Community hygiene norm violators are consistently stigmatized: Evidence from four global sites and implications for sanitation interventions

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ABSTRACT

Community sanitation interventions increasingly leverage presumed innate human disgust emotions and desire for social acceptance to change hygiene norms. While often effective at reducing open defecation and encouraging handwashing, there are growing indications from ethnographic studies that this strategy might create collateral damage, such as reinforcing stigmatized identities in ways that can drive social or economic marginalization. To test fundamental ethnographic propositions regarding the connections between hygiene norm violations and stigmatized social identities, we conducted 267 interviews in four distinct global sites (in Guatemala, Fiji, New Zealand, USA) between May 2015 and March 2016. Based on 148 initial codes applied to 23,278 interview segments, text-based analyses show that stigmatizing labels and other indices of contempt readily and immediately attach to imagined hygiene violators in these diverse social settings. Moral concerns are much more salient at all sites than disease/contagion ones, and hygiene violators are extended little empathy. Contrary to statistical predictions, however, non-empathetic moral reactions to women hygiene violators are no harsher than those of male violators. This improved evidentiary base illuminates why disgust- and shame-based sanitation interventions can so easily create unintended social damage: hygiene norm violations and stigmatizing social devaluations are consistently cognitively connected.

1. Introduction

Sanitation efforts remain central to global health, especially in low-resource communities (WHO and UNICEF, 2017). First implemented in Bangladesh in 1999–2000, Community-Led Total Sanitation (CLTS) and similar community-based behavior change interventions that apply disgust as a trigger (such as the newer SuperAmma, see Biran et al., 2014) seek to make unsanitary behaviors like open defecation (OD) and failure to hand-wash both emotionally repugnant and socially undesirable. While such programs have been implemented most often in very low income rural communities in Asia and Africa, efforts are rapidly expanding in the Americas, the Middle East, and the island Pacific, as well as increasingly applied in post-emergency settings and urban centers (Sigler et al., 2015; Galvin, 2015, Myers et al., 2016, UNICEF, 2013).

The strategy for community hygiene norm change begins with creating a strong emotional disgust response to "trigger" new local sanitation norms that make outdoor defecation and/or non-handwashing unacceptable, while simultaneously connecting the notion of meeting new hygiene norms to desires for social acceptance (e.g., Biran et al., 2014). A main proximate goal is for the new norms to drive sanitation behavior change sufficient to declaring a community open-defecation free (ODF). Triggering strategies include the so-called walk of shame, where facilitators work with village members to identify defecation sites and who is using them, including which parts of the village are the "dirtiest." As the handbook recognizes "transect walks are the single most important motivating tool. The embarrassment experienced … results in an immediate desire to stop open defecation and get rid of these areas. Even though everyone sees the dirt and shit every day, they only seem to awaken to the problem when outsiders force them to look at and analyse the situation in detail" (Kar, 2005:8). This then creates a "collective sense of disgust and shame among community members as they confront the crude facts about mass open defecation and its negative impacts on the entire community" (Kar and Chambers, 2008: 21). The intervention's disgust-elicited "ignition moment" is when community members verbally acknowledge "that they are eating

each other's shit" (Sigler et al., 2015, supplementary materials, no page number given).

This disgust-triggering approach thus includes crude instead of sanitized language (i.e., "shit" talk). Crucially, it also focuses program efforts on building community capacity instead of infrastructure, and leverages community solidarity and collective action (Bongartz et al., 2010). The approach also encourages community members' vigilance not only about their own actions, but about noticing and reacting negatively to others who fail to conform. This activation of community policing of violators is seen as a beneficial outcome, solidifying the sustainability of programs as it widens acceptance of and deepens the purchase of the new local hygiene norms (e.g., Judah et al., 2009, Porzig-Drummond et al., 2009Scott et al., 2008).

There is wide-spread appreciation within the WASH implementation community that sanitation behavior change programs that use disgust as a trigger rapidly and effectively change sanitary beliefs and behaviors to the point that communities can often be declared ODF almost immediately after interventions (e.g., Sah and Negussie, 2009; Musyoki, 2010). And a review of best practices for promoting hand-washing concluded that interventions (like CLTS) that leverage disgust reactions are among the more effective ways to promote rapid behavior change, at least over the short term (Curtis et al., 2009). The evidence on the long-term success of such programs is more equivocal. Some suggest that latrines or hand-wash stations may be built as a result of triggering exercises, but then fail to be used or maintained over time (Venkataramanan et al., 2018, Chakma et al., 2008, Crocker et al., 2017).

Regardless, these disgust-based programs will likely continue to expand rapidly across the Global South for several key reasons. First, these programs are highly preferred by donor agencies because they are relatively low cost and low effort to implement compared to traditional sanitation interventions, i.e., no hardware, nor even soap, is typically provided (see Mara et al., 2010). Further, the approach is also often described positively as "participatory" and "empowering" for communities because it works with community insiders to change hygiene norms (Sigler et al., 2015). And, crucially, evolutionary social science theory has been widely engaged in providing science-based arguments in favor of the efficacy of these interventions, to the extent that aligned scholars have emerged as key allies in support of program expansion (e.g., Biran et al., 2014; Ruland et al., 2015; Aunger and Curtis, 2016).

Ecological-evolutionary frameworks in particular have explained human disgust triggering within sanitation behavior change programming as an evolved response against pathogen exposure (e.g., Curtis et al., 2011; Curtis et al., 2004; Schaller and Park, 2011). Disgust toward potentially sickening objects like human feces is understood as functioning like a "behavioral immune system" (Schaller and Park, 2011). This is why disgusting concomitants (e.g., feces) of unsanitary behaviors (e.g., open defecation) are so easily able to institutionalize avoidance of things (and people associated with those things) as cultural norms. These nudged norms are likely to be robust for two reasons: their association with disgust makes them more likely to be shared and remembered (Eriksson and Coultas, 2014; Heath et al., 2001; Nichols, 2002), and their normativity potentiates contempt, in addition to disgust, for those who deviate from emerging community expectations (Rozin et al., 1999; Gervais and Fessler, 2017). As an enduring and global attitude of devaluation, contempt engenders both cold indifference and reactive intolerance, undermining community support and inclusion. Being the target of such devaluation is a potent elicitor of shame (Sznycer et al., 2016), in addition to the material consequences of exclusion – something people will work very hard to avoid. Hence then, the argument is, CLTS is highly effective because it leverages many of our deepest human instinctive fears and most central social concerns.

