16

Inbar, Pizarro & Bloom (2009)	Sensitivity	Disgust Scale – Revised - Core	Political Issues (Gay marriage)	82	0.52 0.63
Kam & Estes (2016)	Sensitivity	Disgust Scale - Revised	Support for Public Policy (Gay marriage)	1309	0.82
Lai, Haidt & Nosek (2014)	Sensitivity	Disgust Scale – Revised	Attitudes Towards Gay Men – Short Implicit Associations Test (Gay-Straight)	3030	0.37 0.24
Olatunji (2008)	Sensitivity	Disgust Scale – Revised	Index of Attitudes towards Homosexuals	100	0.72
Smith (2012)[b c]	Sensitivity	Three Domain Disgust Scale - Core - Moral - Sexual	Attitudes towards Gay Men	91	0.38 0.41 0.45 0.28
	Sensitivity	Direct Disgust towards Gay Men - Core - Moral - Sexual	Attitudes towards Gay Men		1.74 1.67 2.20 1.35
	Induced	Video Clips	Implicit Associations Test (Gay-Straight)		0.61
Tapis et al. (2007)	Sensitivity	Disgust Sensitivity Scale (Sex subscale only)	Attitudes towards Gay Men	81	0.40
Terrizi Jr. (2010) – Study 1	Sensitivity	Disgust Sensitivity Scale	Attitudes Towards Lesbians and Gay Men	146	0.80
Terrizi Jr. (2010) – Study 2	Induced	Essay	Attitudes Towards Lesbians and Gay Men	102	0.18

a. Domains are included when they were reported by the included studies.
b. Unpublished dissertation
c. Smith (2012) includes five disparate measures of homonegativity. For the sake of space, the measure that focuses on gay men exclusively was included in the table.