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# 'Bad language' in the Nordics: profanity and gender in a social media corpus

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## ABSTRACT

This study looks at the relative frequency of 'bad language' according to gender in Nordic languages and in English in a 210-million-token corpus of messages by 18,686 Nordic Twitter users. For the Nordic languages, more than 19,000 'bad-language' word forms were compiled on the basis of usage note annotations in major Nordic-language dictionaries. The most frequent terms overall are swear words, and while males use more of these items on average, the gender difference is less pronounced for English words. For potentially offensive words in the Nordic languages, males make more use of traditional profanities associated with the Devil, religion, and blasphemy. Both genders make more use of profanities when tweeting to people of their own gender. The study provides empirical evidence for a small gender-based discrepancy in the use of profanity in social media in the Nordic languages, mirroring results previously found in corpus-based studies of English-language data. The results are interpreted in light of previous findings as evidence for a gendered difference in sensitivity toward the use of language that could potentially be offensive.

**KEYWORDS** Profanity; swearing; gender; Nordic countries; social media; Twitter; Corpus linguistics

## 1. Introduction

The use of potentially offensive language is a widespread phenomenon, and in recent years it has been subject to increasing scholarly attention. In much of the existing literature, swearing has a relatively restricted definition, based on taboo as well as specific pragmatic and semantic features. This study considers a broader class of 'bad-language' items, i.e., words that could be perceived as offensive, derogatory, or vulgar, but which are not necessarily swears, collectively termed 'profanity' in this study (see [section 2.1](#)). Profanity has been studied from psychological and cognitive linguistic perspectives as a manifestation of affective state (e.g., Janschewitz 2008; Eilola and Havelka 2010), in terms of its varied pragmatic functions (Jay 1992; Jay and Janschewitz 2008), or in its diverse typological manifestations in different languages and cultural groups (Ljung 2011; Dewaele 2010). From

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a sociolinguistic perspective, profanity is among the language features most consistently proposed to exhibit differential use between males and females. Empirical studies have investigated how identity parameters such as gender, age, or social class pattern with the use of profanity, and corpus-based and quantitative methods have been used to provide a better picture of the ways in which use of profanity in English is manifest by males and females, including in computer-mediated communication (CMC) (e.g., Thelwall 2008; Bamman, Eisenstein, and Schnoebelen 2014; Wang et al. 2014).

While most studies have focused on the profanity in users' first language (L1), especially English, some recent work has also considered the use of profanity in second or additional languages (LX). According to survey data, L1 profanities are perceived to have more "emotional force" than L2 or LX profanities (Dewaele 2004, 2010), with profanities (both L1 and LX) typically considered to be more offensive when used by females than when used by males. Corpus-based studies have, for the most part, demonstrated that in English males are more likely to use profanities than females (McEnery 2006; Bamman, Eisenstein, and Schnoebelen 2014; Wang et al. 2014), but no studies have, to my knowledge, utilized large, multilingual corpora in order to investigate the interplay between gender and profanity use in more than one language.

In the Nordic countries, societies in which knowledge of English is widespread, many speakers make use of profanities borrowed from English as well as native-language profanities: For example, *fuck* is widely used in Swedish, Finnish, and Danish (Beers Fägersten 2017; Hjort 2017; Rathje 2014). By looking at profanities, a class of lexical items that are widely used in informal communication, we can gain insight into the contours of the online language situation in the Nordic societies as it continues to develop (Coats 2019a, 2019b), and this is what the present study sets out to do. The study explores the following questions: (1) To what extent do Nordic male and female Twitter users use profanities, both Nordic-language and English-language? (2) What profanity types exhibit the largest gender-based differences in use? and (3) What are the implications of differences in the relative frequency of profanity types in Nordic languages and in English according to gender identity?

The article is arranged as follows: Section 2 reviews some previous work and defines the term 'profanity' as it is used in this study, and Section 3 describes data collection and filtering, gender and geographical disambiguation, the profanity wordlists used in the study, and the metric used to gauge gender-based differences in word use. Section 4 provides examples of tweets containing profanities in the major Nordic languages, then shows the male-female differences in Iceland, Norway, Denmark, Sweden, and Finland. In Sections 5 and 6, the results are discussed and a conclusion and future outlook are provided.

## 2. Previous work

In recent work, research into gender differences in profanity use has been undertaken using corpora of speech or written text (from print and internet sources) and data collected from surveys.

In the British National Corpus, males use the word *fuck* more than do females, both in spoken and written language (McEnery, Baker, and Hardie 2000a, 2000b; McEnery and Xiao 2003). Several recent survey-based studies have also found gender-based differences in the use of potentially offensive words. Stapleton (2003) administered a survey on the use of 14 potentially offensive swear words to 15 males and 15 females in Northern Ireland, and reported that females use the words less often than do males and are more sensitive to their perceived offensiveness (Stapleton 2003, 26). She suggests, however, that the relationship between gender and swearing is “more complex,” and that for some females in some contexts, swearing may contribute to the construction of a “community-specific version of femininity” (2003, 32). Dewaele (2004) found that females consider profanity words to have more emotional force than do males, and that speakers consider swear words in their first language to have more emotional force than swear words in other languages they speak.

In Nordic contexts, several studies have been based on survey data. Andersson (1977) administered a survey to 95 males and females of different ages in Gothenburg, Sweden. Younger females were more likely than younger males to report negative attitudes toward the use of Swedish-language swear words, while for older informants, gender differences were minimal. Stroh-Wollin (2010) conducted a survey using a similar approach among 68 respondents of different ages in Uppsala, and found that traditional Swedish swear words, which typically make reference to God or the Devil, have become less taboo, while words pertaining to sexual activities have become more used as swear words, particularly among young people. Confirming one of Andersson’s earlier findings, she found that gender-based differences in attitudes toward swearing were minimal for older people, but for younger people, females showed more negative attitudes. Rathje (2014) used a survey methodology to investigate attitudes toward profanity use in Danish among young people and the elderly, and found that younger respondents are more likely to consider English-language profanities such as *fuck* and *shit* to be strong swear words when used in Danish than are older respondents. Hjort conducted a survey on attitudes toward swearing in Finnish; males were found to report higher frequencies of swearing (Hjort 2017, 237), although it was proposed that the relationship between gender and swearing is “much more complex” (2017, 232), as it can also depend on interlocutor and contextual factors such as age, social class, group composition, and speech situation.

Studies based on transcriptions of spoken language have found similar patterns. Mehl and Pennebaker had English-speaking university students in the United States wear devices that recorded a portion of their spoken interaction over a two-day period. Frequency counts of transcribed words showed a much higher use of swear words by males (Pennebaker 2003, 865). McEnery examined the frequency of 50 “bad language words” in the spoken portion of the British National Corpus. He found that rates of use were approximately the same according to gender, but that males were more likely to use “stronger” words such as *fuck* or *cunt*, while females were more likely to use milder swears such as *bloody*, *hell*, or *bitch* (McEnery 2006, 29). In a study of naturalistic spoken interaction among university undergraduate students in the United States, Beers Fägersten found that males use profanities more than females (Beers Fägersten 2007, 36).

For written language, whether in traditional text types or CMC, most research has found a similar male overuse of profanity (i.e., higher relative frequencies for profanity word types). Argamon et al. (2007) compiled 140 million words of text from English-language blogs hosted at blogger.com in 2004. A factor analysis of the 1,000 most frequent words resulted in 20 factor groups, many of which showed differences in frequency of use by males and females. The factor “swearing” was slightly more strongly associated with females. However, many of the 18 words whose frequencies comprised this factor are often used in nonswearing contexts (e.g., *stupid*, *hate*, *drunk*, *kill*, *guy*, *kid*, *sex*, or *crazy*). Newman et al. (2008) analyzed the relative frequencies of different semantic and functional word categories in a corpus of 14,000 English-language texts. They found higher use of swear words in the male-authored texts. Thelwall (2008), analyzing 9,376 short profile texts of users of the social media platform MySpace, found higher rates of “strong swearing” (i.e., the words *fuck*, *cunt*, *nigger*, and *motherfucker*) amongst male users, but similar rates of use for males and females of “moderate” and “mild” swear words (e.g., *arsehole*, *bastard*, *shit*, *bugger*, *bimbo*, *jug*, *cow*, and others). The classification of swear words as strong, moderate, or mild was based on a list prepared for the BBC.