However, more ethnographically-focused scholars have begun to raise questions about the longer-term social impacts of this powerful "triggering," most especially for the lowest-resource communities

where sanitation behavior change programs that use disgust as a trigger are typically deployed (e.g., Lomas and Hammersley-Mather, 2016; Bartram et al., 2012). Based on a qualitative study of handwashing among mothers in Kathmandu, Langford and Panter-Brick (2013) proposed that use of salient social change drivers like disgust and concerns with meeting social norms were effective in motivating behavior change. However, "the implicit assumption was that mothers who did not hand wash with soap were less than virtuous … they also faced social censure and accusations of laziness" (p. 140). That is, the interventions unintendedly then could further marginalize the members of households that were unable to meet the new hygiene norms, such as unable to afford soap or being water insecure (see Wutich et al., 2016 for an example of the latter).

Perhaps more crucially, leveraging concerns around people's desire to maintain social standing and avoid social judgments can potentially act to reinforce social-structural divisions. Mahbub (2008) describes the case of a single rural farming-fishing village in Bangladesh. In the wake of CLTS interventions, the poorest families had been forced by the wealthier families to install latrines they just couldn't afford, because the village elites were strongly motivated by the externally-oriented prestige of being an ODF village. The social policing of non-compliance included daughters being cruelly teased at school for being dirty and disgusting. Some families went without food as a way to meet the debts incurred, while others took out loans with extremely high, predatory interest rates. The toilet builds of the poorest households also often by necessity infringed on public or neighbor's land and then led to new, bitter community conflicts in the years ahead.

As these two cases make clear, sanitation intervention "communities" have all sorts of divisions across spectrums of wealth as well as political power, gender, and so on. And by deploying and institutionalizing contempt- and shame-based strategies at the core of their activities, disgust-triggering programs can inadvertently act to exaggerate these divisions in ways with the most severe social and economic penalties for those with the lowest social power to begin with. Consider a recent publication in *Lancet – Global Health* (Biran et al., 2014) showing intervention campaign materials used in a cluster-randomised trial in India, testing the efficacy of a SuperAmma intervention. These depict an imagined hygiene violator as not just dirty, but also as darker-skinned, buck-toothed, poor/low status (holes in clothing), and obese compared to a slimmer, lighter-skinned, and cleaner non-violator (Fig. 1). In this way, basic program materials do not always draw clear lines between people labeled as unsanitary and having an array of other socially-devalued, morally-questioned attributes.

Further, as Bateman and Engle (2018:168) have pointed out, this entire turn in sanitation practice "resonates with … civilizing process [es], whereby long-held [community] social norms are altered by increasing the salience of shame regarding certain behaviors … [t]he problem … is that shame is already [culturally] salient and it promotes not so much social cohesion as psycho-social harm." Feeling shame is a painful and psychologically destabilizing emotion, and the process of shaming others is well recognized as a powerful tool for keeping sectors of society down and out (Brewis and Wutich, 2018); it also consistently reinforces and is reinforced by poverty (Sen, 1983) and reflects colonial practices (Engel and Susilo, 2014) in ways that are most relevant to the underserved places where open defecation and hand-washing efforts are most concentrated (Bateman and Engel, 2018). Certainly, a significant array of leading ethnographies by medical anthropologists have detailed how stigmas that align with fears of physical disgust, disease, contagion, and lack of sanitation can be generated through pubic health action (or inaction) and that these seem to be especially effective at reinforcing the already-low power of vulnerable groups that have been identified as different (e.g., on the basis of low socioeconomic status, minority ethnicity, or gender) (e.g., Briggs, 2003; Farmer, 2006; Nations and Monte, 1996). Further, in another relevant set of literature, social epidemiologists have shown that stigma can wield power with

Fig. 1. Materials from a SuperAmma intervention in rural India in 2012, part of a randomised controlled trial. Reproduced from Biran et al. (2014: Fig. 1).

sometimes severe health consequences – so much so that it may be a massive but almost unrecognized driver of population health disparities (Hatzenbuehler et al., 2013).

Yet, as Galvin (2015) points out, there are surprisingly few studies that address systematically the theorized concerns about uneven (and potentially unjust) social and economic costs of disgust-and-shame triggering programs in lower resource settings. Even the parallel literature in sanitation marketing recognizes there is a potential downside to employing desire for prestige as a leverage for acquiring sanitation hardware, but fails to measure and track these (Barrington et al., 2017). Our goal in this study is improved fundamental, empirically-generated understandings of how hygiene norms operate and distribute within and across social settings, particularly to clarify if there are consistent (and hence generally expected) cognitive connections made between hygiene norms violations and morally devalued social identities. Our analytic approach is systematic cross-cultural comparison of how people in four eco-culturally distinct communities apply stigma and shame labels to hygiene norms violators. Novel data is required because the existing comparative ethnographic record is surprisingly sparse in this regard. For example, little is available in the Human Relations Area Files (HRAF), a cross-cultural database of longitudinal ethnographic evidence that can be used to identify the cross-cultural record on even what constitutes basic hygiene norm violations *per se* (Wutich and Brewis, 2014).