Schwartz et al. (2013) analyzed personality traits, gender, and age as manifest in a corpus of Facebook posts by 75,000 authors using LIWC (Tausczik and Pennebaker 2010), a text analysis program that counts the frequency of word types in different psychological categories. They found higher male use for swear words. Bamman, Eisenstein, and Schnoebelen (2014) found higher male use of swear words in a large corpus of English-language Twitter messages from the United States. Wang et al. (2014) collected 51 million English-language tweets from the Twitter Streaming API and analyzed patterns of cursing using a lexicon-based approach. They found that males curse more overall, and that in tweets directly addressed to another user, more curse words are used if the addressee is of the same

gender. Of the words in their lexicon, most were more used by males. Lutzky and Kehoe (2016) investigated the use of 80 swear words in a corpus created from WordPress and Blogger blogs and user comments on those blogs. In a collocational analysis, they found that “core swear words” (such as *fuck*, *shit*, and *ass*) tend to group together. Gauthier and Guille (2017) analyzed the use of 26 swear words according to gender and age in a corpus of tweets geo-located to the United Kingdom. They found that younger females were more likely to use the words *bloody*, *bitch*, and *crap* than were younger males, who used the other 23 words in the list more frequently. The finding was interpreted along the same lines as those of McEnery (2006) as evidence that females avoid the use of “stronger” profanities. Zenner, Ruette, and Devriendt (2017) investigated the borrowing of English swear words in Dutch in a corpus of Dutch-language tweets. After manually annotating all occurrences of English swear words, they found that shorter swear words were more likely to be borrowed, as were words they assigned to the semantic category “behavior.” The status of Dutch swear words was not considered.

## 2.1. Defining swearing, ‘bad language’ and profanity

Research into ‘bad language,’ swearing and profanity have grappled with the problem of definitions, as several lexical, pragmatic, syntactic, and orthographical considerations play a role in its constitution. Ljung, in a study of swearing cross-culturally, proposed four defining criteria: An utterance must contain taboo words, the words must be used in a nonliteral meaning, they must qualify as formulaic language, and they must represent emotive language, i.e., “reflect the speaker’s feelings and attitudes” (Ljung 2011, 4). Although such a definition benefits from precision, it may not be applicable to all instances in which potentially objectionable words are used, and it may be difficult to operationalize in a large corpus-based study in which thousands or millions of word tokens could potentially represent profanity. As Beers Fägersten and Stapleton point out, terms such as “taboo,” “stigmatized,” or “inappropriate” are themselves necessarily dependent on communicative and contextual factors (Beers Fägersten and Stapleton 2017, 3). The stigmatized status of lexical types differs between and within cultures and changes over time. Marsh notes that even making direct reference to *trousers* was considered inappropriate in polite society in Victorian Britain (Marsh 1998, 2015). While the use of swear words is undoubtedly associated with strong emotion in many cases, it can have various pragmatic functions, many of which do not necessarily involve strong emotion: Thelwall (2008) identifies several pragmatic contexts for the use of this lexical class, including expression of in-group identity, communication of closeness, emotionally neutral discussion of taboo topics, use in jokes or humor, erotic stimulation, or manifestation of a neurological condition. The proposed nonliteralness

criterion is also problematic: Many speakers would take offense to the use of words such as *fuck* or *shit* even when they are used in their primary denotative meaning.

Assessing the taboo status, the literalness, or emotive content of a short text message (and thus determining whether or not a particular lexeme is used as a swear, according to Ljung's definition) requires a pragmatic perspective on language, in which language choices are interpreted in terms of the contextual factors that govern the act of communication as well as the intentions of the interlocutors. The pragmatic function of Twitter texts, however, can be difficult to interpret: In a short qualitative analysis of the communicative functions of tweets, Crystal notes that for many messages, the pragmatic function is "uncertain" (Crystal 2011, 49), and that the difficulty of accurately categorizing the communicative function of tweets "is bound to raise problems of analysis because not everyone understands functional labels in the same way" (2011, 51).

As far as emotional use of language is concerned, it can be difficult to accurately identify the emotional state of the author of short, isolated texts such as tweets, and disambiguating the pragmatic function of particular turns in communication typically requires contextual information, which for tweets is necessarily limited by channel considerations. A *fuck* in a tweet by a traveler whose flight has been delayed may well represent anger directed at an airline, whereas the same lexeme in other contexts could correspond to bemusement, solidarity, indifference, or other emotional states.

While it may be possible to manually classify communicative functions of individual tweets that contain potentially offensive lexical types, doing so for all instances of potential profanity types in a large corpus is impractical. One approach is to manually assess a small sample: In a study of borrowed English swear words in Dutch-language tweets, Zenner, Ruette, and Devriendt (2017) attempted to verify the use of certain lexical items as swears or insults by checking samples of potential swear word types and then extrapolating the proportion used as swear words to the entire corpus. The method identified those items that are typically found in lists of profanities, such as *shit*, *damn*, or *fuck* as swear words; types such as *dog* were found to be nonswear words. Manual annotation can be time consuming, and the problem is exacerbated by large corpus size and tweets in multiple languages, which would ideally need to be classified by L1 annotators.

In terms of the word types counted as swears or curses, most studies have not attempted to disambiguate pragmatic context (e.g., McEnery, Baker, and Hardie 2000a, 2000b; McEnery 2006; Thelwall 2008; Wang et al. 2014; Bamman, Eisenstein, and Schnoebelen 2014), but relied on pre-existing lists, in some cases augmented by researcher intuition. McEnery, for example, utilized a short word list consisting of the items *arsehole*, *bastard*, *bitch*, *bugger*, *cow*, *cretin*, *cunt*, *fart*, *fucker*, *idiot*, *imbecile*, *moron*, *pig*, *pillock*, *prat*,

*prick, shit, sod, sow, swine, tit, turd, and twat*, amended “on the basis of my own intuition” (McEnery 2006, 40). Thelwall (2008), Wang et al. (2014), Gauthier and Guille (2017) and Zenner, Ruette, and Devriendt (2017) utilized larger pre-existing English word lists.

In this study, a novel method of generating wordlists was developed, based on targeting the usage annotations of several large Nordic-language dictionaries. Scripts were used to scrape the content of the dictionaries and collect words with annotations such as ‘vulgar,’ ‘derogatory,’ or ‘swear,’ resulting in large lists of words that can be considered inappropriate or objectionable, whether used in a literal or a nonliteral sense, and not taking into account the emotional state of the speaker/user or the pragmatic function of the lexical item in its local context. This approach captures those types that are almost universally considered to be swearing (e.g., *fuck, helvete, perkele*), as well as nonswearing items with derogatory connotations. In the following, such expressions are referred to collectively as profanities or ‘bad language.’

### 3. Data and methods

Data for the study were collected from Twitter by targeting users based in Nordic countries who tweet both in English and in a Nordic language. From a global ‘seed’ corpus of 650 million tweets with ‘place’ metadata collected in 2016 and 2017, Nordic users were identified on the basis of location metadata in the tweet. Those with names likely to be male or female were identified and their user timelines (up to 3,250 tweets) were downloaded. Tweets from bots were excluded by targeting the ‘source’ metadata entity.

#### 3.1. Location filtering

At the time of data collection, tweet metadata could include several types of location information: the ‘location’ field within the user profile, the ‘place’ entity for individual tweets, and if a user had enabled the feature that uses GPS to geolocate a device, the ‘geo’ entity, showing the coordinates of the device when the tweet was broadcast. Relatively few tweets contained (the now-deprecated) ‘geo’ metadata (Laylavi, Rajabifard, and Kalantari 2016), and because ‘place’ metadata may be used to indicate that a user is traveling or is commenting on an event associated with a particular place (e.g., “Denmark reported to be world’s happiest country”), it is not always a reliable indicator of user location. Geolocation based on more than one metadata field has been shown to be more accurate than relying on only one of the three metadata fields (Schulz et al. 2013; Ajao, Hong, and Liu 2015). For this study, users were assigned to a Nordic country by identifying those for whom the country referenced in the user profile matched the country referenced in the majority of place mentions sent by that user. The user



profile field was searched using a dictionary of 1,627 place names in the Nordics. Tweets producing matches were included in the data set, and the user profiles were subsequently disambiguated for author gender.