While using cross-cultural comparison, we also focus our analysis on the role of one potential fundamental social distinction within communities that might matter to how morally devalued (stigmatized) hygiene norms violations are considered to be: gender. Women are more often expected to take responsibility for the household meeting hygiene norms (e.g., blamed for unwashed children, dirty clothes, unclean house) (Ray, 2007; Reddy and Snehalatha, 2011). Additionally, disgust-triggering sanitation programs often targets women as those who teach children sanitation habits and are presumed to "know best" (O'Reilly 2006; O'Reilly, 2010) or targeted as "natural leaders" (e.g., Plan Uganda, 2012) despite the complications of explicit gender mainstreaming of participants (Adeyeye, 2011). Moreover, women are often presumed more likely than men to be blocked from social or economic opportunity like employment or education because they are held to higher hygiene standards and judged more harshly (O'Reilly,

2016); this ties to the greater practical and social demands associated with managing menstrual blood, so that women in low-resource settings may not be able or allowed to leave home while they cannot meet challenging menstrual-hygiene norms that men are not required to meet (e.g., Sommer, 2010).

Also, when considering the differential impact of norms based on social categories and lower power, women are often preferentially the focus in sanitation programs; it is assumed they benefit more from, and will ultimately be more empowered by, sanitation change because of their lower status to begin with (e.g., Chambers, 2009). Yet, as O'Reilly's (2010) ethnographic work in Rajasthan, India shows, these assumptions often ignore how sanitation and social power connect. Thus, programs can easily continue to disempower women and undermine their social standing or reinforce their low social standing, even with an explicit goal of the opposite; the assumption that women must and should be the targets for sanitation intervention is fully assumed, yet barely questioned (O'Reilly, 2010). (And, again, review Fig. 1 in the contexts of women's versus men's presentation.)

Moreover, and importantly for why we focus on gender, the "disgust" studies that have informed sanitation behavior change interventions have suggested – mainly on evidence collected in high income country samples – that women are apparently more disgust sensitive than men (see Oaten et al., 2009 for a review). This would suggest that such programing might work more effectively and/or accrue higher social costs to women compared to men. Evolutionary models propose this higher feminine sensitivity might be accounted for by progesterone exposure (e.g., Fleischman and Fessler, 2011) or greater maternal attention to disease cues that help safeguard infants (e.g., Prokop and Fančovičová, 2013; Prokop and Jančovičová, 2016). In terms of our analysis, we consider if women tend to be judged (i.e., labeled with moral transgressions) more harshly than men for hygiene norm infractions. If so, this might provide an alternate, parallel, or supplemental explanation for why women are reported to be more sensitive to disgust elicitations, and one especially relevant to gendered implementation of disgust-triggering sanitation behavior change programs.

2. Research design and methods

2.1. Design

Our approach applies systematically collected and analyzed open-ended interview data supplemented with more standard survey measures (e.g., demographics, scales). The design considers the four-way social characterizations of adult women versus adult men related to male versus female hygiene infractions in four eco-culturally different sites. We were guided by three key research questions that highlighted a possible role for gender as a key vulnerability to the negative social impacts of hygiene norm violations.

(1) Are hygiene violators consistently stigmatized (i.e., typically labeled with non-empathetic, morally questionable or otherwise undesirable attributes both within and across sites)? To test this, we compared qualitative reactions of respondents to female versus male hygiene violators ("unacceptably unclean people") across sites.
(2) Generally, are women held to higher standards, and/or more easily devalued when they cannot meet hygiene norm standards, compared to men? To test this, we compared qualitative reactions of respondents to female versus male violators within each site.
(3) If so, are women endorsing those gendered stigmas that judge women more harshly? To test this, we compared how women and men talked about women versus men who violate hygiene norms within each site.

2.2. Study sites and sample

The sites were selected to provide a range of eco-culturally diverse settings: Guatemala, Fiji, New Zealand, and the United States of America (US0A). Selection was guided by a rationale of comparison of sites in both the Global North and the Global South with higher versus lower sanitation-related disease risk (based on WHO and UNICEF, 2017: Annex 3). Sites selected also allowed the contrast between being water-secure (New Zealand, Fiji) versus water insecure (Guatemala, Arizona in the USA), whether due to economic or ecological constraints; this may be relevant to prevailing hygiene norms (e.g., perhaps they are laxer where water is scarcer). New Zealand is an important inclusion because it has been reported to have the highest handwashing-with-soap rates globally (Freeman et al., 2014), suggesting a very high cultural value placed on CLTS-encouraged sanitary behaviors. Our team included ethnographers with long-term familiarity at each locale. To our knowledge, disgust-based sanitation programs have not been implemented to date in any of the field sites (i.e., they are "pre-trigger" communities). Field data collection took place between May 2015 and March 2016.

Fiji data were collected on Viti Levu, in a medium-sized coastal iTaukei (indigenous Fijian) village, mostly in English with Fijian term use (average age of respondents 36 years, average length of residency at current location 23.3 years). Guatemala data were collected in Spanish in a small rural town one-and-a-half hours outside Antigua (average age of 38 years, average residency of 32 years). New Zealand data were collected in English in Wellington, the capital and a smaller coastal city (average age of 31.8 years, average residency of 9 years). USA data were collected in English in Phoenix, Arizona, an arid, large metropolitan area in the Southwestern USA (average age 34 years, average residency of 18.9 years). Respondents were recruited using purposive sampling aimed at interviewing equal numbers of adult men and women at each site, as well as locally relevant cross-sections of the population (e.g., age, race/ethnicity, SES).

Recruitment was done in public community spaces, with the rationale that public space (and other forms of purposive sampling) are appropriate for capturing cultural norms and knowledge (Handwerker and Wozniak, 1997). Sample size targets were set at a minimum of 60 interviews per site, at least 30 with men and 30 with women. This sample size meets the minimum recommended for cross-cultural ethnographic research (Bernard et al., 2016; Hagaman and Wutich, 2017). The total target sample of 240 was also calculated to provide sufficient power for differentiation by gender or by site in statistical analysis, with alpha set at 0.05. Ethics oversight and approval for the study was provided by Arizona State University's IRB.