### 3.2. Gender disambiguation and language filtering

User gender was disambiguated on the basis of name frequency data obtained from the statistical offices of the Nordic countries (see Coats 2019a). Users for whom the ‘name’ value in the profile matched a given name assigned to one gender with a probability value of  $\geq .8$  were retained in the name set for that country. User timelines (up to 3,250 tweets) of matching users were then downloaded from the Twitter REST API. From this set of more than 31 million tweets, those for whom the user profile text was in a Nordic language (over 14 million) were retained. Very few users from Iceland had set the language of their Twitter interface to Icelandic; therefore Icelandic users with English-language Twitter interfaces were included in the sample.

For each user, only tweets in English and in the principal official language of that user’s country location were retained, based on the automatic language identification metadata in the tweet. Thus, the script retained Icelandic and English for Iceland-based users, Norwegian (both Bokmål and Nynorsk) and English for Norwegian-based users, Danish and English for Denmark-based users, Swedish and English for Sweden-based users, and Finnish and English for Finland-based users. Tweets were tokenized using the Twitter tokenizer provided in the *Natural Language Processing Toolkit* (Bird, Loper, and Klein 2019). The number of users and tweets and the total number of tokens are provided according to gender and country in Table 1.<sup>1</sup>

**Table 1.** Corpus summary statistics.

Country	Gender	# Users	# Tweets	Total # Tokens
Iceland	f	435	337,420	4,717,509
	m	733	685,011	9,721,492
Norway	f	566	361,046	5,475,649
	m	1,094	883,545	13,820,561
Denmark	f	1,134	570,981	8,649,645
	m	1,813	1,442,254	23,055,751
Sweden	f	2,883	2,346,093	33,644,910
	m	4,825	4,509,722	65,674,985
Finland	f	2,349	1,241,541	17,085,307
	m	2,854	2,000,685	27,683,445
<b>Totals</b>		18,686	14,378,298	209,529,254

<sup>1</sup>The Tweet IDs for the data analysed in this study are available at <https://github.com/stcoats/NordicGenderProfanity>.

### 3.3. Sources of profanity

For English, most corpus-based studies of swearing and profanity have relied on lists of words deemed to be offensive according to the judgment of the study's author(s) or of others (e.g., McEnery 2006; Thelwall 2008; Wang et al. 2014; Bamman, Eisenstein, and Schnoebelen 2014; Zenner, Ruetten, and Devriendt 2017). For this study, the 'bad-language' vocabulary of the Nordic languages was obtained by conducting targeted web scrapes of monolingual Nordic-language dictionaries. The dictionaries scraped were the Icelandic *Íslensk nútíamálsorðabók*, the Norwegian *Det Norske Akademis Ordbok*, the Danish *Den danske Ordbog*, the Swedish *Svensk Ordbok* and the Swedish Wiktionary, and the Finnish *Kielititoimiston sanakirja*.<sup>2</sup> Words were targeted if their usage annotation included terms such as 'swear word,' 'derogatory,' 'vulgar,' 'term of abuse,' or similar values.

#### 3.3.1. Nordic online dictionaries

For Icelandic, the initial word list consisted of 204 items of the *Íslensk nútíamálsorðabók* containing the annotations *blótsyrði* 'swear word,' *gróft* 'coarse/vulgar,' or *niðrandi* 'derogatory'; inflected forms were retrieved from the *Beygingarlýsing íslensks nútíamáls*, the Database of Icelandic Morphology (Bjarnadóttir 2017). These included definite and indefinite forms of nouns in singular and plural in the nominative, accusative, dative, and genitive cases; inflections according to gender, case, number, definiteness, and degree for adjectives; and for verbs present and preterite indicative and subjunctive forms, as well as verbal forms used in impersonal constructions and the middle voice, plus imperatives, participles, and supine forms.<sup>3</sup> False positives were excluded by checking if any of the inflectional forms for an identified term were also attested for a nonprofanity word: for example, *ári*, a term with the approximate meaning 'little devil,' is noted to be a mild profanity, but can also be the indefinite dative singular of the neuter strong-declension-class word *ár* 'year.' After the exclusion of such ambiguous items, the Icelandic list of potential profanity items comprised 2,251 forms.

For Norwegian, the Norwegian Language Council (*Språkrådet*) maintains extensive dictionaries of Bokmål and Nynorsk, the *Bokmålsordbok* and the *Nynorskordbok*, which are also available in XML format at the

<sup>2</sup>The ISLEX dictionary of the *Stofnun Árna Magnússonar í íslenskum fræðum* (the Árni Magnússon Institute for Icelandic Studies), which contains translations of approximately 58,000 headwords from Icelandic into Danish, Norwegian, Swedish, Faroese, and Finnish (Úlfarsdóttir 2015), was considered as a source of potential profanities, but due to the relatively modest size of the resulting word list (139 lexemes), an approach based on monolingual dictionaries was used.

<sup>3</sup>An overview of the inflectional forms provided for headwords in the Database of Icelandic Morphology can be found at <https://bin.arnastofnun.is/DMII/infl-system/>.

Language Bank of the Norwegian National Library.<sup>4</sup> These dictionaries contain, for some headwords, usage notes comparable to the annotations found in the *Íslensk nútímamálsorðabók* and other large Nordic dictionaries. The larger *Norske Akademis Ordbok* (225,000 headwords, compared to 65,000 for the *Bokmålsordbok* and 90,000 for the *Nynorskordbok*), however, contains many additional words with annotations indicating their status as potential profanities, such as *tyskerhore* ‘German whore,’ *skapphomo* ‘closeted homosexual,’ or *erkedum* ‘exceptionally dumb.’ In addition, the usage notes of the *Bokmålsordbok* and the *Nynorskordbok* are sparser, with no usage annotation for words such as *drite* ‘to shit’ or *pikk* ‘cock,’ terms that are labeled *vulgært* ‘vulgar’ in the *Norske Akademis Ordbok*. For these reasons, words were selected from the latter dictionary on the basis of the presence of the terms *vulgært* ‘vulgar,’ *nedsettende* ‘derogatory,’ *kraftuttrykk* ‘expletive,’ *skjellsord* ‘term of abuse,’ or *i eder* ‘in oaths’ as a stylistic annotation. In order to exclude false positives, only those items containing the usage annotation for the first provided definition were collected. A script was devised to create inflected forms of the retrieved Norwegian words, based on the inflectional endings available on the word’s page in the *Norske Akademis Ordbok*: for nouns, the determinate and indeterminate forms in singular and plural, for adjectives the common and neuter declinations in singular and plural, and for verbs, the indicative present, preterite, perfect participle, and verbal substantive forms ending in *-ing*, *-ning*, or *-else*.<sup>5</sup> From these words, and a smaller set retrieved from an online resource containing a list of profanity items (Gianotto 2013) possible possessive/genitive and passive verbal forms were generated by suffixing *-s* to the inflections created in this manner. The procedure resulted in 1,107 words, and in total 7,942 potential inflected or derived forms. *Det Norske Akademis Ordbok* is a Bokmål dictionary, and as such the present study does not consider profanity items in Nynorsk, except those that have the same orthography as their Bokmål counterparts.

The Danish profanity items were based on a scrape of 106,379 headwords of *Den Danske Ordbog*,<sup>6</sup> maintained by the Danish Society for Language and Literature. All lemmas that included *nedsettende* ‘derogatory,’ *skældsord* ‘term of abuse,’ *meget uformelt* ‘very informal,’<sup>7</sup> or *bandeord* ‘swear word’ as an annotation under *sprogbrug* ‘usage’ were retrieved, including all inflected forms provided for that lemma (for

<sup>4</sup><https://www.nb.no/sprakbanken>.

<sup>5</sup><https://naob.no/veiledning/boyning/>

<sup>6</sup><https://ordnet.dk/ddo>.

<sup>7</sup>*Meget uformelt*, in the Danish dictionary, corresponds approximately to the labels *vulgært* and *vulgärt* in the Norwegian and Swedish dictionaries: it is used to label words that refer to sexuality and bodily processes, such as *fisse* ‘cunt’, *kneppe* ‘to fuck’, *pisse* ‘to piss’, *røvpuler* ‘assfucker’, and others.

nouns the indefinite and definite singular and plural endings, for verbs the present indicative, preterite, and past participle endings). Polysemous words were only considered profanities if one of the target annotations appeared in the headword's first definition provided by the dictionary; for lexemes with multiple dictionary entries, only if the target annotations appeared in the first given definition for all dictionary entries. To this list, some additional items were added from online wordlists prepared for webmasters seeking to control profanity on websites (Emerick and Lindiakos 2015; Gianotto 2013), then potential genitive and possessive forms and passive verb forms were generated by adding the -s ending to the items. The procedure resulted in a list of 596 lexical items, and in total 3,481 forms, including potential inflections.

For Swedish, the usage annotations of the *Svensk Ordbok*,<sup>8</sup> published by the Swedish Academy, were found to be fewer in number compared to those of the other Nordic dictionaries. A scrape of lemmas containing the usage notes *nedsätt.* or *nedsättande* 'derogatory,' *svordom* 'curse,' *stöt.* or *stötande* 'offensive,' and *kraftuttr.* or *kraftuttryck* 'swear word' in the first dictionary definition resulted in 55 lexical items. The Swedish Wiktionary proved to be a more extensive repository of potentially offensive terms,<sup>9</sup> including items not attested in the *Svensk Ordbok*, but found in Swedish-language tweets, such as *bajspackare* 'fudge packer' or *geggveck* 'vagina.' All entries listed on the Swedish wiktionary category pages *nedsättande* 'derogatory,' *skällsord* 'term of abuse,' *vulgärt* 'vulgar,' and *svordomar* 'swears' were collected.<sup>10</sup> A script then selected those words with the targeted usage annotation in the first provided definition for the item, or in the first definition of all corresponding lemmas, if more than one entry was present in the dictionary for the word. Likewise, lemmas with multiple grammatical classes were excluded if the first definition entry for each class did not have a potentially offensive meaning (e.g., *sopa* 'to sweep' as a verb, but 'waste' as a noun, listed as colloquial and derogatory in the Swedish wiktionary and as colloquial in the *Svensk Ordbok*; cf. *hora* as a noun 'whore,' as a verb 'to whore,' both listed as derogatory in the Swedish dictionaries). Inflections for Swedish items, if available, were retrieved from the corresponding html objects on the definition pages. For nouns, inflected forms typically included the singular and plural definite and indefinite forms in nominative and genitive cases, and for verbs the active and passive infinitive, present, preterite, and supine forms, as well as the present and perfect participles. Included adjectival inflections were the singular and plural neuter and common forms, as well as, for some

<sup>8</sup><https://svenska.se/so>.

<sup>9</sup><https://sv.wiktionary.org>.

<sup>10</sup><https://sv.wiktionary.org/wiki/Kategori:Svenska/Skällsord>, <https://sv.wiktionary.org/wiki/Kategori:Svenska/Nedsättande>, <https://sv.wiktionary.org/wiki/Kategori:Svenska/Vulgärt>, <https://sv.wiktionary.org/wiki/Kategori:Svenska/Svordomar>.

words, comparative and superlative forms. The procedure resulted in 286 lexical items; combined with the types from the *Svensk Ordbok* and including inflections, possessive/genitive forms and passive voice -s endings, this resulted in a list of 2,486-word forms.

For Finnish, a script was written to retrieve all headwords from the *Kielitoimiston Sanakirja* that included the terms *kirosana* ‘swear word,’<sup>11</sup> *kirosanana* ‘used as a swear word,’ *halv.* (*halventavasti* ‘derogatory’), or *alat.* (*alatyylinen* ‘vulgar’) in the usage notes. For polysemous items, only words with the targeted usage notes in the first definition were extracted. Inflected forms were retrieved from the same resource: for nouns, singular and plural inflections in nominative, genitive, partitive, and illative cases were included, and for adjectives, comparative and superlative forms. For verbs, the infinitive I., the active indicative present 1<sup>st</sup> person singular, the active indicative imperfect 3<sup>rd</sup> person singular, the active conditional present 3<sup>rd</sup> person singular, the active potential present 3<sup>rd</sup> person singular, the active imperative present 3<sup>rd</sup> person singular, the active participle II. form, and the passive imperfect form were included. Some additional types were added on the basis of online lists (Emerick and Lindiakos 2015; Gianotto 2013). The Finnish material consists of 368 lexical items, corresponding to 3,231 forms in total. The final word lists were manually checked and edited to remove false positives.

### 3.3.2. English word list

For English,<sup>12</sup> lists from two crowd-sourced sites were combined with a list of 1,343 potentially offensive terms created at Carnegie-Mellon University;<sup>13</sup> the aggregated list was edited manually to remove duplicates and words whose potential offensiveness was judged to be minimal (e.g., *German*, *liquor*, or *sick*, among many others). Additional lexemes were added from headwords in the *Oxford English Dictionary* containing the usage annotations ‘derogatory’ and ‘coarse slang.’ An attempt was made to generate inflected forms (plurals and verb declensions) for the English words with the Snowball stemmer,<sup>14</sup> but it was found that this procedure resulted in many errors, likely due to difficulties with handling out-of-vocabulary stems. Plural forms, compounds, orthographical variants, and inflected forms of verbs were then created for the English items by using regular expressions and through manual editing. In total, the English list comprises 419 base lexical items and 1,546 forms.<sup>15</sup>

<sup>11</sup><https://www.kielitoimistonsanakirja.fi>.

<sup>12</sup><https://www.noswearing.com/dictionary> and <http://www.youswear.com>.

<sup>13</sup><http://www.cs.cmu.edu/~biglou/resources/>.

<sup>14</sup><https://snowballstem.org/>.

<sup>15</sup>The profanity items are available at <https://github.com/stcoats/NordicGenderProfanity>.

### 3.3.3. Word list considerations and caveats

The lists for the different languages are extensive, but they are not necessarily equivalent in terms of their semantic and pragmatic coverage. The editorial procedures of the teams that compiled the dictionaries are unlikely to have been exactly the same, a fact evident in differences in the usage annotations applied to words in similar semantic classes. For example, *Den Danske Ordbog* does not have a usage annotation tag that corresponds directly to the ‘vulgar’ tags of the *Íslensk nútímamálsorðabók*, *Det Norske Akademis Ordbok*, or the Swedish Wiktionary; the Danish *meget uformelt* ‘very informal’ tag is applied to some potentially offensive words denoting sexuality and bodily processes, but not all words in this class. For Swedish, many lexical items from the category ‘vulgar’ in the Swedish Wiktionary have the label *vardagligt* ‘informal/colloquial’ or *starkt vardagligt* ‘very informal/colloquial’ in the *Svensk Ordbok*, but the *vardagligt* annotation is also used for informal language that is unlikely to be considered vulgar or offensive, such as the intensifying blending element *jätte-* ‘super, very.’

The inflections available in the scraped resources differ somewhat for the languages under consideration. For example, the *Database of Icelandic Morphology* provides an extensive listing of inflectional forms for lexemes in Icelandic, but for Finnish, a language exceptionally rich in inflectional forms, the *Kielitoimiston sanakirja* provides only a subset of the possible forms. For Finnish nouns, the inflections corresponding to the principal grammatical cases (nominative, accusative/genitive, partitive) and the illative case are provided, but not the forms for the other locative cases.<sup>16</sup> The Danish, Norwegian, and Swedish dictionaries scraped for the study provide the basic inflectional forms for nouns, adjectives, and verbs, but are not entirely consistent in how some word classes are treated, such as comparatives or possessives/genitives. Words formed from the compounding of profanity stems are not captured in the frequency statistics, unless the compound itself was determined to be a profanity item (i.e., has a headword entry in a sampled dictionary). Thus, compounds such as *skidesjovt*, Dan. approx. ‘fucking fun,’ from *skid* ‘shit’ and *sjov* ‘fun’ are not counted. In addition, because not every dictionary page for every word in the Nordic lists was manually checked, the possibility that a word may be missing from a list cannot be ruled out: a nonstandard configuration of the html elements on that word’s dictionary page could cause the scrapers built for this study to miss the relevant entity.