2.3. Text (open-ended response) dataset

The open-ended interview asked each respondent to imagine two people, one a man and the other a woman (offered in random order), who were *unclean in a socially unacceptable way* [hereafter: "hygiene violators"]. Responses were hand-written by the interviewer using a predesigned text notation system designed to capture verbatim data, with attention to noting emotional or emphatic speech in the text and in notes at the end. For each gendered hygiene violator respondents were asked: What does she/he look like? What is it about him/her that makes him/her unclean? The standard probes were: "What would her/his ___ look like?" "How could you tell that her/his ___ is/are unclean?" Probes were used to ask specifically about hands, feet, underarms, face (including eyes, ears, nose), mouth, skin, hair, and clothing. Then, to elicit explicit labels, respondents were asked: "Who is this person? What do you think of him/her? What can you tell me about him/her?" Following this, respondents were asked a freelist question: "If you had to label this person, what would you call him/her?" Interviewers continued to probe to reach a goal of five freelisted labels, recorded in the order produced. In all societies, women have gender-specific hygiene norms they are expected to meet related to menstruation; in many places efforts to meet or policing of these norms can have profound impacts – like exclusion from education or death by seclusion (e.g., Dahal, 2008; Jewitt and Ryley, 2014). But, given that our goal is to directly compare how violations of the same or similar hygiene norms apply differently to men versus women as *stigma* (defined as devalued social identities), we purposefully avoided specific probes on menstruation-related hygiene.

Open-ended interview responses were transcribed into .rtf files using Microsoft Word and re-checked for entry error by a second individual. Data cleaning included correcting data entry errors and introducing systematic spacing and punctuation. Then the text files were uploaded into MAXQDA version 12 (VERBI GmbH, Berlin, Germany) for data structure coding.

All the textual data produced, including the freelist answers, were included in the larger analysis of text segments, whereby we identified themes and codes using a combination of inductive and deductive approaches (Bernard et al., 2016). First, three members of the research team independently read all responses and then identified emergent themes according to their frequency, universality (predominance across respondents), differentiation (relative importance among respondents in specific sites), and emphasis (emotional or emphatic speech) (Baxter and Eyles, 1997). Disagreements in initial and later iterations of themes and codes were resolved through discussion among coding leads, site leads, and content experts on stigma/hygiene. This initial, theme-identification stage enabled us to inductively identify shared meanings in the text (Bernard et al., 2016), such as: appearance, health, evokes feelings in others, and economic, ethnicity, gender, and social dimensions.

Next, following a content analysis approach appropriate for systematic coding and comparison (Krippendorff, 2018), we developed codes to enable us to identify the presence/absence of themes in a valid and reliable fashion. For each code, using MacQueen and colleagues' (1998) widely-adopted format, we developed a theoretically-informed Definition, inclusion and exclusion criteria, and typical/atypical exemplars (see Table 1). During codebook development, and in consultation with the coding team and site leads, we refined the codebook to ensure that all codes reflected relevant theoretical literature and site-specific ethnographic concepts. At the end of this process, each code

Table 1
Example of a code definition.

Code Definition for *Disease, any* (kappa = .815, reached)
Definition: Description of person with an infectious or non-infectious disease, or specific symptoms that could be infectious or respondent suggests concern about contracting this disease
Inclusion Criteria: Generic or specific reference to a disease, health abnormality, or symptoms associated with disease. Includes skin disease.
Exclusion Criteria: Reference to general health, e.g. the "unhealthy" code, addiction (drug/alcohol use, mouth, bacteria).
Typical Exemplars: runny nose, pneumonia, "coughing," "herpes" (NZ111), scabies, rash
Atypical Exemplars: HIV, pneumonia, unsanitary, afraid will catch something, snot on the face
Close but No: unhealthy, addiction

(and all 8 coders – three across the whole data set and 5 on specific codes) was tested for inter-rater reliability for each of the four study sites, where the acceptable minimum Cohen's kappa was set at > 0.8. Our fully coded dataset contained responses from 267 respondents describing 534 hygiene violators (half men, half women).

In this analysis, we focus on 10 primary codes applied to data about hygiene violators. These codes were organized in three theoretical domains: (A) the *empathy* domain included three codes: unlucky, lack of support, lack of money; (B) the *stigma* domain included five codes: socially undesirable identity, contempt, disgust, drug/kava/alcohol abuse, doesn't care about appearance; (C) the *disease* domain included two codes: disease and mental illness (see Table 2). The domains were selected because they were relevant to all sites, and on the basis of general theoretical relevance to the social stigma literature (A and B) and evolutionary-disgust literature (C). The *empathy* and *stigma* domains were selected to identify labels that specifically evoked stigma, or specifically evoked empathy (as the converse of stigma). The *disease* codes were included because the evolutionary disgust literature identifies concerns about disease as central; different disease labels may be stigmatizing or empathetic, or both or neither, so it also made analytic sense to additionally differentiate mentions of disease as a separate coding category.

2.4. Closed-ended interview data

To better characterize the samples from the four sites in relation to each other, at the end of each interview we collected standard demographics from each participant and asked each to identify their social standing within their community by pointing to a picture of a ladder scaled from 0 (bottom) through 10 (top) (e.g., Giatti et al., 2012). To allow articulation with existing ecological-evolutionarily literature, we also collected closed-ended responses during the same interviews applicable to creating scalar measures of the types applied in testing disgust reactions. These were:

Hygiene behavior: Respondents each rated 26-items from the hygiene behavior scale developed and validated by Stevenson et al. (2009). Possible scores were from 1 to 4 for each item, based on reporting that they never do the hygiene behavior (1) to that they often do it (4). Items include general hygiene (e.g., hand-washing before eating food), household hygiene (cleaning the bathroom), food-related hygiene (e.g., handling raw foods), hand hygiene (washing with soap)

Table 2
Three theoretical domains containing 10 codes.

EMPATHY codes	STIGMA codes	DISEASE codes
Unlucky	Socially undesirable identity	Disease
Lack of support	Doesn't care about appearance	Mental Illness
Lack of money	Disgust	
	Contempt	
	Drug/alcohol/kava abuser	

and personal hygiene (changing clothes daily).

Disgust sensitivity: Respondents were presented with 9 photographic images considered potentially disgusting (e.g., yellow phlegm, dirty teeth, parasitic worms), as presented by Curtis et al. (2004). They were asked to identify if their reaction to each photograph was: 0 – not at all disgusted to 4 – completely disgusted. Scale scores were created based on the sum, and possible score range was 0–36.