Wordlists compiled for the study were checked for the languages under consideration by L1 speakers, whose opinions about the status of a given

<sup>16</sup>Some locative Finnish forms are included in the Finnish ‘bad language’ list due to their inclusion in the supplementary resource used to augment the list (Gianotto 2013).

word as derogatory, vulgar, or offensive was not always in accord with the word's dictionary usage annotation. Except in the case of false positives, and in order to maintain consistency, words were not removed from the lists on the basis of their not being "offensive enough."

Despite these differences between the annotations in the dictionaries, because the same lists are used to compare frequencies amongst males and females in each language, they do not affect within-country gender differences. Nevertheless, because the items in the lists are not entirely equivalent, differences between individual countries in terms of relative frequencies of profanity are not necessarily meaningful.

### 3.4. Quantifying usage differences

In general, frequency distributions for content word types in corpora are highly skewed: for a given word type, some users may use the type relatively frequently, but many users will use it infrequently or not at all. Comparing relative frequencies using hypothesis testing can therefore be problematic, as the assumptions that underlie commonly used statistical tests such as Pearson's  $\chi^2$  test of independence or the log-likelihood test (e.g., normally distributed test statistics or the 'bag of words' model, i.e., statistical independence of word co-occurrence) may not be met. Previous studies have advocated different approaches to the measurement and comparison of word frequencies, for example, the use of nonparametric statistical tests based on rank-ordering or employing random resampling techniques (Lijffijt et al. 2016), the transformation of relative frequency counts to a more normal-like distribution and the calculation of an ordinary least-squares regression coefficient (Schwartz et al. 2013), or a focus on dispersion and effect sizes, rather than hypothesis testing and p values (Gries 2005).

For the highly skewed count data that constitutes the frequencies of profanity items in this study, country-level differences (treated in Sections 4.1 and 4.2) are evaluated according to gender by means of the Mann-Whitney  $U$  test, a nonparametric test for the comparison of two distributions in which the null hypothesis (in the nondirectional version of the test) is that it is equally likely that a randomly selected value from distribution 1 is greater than or smaller than a randomly selected value in distribution 2. Because the Mann-Whitney  $U$  test considers rank orders, rather than the values associated with these ranks, it is not a test of the equivalence of mean values for two samples like Welch's  $t$ -test for independent samples. Rather, the Mann-Whitney  $U$  test compares the means of the ranks, and thus the medians of the underlying values for the two samples. A test statistic whose calculation is based on rank order, rather than on relative frequency, can help to mitigate the effects of low dispersion and heterogeneity of variance (Sheskin 2000).



A commonly used effect size measure for the Mann-Whitney  $U$  test is the rank-biserial correlation coefficient  $r_{bc}$ , which can be derived from the parameters of the Mann-Whitney  $U$  test (Kerby 2014) or from the equation for another ranking coefficient, Spearman's rho (Glass 1965). The coefficient, which is also used in the present study, is the proportion of all possible pairings between the values in sample 1 and sample 2 in which the rank for the value from sample 1 is lower than the rank for the value from sample 2, minus the proportion of pairings in which this is not the case. Like other correlation coefficients, the rank-biserial correlation coefficient ranges in value from  $-1$  to  $1$ .

For individual lexical items (treated in Section 4.3), differences in use are reported not on a per-user basis, but by aggregating all uses of a given type according to the gender of the user, then calculating the log-likelihood measure  $G$  (Dunning 1993; Rayson and Garside 2000). A  $G$  value of  $0$  indicates no difference in relative frequency; higher  $G$  values indicate greater differences in relative frequency.

### 3.5. Examples of profanity use

As mentioned above, a caveat pertains to the pragmatic contexts of the use of profanity items, an issue that is crucially related to the definition of profanity or swearing. Many of the items in the profanity lists, although selected on the basis of usage note annotations that can be translated as 'derogatory,' 'offensive,' or 'vulgar,' can also be used inoffensively, for example, as playful expressions, solidarity markers, or, for polysemous items, with a secondary, inoffensive denotation. This issue can be exemplified in the following example tweets. The original tweet text is presented in italics followed by an English translation in normal typeface. User screen names and URLs have been anonymized.

#### 3.5.1. Iceland

Tweets from Iceland contain a range of Icelandic-language profanities:

'@User nei hvur andskotinn.' '@User no where damnit.'

'Vonandi er gaurinn með "*helvítis fokking fokk*" skiltið á Austurvelli. #Cashljós' 'Hopefully the guy with the "hell fucking fuck" sign is on Austurvöllur. #Cashljós'

In the second example, Austurvöllur (dative *Austurvelli*) is a public square in the Icelandic capital Reykjavík. In addition to the profanity *helvítis*, the text contains the word *fokk*, an orthographically assimilated version of 'fuck,' as well as the form *fokking*, which, despite the assimilation of the verbal root to Icelandic phoneme-grapheme norms, retains the ending of the English participle.



### 3.5.2. Norway

*Jævla* ‘devil’ can be used as an adverbial intensifier approximately equivalent in meaning to Engl. ‘fucking.’

‘*Du er en jævla weirdo . . . . Men jeg elsker det*’ ‘You are a fucking weirdo . . . . But I love it’

### 3.5.3. Denmark

Danish tweets contain items such as *helvede* ‘hell,’ *lort* ‘shit,’ *pis* ‘piss,’ and the borrowing *fuck*, which is listed as a headword in *Den Danske Ordbog* and thus is also considered a Danish profanity in this study.

‘*Fuck det lort. For helvede pis altså*’ ‘Fuck that shit. For fuck’s sake piss then’.

### 3.5.4. Sweden

Traditional Swedish-language profanities such as *fan* ‘Satan,’ *jävla* ‘devil’ or *helvete* ‘hell’ are relatively common in the Swedish tweets. In the first example below, the author discusses football/soccer strategy. In the second example, the author expresses an opinion about a film.

‘@User ja det vore väl själva fan om man inte ska hitta rätt målvakt nån jävla gång.’ ‘@User yes it would really be shit if you couldn’t find the goal-keeper any fucking time’.

‘@User hur fan kan man rösta på Fight Club?! Den “twisten” kom ju 20 min innan slutet’ ‘@User how the devil can you vote for Fight Club?! The “twist” came 20 minutes before the end’

### 3.5.5. Finland

Tweets from Finland exhibit profanities such as *helvetti* ‘hell,’ *saatana* ‘Satan,’ or *vittu* ‘cunt’ (used also as an intensifier), as in the following examples:

‘No mitä helvettiä, lopettivat jo nyt lyhyt keikka + hyvä musiikki ei vaan toimi, #bubkatse no onneksi on halpaa olutta.’ ‘Well what the hell, they’ve already stopped a short gig + good music aren’t working, #bubkatse but luckily there is cheap beer.’

‘@user himos festival tulee teeveestä . . . .vittu mitä legendaa . . . .äijä on vittu paras . . . .saatana.tää on ROKKIA!’ ‘@user the himos festival is on tv . . . .fuck what a legend . . . . geezer is the fucking best . . . .fuck.this is ROCK!’

These examples are from a random sample of messages posted by Twitter users in the Nordics, but the patterns observed may not be representative of language use in other Nordic social media genres or in other language contexts in Nordic societies. Finally, the criteria for the definition of profanity are dependent on contextual factors such as local usage norms, situation, and interlocutor or user identity. As such, the approach used in this study

attempts to provide a broad overview of general tendencies in gender-based patterns of profanity use, not to comprehensively capture all manifestations of language that could potentially be objectionable in Nordic Twitter messages.

## 4. Results

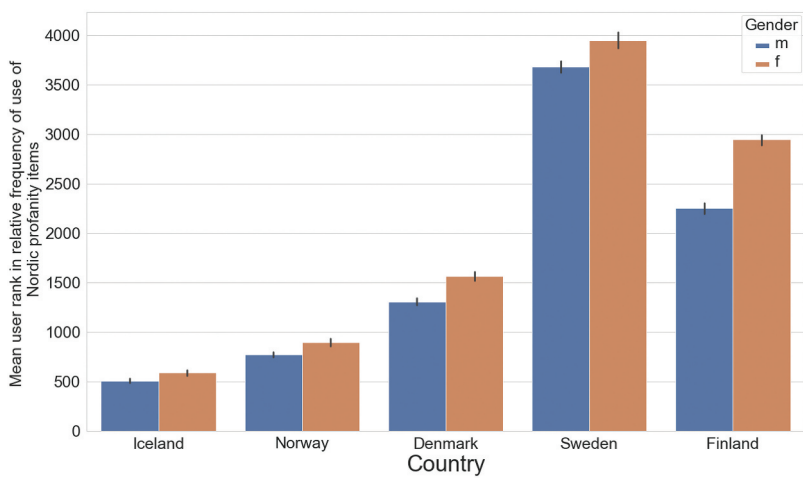
In aggregate, 3,560 of the 19,197 Nordic-language profanity items were attested in the corpus, for a total of 347,580 occurrences. Five hundred and eight of the English-language items were attested for 86,285 total occurrences. Overall, and in agreement with prior analyses of profanity use in English, a relatively small proportion of types thus constitutes the majority of occurrences in the data (Wang et al. 2014; McEnery 2006). For the Nordic languages and English, swear words that can be used to express affect in a range of contexts are among the most frequent types in all of the country-level subcorpora, whereas derogatory or vulgar terms with more specific meanings are less common.

The following sections provide an overview of gender differences in the use of Nordic-language items in Nordic-language tweets (Section 4.1) and English-language items in English-language tweets (Section 4.2), based on mean values per user. Section 4.3 looks at gender differences for individual word types for Iceland, Norway, Denmark, Sweden, and Finland.

### 4.1. Mean use of Nordic profanities by country and gender

Figure 1 shows the mean rank by gender and country for the proportion of the total word count constituted by Nordic-language profanities for the principal language of the country, with bootstrapped 95% confidence intervals shown by the black central line on each bar. In the plot, the user in the corresponding country subcorpus with the highest normalized use of profanity items in that language is assigned rank 1 and the user with the lowest profanity use the highest rank. As is shown, male users show *lower* mean ranks, indicating *greater* use of the ‘bad-language’ items in the lists. Mann-Whitney *U* tests were significant for gender differences in the distributions of relative profanity use for all five countries at  $p = .05$ .<sup>17</sup> Rank-biserial coefficients, which quantify the strength of the gender difference in ranks, were Iceland  $r_{bc} = .15$ , Norway  $r_{bc} = .15$ , Denmark  $r_{bc} = .18$ , Sweden  $r_{bc} = .07$ , and Finland  $r_{bc} = .27$ : Gender-based differences in the aggregate use of these

<sup>17</sup>Iceland  $U = 156,975$ ,  $p = 1.22 \cdot 10^{-5}$ , Norway  $U = 342,511.5$ ,  $p = 1.66 \cdot 10^{-7}$ , Denmark  $U = 1,093,838.5$ ,  $p = 2.96 \cdot 10^{-17}$ , Sweden  $U = 7,171,322.5$ ,  $p = 2.64 \cdot 10^{-7}$ , Finland  $U = 4,136,294.5$ ,  $p = 1.91 \cdot 10^{-68}$ .

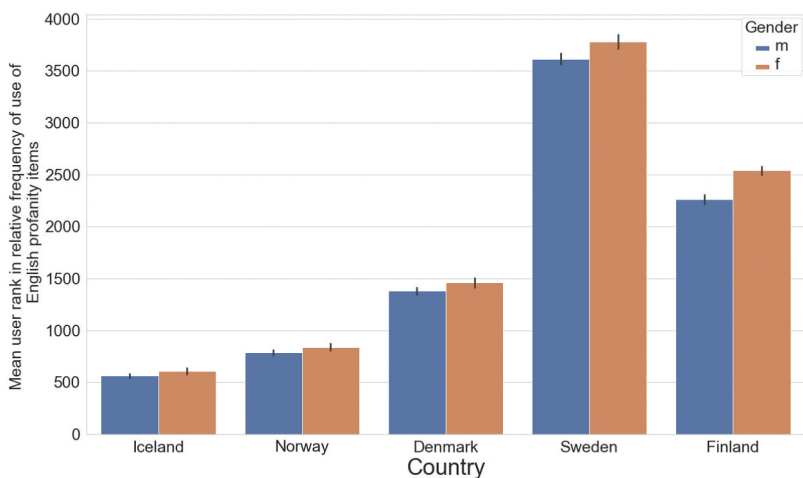


**Figure 1.** Mean rank of relative profanity use by country and gender (Nordic languages).

words are most pronounced in Finland, somewhat less in Iceland, Norway, and Denmark, and least pronounced in Sweden.

**4.2. Mean use of English profanities by country and gender**

For English profanities in English-language tweets, shown in terms of mean user ranks of relative profanity use by country and gender in [Figure 2](#), the picture is similar: males use more English-language profanity than do females. As with the Nordic-language data, Mann-Whitney *U* tests were



**Figure 2.** Mean rank of relative profanity use by country and gender (English).

**Table 2.** Effect sizes for Nordic-language and English-language gender differences.

Country	$r_{bc}(\text{Nordic})$	$r_{bc}(\text{English})$
Iceland	0.15	0.08
Norway	0.15	0.07
Denmark	0.18	0.06
Sweden	0.07	0.04
Finland	0.27	0.12

significant for gender differences in the distributions of relative profanity use for all five countries at  $p = .05$ .<sup>18</sup> Effect sizes, although they show the same country-level trend as is evident with the Nordic lexical items (largest difference in Finland, less in Iceland, Norway, and Denmark, smallest difference in Sweden), were smaller when compared to the Nordic-language samples: Iceland  $r_{bc} = .07$ , Norway  $r_{bc} = .08$ , Denmark  $r_{bc} = .06$ , Sweden  $r_{bc} = .04$ , and Finland  $r_{bc} = .12$ . Male-female differences, as measured by rank-biserial correlation values for the Nordic-language and the English-language subsamples, are summarized in Table 2.

The smaller values of the rank-biserial correlation coefficient for English tweets, compared to Nordic-language tweets, show that male and female use of profanity items is slightly more equal in English, compared to Nordic languages. This may result from attenuation of the stigma associated with ‘bad language’ use in a non-L1 language (Dewaele 2004, 2010), a stigma to which females are proposed to be more sensitive. The possibility is discussed in Section 5 below.

**4.3. Words with the largest male-female difference in use by country**

In Sections 4.1 and 4.2, it was shown that the average male Twitter user in the sample makes more use of profanity items in aggregate than does the average female user, especially when writing in a Nordic language. In this section, the focus is not on per-user frequencies, but on individual lexical items, considered in terms of their aggregate use by all males and females in the corresponding country-level subcorpora. Tables 3–8 show the 20 ‘bad-language’ words with the highest overall frequencies in the subcorpora for the major language of the corresponding country. Word types are aggregated in these tables: frequencies of inflections and derivations, compounds with the same head, and variants with nonstandard orthography are summed.

For the most part, the gender-based trend shown in the data from this perspective is the same as when considering frequencies on a per-user basis. However, it should be noted that aggregating over genders, rather than giving the relative frequency of each user equal weight, relatively emphasizes the

<sup>18</sup>Iceland  $U = 167,731$ ,  $p = 0.025$ , Norway  $U = 307,439.5$ ,  $p = 0.018$ , Denmark  $U = 98,8791$ ,  $p = 0.0065$ , Sweden  $U = 6,580,222$ ,  $p = 0.00047$ , Finland  $U = 3,125,085$ ,  $p = 1.64 \cdot 10^{-18}$ .

contribution of those users who have contributed more tweets to the corpus and de-emphasizes the contribution of users who have contributed less to the total token counts. In addition, it should be kept in mind that for the lower-frequency items in [Tables 3–8](#), the trends may represent the usage of very few users.