Perceived vulnerability to disease contagion: Respondents provided reactions to 15 items from Duncan et al. (2009), related to their self-reported susceptibility to disease and germ avoidance. For example, items were structured "In general, I am very susceptible to colds, flu, and other infectious diseases. It really bothers me when people sneeze without covering their mouths" to which responses were collected on a 7-point scale from 0 (strongly disagree) to 6 (strongly agree). The resulting scale was derived by summing the item responses (possible range 0–90), with higher scores reflecting higher perceived susceptibility.

Since stigma is concerned with creating and maintaining social distance, we also measured preferred social distance related to poor hygiene. Using a diagram showing circles of increasing distance from ego, respondents were asked to "identify how close you are *willing* to be to someone who … [does/not perform specific hygiene behaviors]", e.g., someone who does not wash their hands after using the toilet. The four response options were: public space (25 ft), social space (12 ft), personal space (4 ft), or intimate space (1.5 ft) Scores represent the mean value across 6 hygiene-behavior items (possible scores 4–24). Lower values reflect desire for more social distance.

Since the last three measures (disease sensitivity, disease vulnerability, and preferred social distance) were highly correlated and theoretically related, for the statistical analyses we collapsed these measures into a single measure through factor analysis. The first component explained 44.5% of variance; being high on this dimension was associated with higher disgust sensitivity, higher perceived disease vulnerability, and desire for greater social distance. This collapsed "disgust/avoidance" variable was then cut at the mean to create a binary variable of more (1)/less (0).

2.5. Statistical analyses

All statistical models were created and run in SPSS version 22. We used ANOVA with post-hoc Bonferroni to identify differences across the sites, and t-tests for gender differences within sites in the four scale measures of related to disgust/hygiene sensitivities, preferences, and behaviors (**Analysis 1**). For analyses using 4-group/6-way across-site comparisons alpha was set at 0.05/6 = 0.0008, using Bonferroni adjustment. Otherwise, alpha was set at 0.05.

Then, we used verbatim (i.e., non-coded) freelist word/term responses to the hygiene norm violators based on the single prompt "*If you had to label this person, what would you call him/her?*" (as noted, with a target of five labels per elicitation) to measure salience of each word term. This was then used to understand descriptively the convergence/divergence of verbatim label salience across sites, and by gender of imagined hygiene violators (**Analysis 2**). Salience scores are used to identify the most culturally salient terms in any domain, i.e., reflect those people mention soonest and most often. We used *FLARES* (Wencelius et al., 2017) to calculate a salience score for each freelist word; scores range from 0 to 1 and reflects average rank of an item across all lists, weighted by lengths of the lists (Smith and Borgatti, 1997), whereby higher scores for words indicate greater cultural salience.

We used Pearson's Chi^2 to test if prevalence of key sub-theme codes (as shown in Table 2) were different if respondents were talking about men versus about women (**Analysis 3**). We used a McNemar test to determine if frequencies of coded responses to male and female hygiene violators within each site were different, considering each country site sample separately (**Analysis 4**).

We then used MAXDictio to identify frequencies of coded segments related to the male and the female hygiene violators for each respondent. These data were used as the outcome variable in a binary logistic regression to test if respondent gender predicted greater likelihood of ascribing the non-empathy (stigmatized), empathy, or disease label codes to male or female violators (**Analysis 5**). The binary outcome variable for the regression was the presence (1) or absence (0) of (a) empathy, (b) stigma, or (c) disease codes in the responses to the male and then the female hygiene violators. Also included in the model as predictors were respondents' gender (the main variable of interest) and possible covariates: respondent age (arbitrarily split at under 45 years versus over), respondent hygiene behaviors (more versus less, cut at mean), the two-level disgust/avoidance variable, and higher, middle, or lower social standing (divided by tercile for each site), and with site entered as a category (with the USA site as the reference).

3. Results

Analysis 1. Differences Across the Sites in Hygiene and Disgust Measures

The mean values of hygiene behaviors did not differ significantly across the sites (Table 3); that is, reported handwashing and other hygiene behaviors were reported to occur at similar levels in all four communities. For disgust sensitivity, mean scores in the New Zealand site were significantly higher than Fiji (p = 0.000, 95% upper and lower CI = −17.4, −4.3) and Guatemala site (p = 0.000, CI = −15.7, −3.5), meaning people in the New Zealand site rated the same items as being less disgusting. For perceived vulnerability to disease contagion, the Guatemala site was statistically higher when compared against New Zealand (p = 0.000, CI = 2.9, −12.8)), but not the USA (p = 0.041, CI = 0.14, 10.8) or Fiji (p > 0.10) sites, meaning respondents on average identified themselves as more likely to get sick. For social distance, the Guatemala site was lower scoring than New Zealand (p = 0.000, CI = −0.81, −0.11), and Fiji (p = 0.003, CI = −0.81, −0.17), but not USA (p = 0.27 CI = −0.72, −0.03) sites, meaning on average people at the Guatemala site reported a preference for greater social/physical distance from people performing unsanitary behaviors.

Considering gender of respondents, women at the Fiji site reported they themselves practiced more hygiene behaviors than men (e.g., washed more often) (p = 0.035, CI = 0.007, 0.333), but there was no gender difference at the other three sites. On the disgust sensitivity scale, women in the USA (p = 0.012, CI = 2.2, 16.7) and New Zealand

(p = 0.023, CI = 0.94, 12.1) sites displayed greater disgust-sensitivity on average, but gender differences were not significant for the Fiji or Guatemala sites. There was no significant gender difference in the social distance scores or perceived vulnerability to disease scores within any of the sites.

Analysis 2: Gender Differences in the Salience of Attributes and Identities.