**4.3.1. Nordic profanity**

[Table 3](#) shows the results for the 20 most frequent profanity types in Icelandic tweets, with token counts, relative frequencies per 1,000 words,

**Table 3.** Most frequent Icelandic profanities, Iceland.

rank	word	male	female	male_rel	female_rel	G	gender
1	<b>helvíti</b> , helvískir, helvískur, helvítin, helvítinu, helvítis, helvítið, helvítum	1388	341	0.231	0.124	120.158	<b>m</b>
2	<b>andskoti</b> , andskota, andskotann, andskotans, andskotanum, andskotar, andskotarnir, andskotinn, andskotum	612	153	0.102	0.055	50.217	<b>m</b>
3	<b>djöfulli</b> , djöflamergur, djöfuls, djöfulsins	617	145	0.103	0.053	59.419	<b>m</b>
4	<b>ansi</b> , ansans	602	136	0.1003	0.0493	63.607	<b>m</b>
5	<b>fjandi</b> , fjanda, fjandakornið, fjandann, fjandans, fjandanum, fjandinn	361	96	0.06	0.035	24.504	<b>m</b>
6	<b>kúkur</b> , kúka, kúkalabba, kúkalabbi, kúkar, kúkinn, kúkum, kúk, kúkurinn, kúkalabbar, kúknum, kúks	245	151	0.0408	0.0547	7.551	<b>f</b>
7	<b>hálfviti</b> , hálfvita, hálfvitar, hálfvitarnir, hálfvítinn, hálfvítum	128	42	0.021	0.015	3.456	m
8	<b>bölvað</b> , bөлvaða, bөлvaði, bөлvaðir, bөлvaðra, bөлvaðri, bөлvaður, bөлvuð, bөлvuðu, bөлvuðum	94	29	0.016	0.011	3.372	m
9	<b>auli</b> , aulana, aulann, aular, aularnir, aula, aulinn, aulum, aulunum	67	37	0.0112	0.0134	0.617	f
10	<b>tussa</b> , tussan, tussu, tussuna, tussur, tussurnar, tussum	23	65	0.004	0.024	64.72	<b>f</b>
11	<b>gerpi</b> , gerpin, gerpis, gerpið, gerpum	53	10	0.009	0.004	7.2	<b>m</b>
12	<b>hóra</b> , hóran, hóru, hórinni, hórur, hórurnar, hórurum, hóruna, hórurum, hórungi	32	28	0.0053	0.0102	5.379	<b>f</b>
13	<b>tík</b> , tíkin, tíkina, tíkur, tíkurnar, tíkinni	34	23	0.0057	0.0083	1.621	f
14	<b>fjári</b> , fjárann, fjárans, fjáranum, fjára, fjárinn	29	12	0.005	0.004	0.019	m
15	<b>fyllibytta</b> , fyllibyttu, fyllibyttum, fyllibyttuna, fyllibyttunum, fyllibyttur, fyllibytturnar	32	8	0.005	0.003	2.087	m
16	<b>kunta</b> , kuntan, kuntu, kuntum, kuntuna, kuntunni, kuntur, kunturnar	27	4	0.004	0.001	4.759	<b>m</b>
17	<b>plebba</b> , plebbar, plebbi, plebbinn, plebbarnir	15	16	0.002	0.006	4.572	<b>f</b>
18	<b>lessa</b> , lessan, lessum, lessunni, lessur, lessu, lessurnar	8	17	0.001	0.006	12.513	<b>f</b>
19	<b>skramba</b> , skrambans, skrambi, skrambinn, skrattakollar	22	3	0.004	0.001	4.1	<b>m</b>
20	<b>feitabolla</b> , feitabollan, feitabollu, feitabollum, feitabolluna, feitabollur, feitabollurnar	20	3	0.003	0.001	3.219	m

**Table 4.** Most frequent Norwegian profanities, Norway.

rank	word	Male	female	male_rel	female_rel	G	gender
1	<b>fan</b> , faen, faens, fanden, fandens, fanken, fans, fæn, fæns	3,462	864	0.3286	0.2336	85.614	<b>m</b>
2	<b>drite</b> , dreit, dret, drit, driten, driter, drites, dritet, driti, dritings, dritt, dritten, drittsekk, drittsekken, drittsekkene, drittsekker, bedriten, bedritent, bedritne,	1,633	582	0.155	0.1574	0.084	f
3	<b>jævel</b> , jævla	1,117	274	0.106	0.0741	29.954	<b>m</b>
4	<b>helvete</b> , helvetes, helvette, helvettes	837	220	0.079	0.059	15.114	<b>m</b>
5	<b>ræv</b> , ræva, ræven, rævhø, rævhål, rævhøl, rævhølene, rævpule, rævpuling, rævpult, rævva	584	106	0.0554	0.0287	44.54	<b>m</b>
6	<b>idiot</b> , idioten, idiotene, idiotenes, idiotens, idioter, idioters, idiots	529	124	0.05	0.034	17.356	<b>m</b>
7	<b>rakk</b> , rakkerunge, rakkerungen, rakkerungene, rakkett	258	109	0.024	0.029	2.38	f
8	<b>pule</b> , pul, puler, puling, pulings, puls, pult, pulte	217	66	0.0206	0.0178	0.928	m
9	<b>pokker</b> , pokkers	209	64	0.02	0.017	0.805	m
10	<b>piss</b> , pissa, pisser, pissert, pist	232	31	0.022	0.0084	31.448	<b>m</b>
11	<b>satan</b> , satans	203	42	0.019	0.011	10.352	<b>m</b>
12	<b>fuck</b> , fucke, fucket, fucking, fuckings	106	34	0.01	0.009	0.132	m
13	<b>guttunge</b> , guttungen, guttungene, guttungens, guttunger	120	18	0.011	0.005	13.023	<b>m</b>
14	<b>føkk</b> , føkker, føkking, føkkings	88	26	0.008	0.007	0.455	m
15	<b>hore</b> , hora, horebukk, horene, horer, horesønn, horunge	72	21	0.0068	0.0057	0.407	m
16	<b>homo</b> , homoen, homoene, homoer, homos	62	22	0.006	0.006	0.007	f
17	<b>bæsj</b> , bæsjen, bæsjer	59	22	0.006	0.006	0.013	f
18	<b>skite</b> , skiting, skitt	59	19	0.006	0.005	0.04	m
19	<b>bikkje</b> , bikkjen, bikkjene, bikkjenes, bikkjer	47	26	0.004	0.007	2.852	f
20	<b>sinnssyk</b> , sinnssyke, sinnssykt	50	20	0.005	0.005	0.126	f

G values, and an indication of the gender with greater aggregate use, on the basis of overall relative frequency. G values greater than 3.83 are significant at  $p = .05$  (indicated in the tables with bold typeface in the “gender” column).

Males make more use of *helvíti* ‘hell’ and inflected forms, as well as the diabolical types *djöfulli*, *andskoti*, *fjandi*, and *skrambi*. Most words that can be used to cast females in a negative light, such as *tussa* ‘cunt,’ *hóra* ‘whore,’ or *lessa* ‘lesbo’ are more used by females, as is *kúkur* ‘shit.’ *Kunta* ‘cunt’ is more used by males. *Fjári* ‘devil,’ *fyllibytta* ‘drunkard/souse,’ and *feitabolla* ‘fatso’ show slightly more use by males. Due to the relatively small size of the Icelandic subcorpus, for many of the terms in Table 3, gender-based differences are not statistically significant.

In Norway, the most common profanity types are more used by males (Table 4). Devil- and Hell-related words, constituting the traditional Nordic profanities, are represented by the terms *fan*, *fans*, *faen*, *faens*, *fanden*,

Table 5. Most frequent Danish profanities, Denmark.