The word terms with highest salience by speaker's gender and gender of the hygiene norms violator are shown in Table 4. This word-based, rather than code-based, analysis shows that judgmental labels are highly salient (based on Smith's salience scores) across all the sites, and when talking about men as well as women hygiene violators. Subjective assessments such as "lazy" are also consistently highly salient (i.e., across sites), along with less subjective descriptors such as "homeless" and "dirty". A few salient terms showed a lack of direct blame of the violator for their condition, such as "unfortunate," "poor" or "abandoned". That is, most were highly blaming of the person, such as citing lack of required action (e.g., "lazy"), an indicator of stigma. Words suggesting disease (e.g., "unhealthy" or "unhygienic") occurred in some lists, but did not consistently show high salience compared to other more stigmatized descriptors related to undesirable social roles or moral characteristics.

Analysis 3. Differences Across Sites in Empathy, Stigma, and Disease Labeling

Stigmatizing labels related to being "unacceptably unclean" were evident across all the sites (Fig. 2). These labels occur with high frequency in reference to both men and women hygiene violators. With a couple of minor exceptions, the prevalence was not statistically different across sites. Based on the Chi-squared tests, prevalence was lower in the Guatemalan site compared to others in how frequently respondents ascribed a "socially undesirable" label to both men (X^2 = 75.8, p = 0.000) and women (X^2 = 46.7, p = 0.000) hygiene violators. Importantly for stigma, "contempt" expressions proved to be similarly applied to both genders of hypothetical hygiene violators when tested across the sites (p > 0.05). There were statistical differences across sites in "drug/alcohol abuser" codes applied to women (X^2 = 17.4, p = 0.042), being more frequently identified by USA respondents. Fijian respondents were significantly more likely (X^2 = 90.2, p = 0.000) to be coded as associating hygiene violators with "disease" compared to the other sites. Notably, there were no "disease" responses for either men or women in New Zealand or USA sites.

Analysis 4. Differences within Sites in Reactions to Male versus Female Hygiene Norm Violators.

Within each site, based on a binomial McNemar test, there was no statistical difference in frequencies of the individual empathy codes in descriptions of female versus male hygiene violators (all p > 0.05, e.g., "unlucky," see Table 2 for the list). However, the drug/alcohol code (a non-empathy code) was statistically more frequent for men in the Guatemalan (p = 0.21) and women in the USA (p = 0.034) sites. "Disgusting" was more frequently applied to men in New Zealand than women (p = 0.013), as was the code for socially undesirable identity (p = 0.027). There was no difference in the use of disease labels for describing men and women hygiene violators at any of the sites (all p > 0.05).

Analysis 5: Within and across Site Differences in Women's and Men's Responses to Male versus Female Hygiene Norm Violators.

Regression modeling showed that the gender of the respondent did

Table 3
Mean scores (± SD) on measures of hygiene behaviors, disgust sensitivity, preferred social distance, and perceived disease vulnerability by site and gender.

	Viti Levu, Fiji N = 59, 33 women	Acatenango, Guatemala N = 65, 33 women	Wellington, New Zealand N = 82, 43 women	Phoenix, USA N = 61, 31 women
Hygiene Behavior Scores				
men	3.27 (.34)	3.4 (.31)	3.01 (.37)	3.12 (.29)
women	3.44 (.27)[a]	3.53 (.23)	3.07 (.34)	3.12 (.44)
Disgust Sensitivity Scores[b]				
men	31.8 (11.4)	30.6 (14.3)	19.4 (11.3)	22.3 (7.8)
women	35.5 (13.1)	34.6 (13.7)	25.9 (11.5)[a]	31.7 (16.3)[a]
Perceived Vulnerability to Disease Scores[b]				
men	44.8 (16.2)	43.7 (13.4)	37.1 (8.3)	40.4 (4.7)
women	47.6 (13.4)	48.4 (16.2)	39.1 (9.0)	40.9 (1.4)
Social Distance Scores[c, b]				
men	2.31 (.65)	1.73 (.66)	2.27 (.75)	2.22 (.69)
women	2.15 (.69)	1.80 (.79)	2.25 (.75)	2.06 (.82)

[a] Statistically significant gender difference, based on *t*-test.
[b] Statistically significant difference across sites, based on one-way ANOVA.
[c] Lower score represents preference less intimacy and greater social distance.

Table 4
Rankings of the 10 most salient verbatim word terms in each site for describing unacceptably clean men or women based on Smith's salience score. Words mentioned only once by respondents within each sub-group are excluded.

Talking about Male Violators

	Men talking about Men				Women talking about Men			
	Guatemala(a)	Fiji	US	New Zealand	Guatemala	Fiji	US	New Zealand
1	Mugroso [filthy, mucky]	Lazy	Homeless	Homeless	Sucio [dirty]	Dirty	Homeless	Homeless
2	Sucio [dirty, unwashed]	Unhealthy	Bum	Dirty	Mal hygiene [poor hygiene]	Lazy	Dirty	Dirty
3	Asqueroso [disgusting]	Ugly	Dirty	Lazy	Alcoholica [alcoholic]	Ugly	Poor	Poor
4	Mal [bad]	Dirty	Poor	Tramp	Chucos [dirty, unsanitary]	Poor	Lazy	Unkempt
5	Vagabundo [vagabond/bum]	Uneducated	Beggar	Bum	Descuidado [self-neglect]	Unhealthy	Bum	Smelly
6	Mal olor [smells bad]	Untidy	Hobo	Unfortunate	Huevon [lazy, do-nothing]	Homeless	Uneducated	Unemployed
7	Pordiosero [beggar]	Farmer	Grimy	Hobo	Abandonados [abandoned]	Beggar	On drugs	Sad
8	–	Not good	I don't judge	Degenerate	Haraganeso [lazy, idle]	Mad	Mentally ill	Alcoholic
9	–	Doesn't look after himself	Unlucky	Unhappy	No le gusta estar limpia [doesn't like to be clean]	Uneducated	–	Weird
10	–	Homeless	Drug dealer	Poor	Borracho (10 =) [drunk] Perezoso (10 =) [lazy, slothful]	Snapped	–	Unhygienic

Talking about Female Violators

	Men Talking about Women				Women Talking about Women			
	Guatemala	Fiji	US	New Zealand	Guatemala	Fiji	US	New Zealand
1	Sucia [dirty, unwashed]	Lazy	Homeless	Homeless	Sucia [dirty, unwashed]	Dirty	Homeless	Homeless
2	Abandonadas [abandoned]	Ugly	Drug addict	Unfortunate	Chuca [dirty, unsanitary]	Lazy	Dirty	Dirty
3	Alcoholica (3 =) [alcoholic]	Mentally off	Poor	Dirty	Perezosa [lazy, slothful]	Ugly	Poor	Unkempt
4	Chuca (3 =) [dirty, unsanitary]	Dirty	Bum	Unlucky	Dejada [self-neglectful]	Poor	Needy	Sad
5	Falta de recursos [impoverished]	Homeless	Prostitute	Tramp	Vive en calle [homeless]	Unhealthy	I don't label	Poor
6	No hygienica [unhygienic]	Unhealthy	Crazy	Lazy	Haragana [lazy, idle]	Beggar	Prostitute	Unemployed
7	Desagradable [unpleasant]	Doesn't look after herself	Abused	Addict	Cochina [dirty, pig]	Uneducated	Unlucky	Mental health problems
8	Mal persona [bad person]	Stupid	I don't judge	Poor	Descuida [self-neglect]	Homeless		Lonely
9	Loca [crazy]	Untidy	Lazy	Bum	Huevona [lazy, do-nothing]	Grandmother		Troubled
10	Pobre (9 =) [poor]	Fat	Dirty	Hobo	Indigente [indigent]	Mental		Unhealthy

not affect the risk of respondents labelling women with empathy, non-empathy, or disease codes (all $p > 0.05$, CI included 1.0), once all the other covariates (such as age level and terciles of within-site social standing: see above) were considered (noting no covariates proved significant). We found, however, that female respondents had lower odds of applying non-empathy (stigmatized) labels to male hygiene violators ($B = -1.6$, $exp(B) = 0.199$, CI = 0.061-0.650, $p = 0.007$). There was no difference in the odds of respondents' reactions to male hygiene violators with regard to disease or empathy codes.

4. Discussion

Using explicit cross-cultural comparison of subjective (qualitative) responses, our goal was to identify how norms of cleanliness might be tied to negatively judgmental social labels (i.e., stigma). We confirmed our first proposition, that hygiene violators in four different country settings are consistently stigmatized (i.e., associated with negative moral judgment labels) in ways that suggest they are to blame for their failure to meet norms and are subject to contempt. The systematic analysis of coded interview data also clarified that these stigmas were not most often or particularly aligned with concerns or fears of disease, contagion, or physical danger, but rather with moral failures (such as being "disgusting" or "lazy").

We began with two key questions related to the gender of violators, specifically whether women are held to higher standards, and/or more easily devalued when they cannot meet hygiene norm standards compared to men, and – if so – whether male versus female respondents in

each site label female hygiene violators differently. While we found some minor differences in responses to men versus women violators, these differences were much less important than we expected. For example, in Analysis 3, some sites showed gender differences in labeling, but these seem minor when viewed in the context of broader findings. They could well be a statistical artefact. Similarly, in Analysis 5, once we controlled for other variables, gender dropped out as a key explanatory variable. That is, there were consistently high levels of stigmatizing (non-empathetic and contemptful) labels given to imagined community members - both male and female – who were "unacceptably unclean". And, there were very few "disease" labels applied to either by comparison. These results are consistent across the four eco-culturally diverse sites.

Our findings have a number of implications for both the fundamental social science studies of disgust, and the ways they inform CLTS-type sanitation programming. First, prior literature on gender and disgust sensitivity has developed a series of evolutionary explanations for why women are typically more disgust-sensitive than men. Women's higher perceived sensitivity to disease was only evident in Global North/Anglophone samples (i.e., New Zealand and US). Given the observation that most of the studies establishing a higher female sensitivity to disgust are conducted with English speakers (e.g., Curtis et al., 2004), this suggests it will be important to conduct studies in a wider array of cultural and language samples to identify if greater female disgust sensitivity holds up as a pan-cultural phenomenon.

Moreover, the vast majority of social science research into hygiene norm violations, broadly defined, focuses on menstrual taboos and
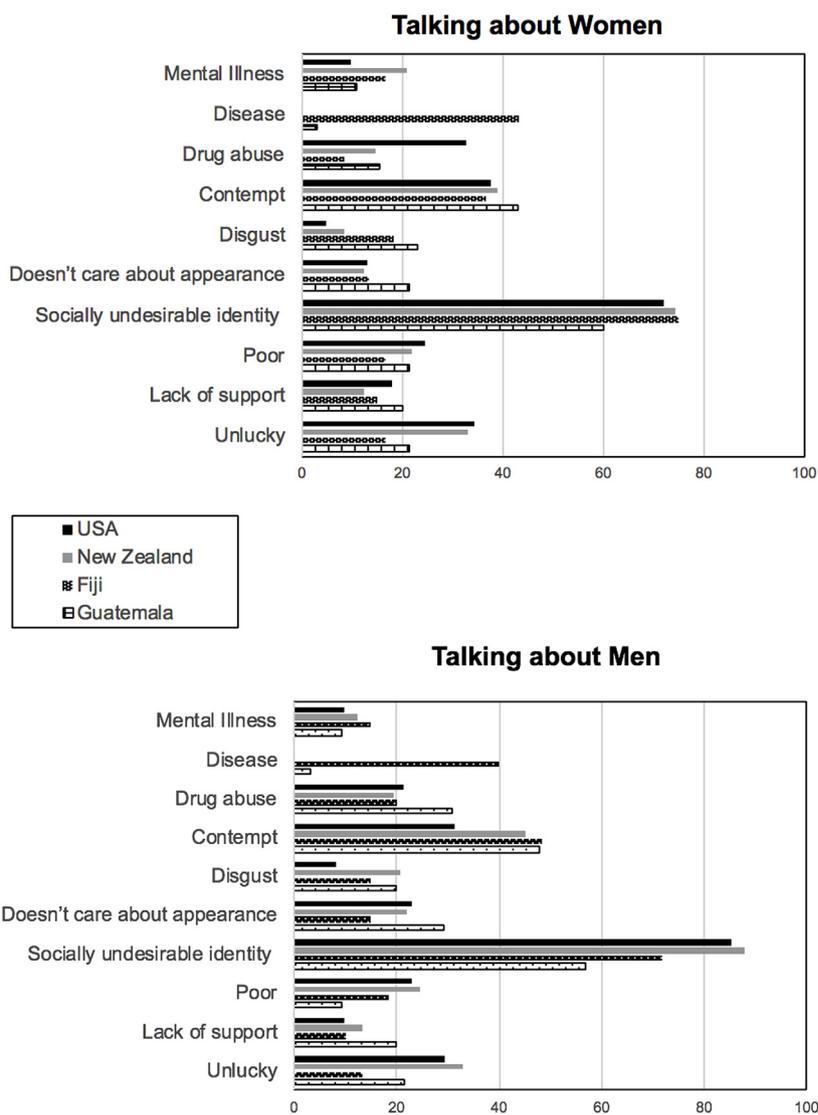
Fig. 2. Percentage of theme-coded responses applied to hygiene violators by site (men and women combined, talking about each gender).

other cultural concerns around pollution created specifically by women. Our study purposefully avoided direct solicitation of menstruation-related labels or issues; interestingly, only one spontaneous elicitation was offered by a New Zealand female respondent ("period stains"). This could be explained as a function of the interview process, which allowed respondents to avoid sensitive or uncomfortable topics. However, respondents readily raised many other potentially sensitive topics. So, the parsimonious explanation is that hygiene norm violations in these sites are not necessarily nor immediately tied to menstrual pollution (or other sanitation issues specific to women).

Our analysis here adds an additional perspective as to why CLTS-type programs work in similar ways across diverse sites to activate so effectively community concerns to sanitize: the consistently close association between standards of cleanliness and a readiness – even preference – to attach morally-damaging stigmatizing labels. In terms of application, sanitation development work has widely engaged shame as a tool for behavior change, while not considering in much detail exactly how and why shame attaches to social identities in ways that might reinforce existing social and economic vulnerabilities, including reinforcing potentially damaging stigma and engendering contempt (as previously noted by Barrington et al., 2017, Bartram et al., 2012, Engel

and Susilo, 2014). This is why identifying the possible impacts of shame and stigma in relation to local hygiene norms is an immediate and important area for more ethnographically- or culturally-oriented social scientists to be engaged, helping to identify some basic dimensions of how hygiene norms vary from place to place, how these become attached to socially devalued identities (i.e., stigmatized), and how these might align with existing social or economic vulnerabilities. We began with an assumption that gender might prove one of those key vulnerabilities, most especially because it is implied in programming assumptions (e.g., that women will benefit more from sanitary behavior-change interventions than men). Yet, it seems on the basis of this analysis that unacceptability in relation to local cultural norms applies to both genders, all other factors being the same.

These findings suggest it is necessary to look more closely at other means by which communities differentiate socially, such as along economic/wealth lines, as relevant to sanitation. Some CLTS practitioners have begun to identify the need to do this; for example, Myer and Grillo (2017:6) note pre-triggering efforts should include a "situational analysis on vulnerability, exclusion, poverty issues in different areas and understanding exclusion issues." But our theoretical understandings of *how* this matters needs to be much defined before we can

know when and how to operationalize this. While we included a control for self-reported community standing in our statistical models (Analysis 5), our measure was crude. For example, improved evidence on how disgust triggering intersects with relative social and economic circumstances may help explain why CLTS sanitation seems to be most successful in driving behavior change in small rural village settings, but less so in urban ones. Some suggest the reason could be less access to land, construction materials (e.g., Kar and Chambers, 2008), or the scale of communities for intervention in urban settings (Lomas and Hammersley-Mather, 2016). But cities are also typically much more socioeconomically differentiated and diverse. This could reduce the power of threats of social stigma to engender behavior change because people have more varied social roles and connections, or – relatedly – it could mean that social policing by one's neighbors has less reach. Examining these social institutions across sectors of society with higher and lower social power differentials in high proximity (e.g., as described by O'Leary 2015; 2016) would thus be a recommended next step to the goal of better theory building to predict when and how disgust-based interventions might create or magnify damaging forms of shaming.

Our study has notable limitations. The lack of across-site variation in hygiene behavior reports means we cannot rule out social desirability influences on respondent reports. The study is also limited by use of an ethnographic sampling strategy particularly suited to robust cultural and qualitative comparisons, meaning the quantitative results might be different had population-representative sampling been used. In terms of application to sanitation interventions, the use of hypothetic violators as interview elicitation means we are not capturing direct ethnographic evidence the negative impacts of programs. Obviously, better tracking the social impacts of behavior change program implementation (a major recommendation based on these findings) needs to engage not just norms, but their application in justifying rejection or mistreatment of vulnerable community members.

5. Conclusion

There is little doubt that a disgust-based approach to sanitation behavior change efforts saves lives when it reduces exposure of under-resourced communities to infectious disease. But a crucial question is how and why disgust aligns *socially* in ways that might damage, such as through the ascription of contempt-related stigmas. This study deploys a novel approach to identifying hygiene norms across sites, through comparative analysis of interview-elicited text. We find that stigmatizing labels readily and immediately attach to imagined hygiene violators across diverse social settings, and to women and men alike. That is, everyone appears potentially vulnerable to the negative social labeling of hygiene norms violations, and hence to associated stigma, contempt, and shame. Moreover, the norms elicited show that social rejection related to hygiene is connected primarily to moral judgments, not simply or particularly concerns over avoiding disease contagion. Related to this, extension of empathy to violators is infrequent. These results expand the empirical social science rationale for why disgust-based interventions sanitation interventions must always be very carefully planned. If sanitary dignity is a human right as some propose (Langford et al., 2017), recognizing that hygiene norm violations and stigmatizing labels are directly cognitively connected is central to defining and advancing that agenda.

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