rank	word	Male	female	male_rel	female_rel	G	gender
1	<b>sgu</b> , <b>sgj</b>	7994	2380	0.4769	0.441	11.315	<b>m</b>
2	<b>fanden</b> , fa'ens, fa'me, fand'me, fandeme, fandens, fandme, faneme, fanme	3178	1334	0.1896	0.2472	63.349	<b>f</b>
3	<b>skidt</b> , skide, skideballe, skideballe, skiden, skider, skiderik, skiderikken, skiderikker, skides, skidt, skisme, skidts	2915	978	0.1739	0.1812	1.193	<b>f</b>
4	<b>kæft</b> , kæfte, kæften, kæfter	2382	862	0.142	0.16	8.367	<b>f</b>
5	<b>søren</b> , søreme, sørens, sørme	2267	579	0.1352	0.1073	25.638	<b>m</b>
6	<b>pisse</b> , pis, pissede, pisser, pisses, pisset	1367	556	0.0816	0.103	20.622	<b>f</b>
7	<b>lort</b> , lorte, lortefilm, lorteland, lortelande, lortene, lortevejr, lortevejret	1151	571	0.069	0.106	67.118	<b>f</b>
8	<b>røv</b> , røve, røven, røvens, røverrede, røves, røvhul, røvhuller, røvhullerne, røvhullet, røvs, røvsyg, røvsyge, røvsygt, røvene	1221	460	0.0728	0.0852	7.891	<b>f</b>
9	<b>satan</b> , sat'me, satans, sateme, satme	1035	272	0.0617	0.0504	9.029	<b>m</b>
10	<b>helvede</b> , helvedes	891	311	0.053	0.058	1.404	<b>f</b>
11	<b>pokker</b> , pokkers	773	316	0.046	0.059	12.11	<b>f</b>
12	<b>idiot</b> , idioten, idiotens, idioter, idioterne, idioternes, idioters, idiots	753	274	0.045	0.051	2.829	<b>f</b>
13	<b>dælen</b> , dæleme, dælens, dælme	601	256	0.0359	0.0474	13.236	<b>f</b>
14	<b>møg</b> , møgdyr, møget, møgso, møgsvin, møgungen, møgungen, møgungens, møgs	218	103	0.013	0.0191	9.405	<b>f</b>
15	<b>åndsboller</b> , åndssvag, åndssvagt, åndssvage, åndssvagt	197	94	0.012	0.017	8.968	<b>f</b>
16	<b>pik</b> , pikhoved, pikke, pikkemand, pikkemænd, pikken, pikkens, pikansjos	177	79	0.0106	0.0146	5.249	<b>f</b>
17	<b>fjols</b> , fjollehoved, fjolser, fjolserne, fjolsernes, fjolset, fjolsets	173	60	0.01	0.011	0.175	<b>f</b>
18	<b>populisme</b> , populismen, populismens, populist, populisten, populisternes, populisternes	187	37	0.011	0.007	7.657	<b>m</b>
19	<b>gu</b>	139	48	0.008	0.009	0.11	<b>f</b>
20	<b>hulen</b> , hulens	130	33	0.008	0.006	1.329	<b>m</b>







*fandens*, *fanken*, *fæn*, and *fæns* ('devil,' compare English cognate 'fiend'), *jævel* ('devil') and the adjective or adverbial intensifier *jævla* (approx. 'fuck-ing'), *helvete*, *helvetes*, and *helvete* 'hell,' *pokker* (a mild term meaning 'devil/imp'), and *satan* 'Satan.' Body- and body-function-related words include *drite* 'to shit,' *ræv* 'ass,' *piss*, 'piss,' *bæsj* 'shit,' and *skite* 'to shit.' *Rakk* is defined by *Det Norske Akademis Ordbok* as a derogatory word denoting a collectivity of objectionable people in expressions such as *rakk og pakk*, and, along with *drite*, *dust* 'fool,' *homo* 'homo,' *skite*, and *bæsj*, is among the most frequent types more used by females in the data (although not significantly, based on p values). *Fuck* is present as a Norwegian lexical item due to its inclusion as a headword in the dictionary source for the Norwegian profanity list; it is also represented among the frequent types in Norwegian orthography as *føkk*. Noncurse and nonvulgar types with derogatory connotations in the list include *bikkje*, 'dog,' which has a 'derogatory nuance,' according to *Det Norske Akademis Ordbok*; used to denote a human, it is stated to be derogatory, and *sinnssyk* 'mentally ill,' which "can be perceived as derogatory," according to the dictionary.

The most frequent types show a somewhat different pattern in the Danish data (Table 4): many have a higher relative frequency of use amongst females. *Sgu*, an intensifier described as a "reinforcing swear" in *Den Danske Ordbog*, and its variant, the much less-frequent *sgi*, are the most common profanity types in the Danish data, and show moderately strong male overuse. The majority of the most frequent types, however, show female overuse, in aggregate, including the traditional swear *fanden* 'the Devil' and variants, as well as words pertaining to bodily processes and excrement such as *skid*, *lort*, both 'shit/crap,' *pisse* 'to piss,' *møg* 'dung, muck,' and derived forms.<sup>19</sup> *Satan*, *søren* (a personal name, used as a euphemism in mild expressions such as *for søren*, approx. 'for Pete's sake') and derived terms such as *sateme/satme* and *søreme/sørme* are more used by males, as is *populisme* and derived terms. *Populisme* and *kæft* are not necessarily offensive lexemes, but the usage note for the former is 'derogatory,' and for the latter 'informal or derogatory,' for example, in formulations such as *hold din kæft* 'shut your mouth/shut up.' More female use of individual profanity items, compared to slightly higher male use of the items on an average per-user basis, results from the fact that the relative frequencies in these tables are not normalized per user, but on the basis of the aggregate profanity and token counts.

Males use more Nordic-language profanity in Sweden, the country with the largest number of tweets in the corpus (Table 6). The diabolical profanities *fan* and variant forms, *satan*, and *helvete* are more used by

<sup>19</sup>Rathje reports that young females are more likely to consider *fanden* to be a swear word than are young males (2014, 43).

males, while *jävla* and variants is more used by females. The type with the highest G value by far is *himla* ‘heaven,’ a mild adverbial intensifier, almost five times more likely to be used by females in this data set. Females make more use of euphemisms such as *jäkla* (for *jävla*), *fasen* and *fasiken* (for *fan* or *fanden*), and the mild words *tönt* ‘fool’ and *nörd* ‘nerd,’ as well as terms more likely to be used in reference to females such as *fitta* ‘cunt’ and *hora* ‘whore.’

Almost all of the most frequent profanity items are more used by males in the Finnish data (Table 7); this corresponds to Finland also being the Nordic country with the most pronounced male-female difference in per-user average rates of profanity use. The most frequent types include *vittu* ‘cunt,’ the most widely used Finnish swear word, *paska* ‘shit,’ *perse* ‘ass,’ and mild terms such as *äijä* ‘old guy’ or *jätkä* ‘dude/guy,’ as well as traditional profanities pertaining to Satan/the Devil or heaven, such as *helvetti*, *saatana*, *perkele*, or *jumalauta* (an expletive with no inflections, approx. ‘damnit,’ lit. ‘God help’). The only type showing more relative use by females, *muija*, approx. ‘chick,’ is a word used to refer to female persons, and noted by the *Kielitoimiston Sanakirja* to be derogatory. *Puuhestella* is a verb with the approximate meaning ‘inexpertly tinker around with/potter/dabble at something’ whose usage is noted as *us. halv.* ‘often derogatory’; some Finnish speakers consulted for this study disagreed with this assessment.

#### 4.3.2. English profanity

For the English profanities, a similar picture emerges for the countries included in this study, in that more of the most frequent types are used relatively more by males. The 20 most frequent types in the aggregated English-language data are shown in Table 8.

The only words significantly associated with female use in this data are *bitch*, *bastard*, *nerd*, *boob*, and *slut*.

## 5. Discussion

Differences between males and females by country in terms of aggregate use of profanity (Figures 1 and 2, Table 2) show that while in general, males use more profanity words than do females, the difference is attenuated when the same users tweet in English. The gender differences in use are small, with  $r_{bc}$  values ranging from 0.04 to 0.27. Gender-based differences are most pronounced for Finland, less prominent for Iceland, Norway, and Denmark, and least distinct for Sweden.

For individual word items, more types overall have a higher likelihood to be used by males, rather than females. As shown in Section 4, males have lower average ranks when the relative frequency of profanity is calculated for each user and users are ordered from lowest to highest, both in local Nordic

Table 8. Most frequent English profanities, all Nordics.

rank	Word	male	female	male_rel	female_rel	G	gender
1	<b>fuck</b> , ffs, fuck, fuckboi, fuckable, fuckbags, fuckboi, fuckbois, fuckboy, fuckboys, fucked, fucker, fuckers, fuckface, fuckfaces, fuckhead, fuckheads, fuckin, fucking, fucknut, fuckoff, fucks, fuckstick, fucktard, fucktards, fuckup, fuckups, fuckwit, fuckwits, fuk, fucker, fuckers, fuks, fuq, fucksticks, fuckwad, fuqboi, fuqg	20,048	11,661	0.7598	0.7359	7.478	<b>m</b>
2	<b>shit</b> , shitbag, shitbags, shitcanned, shitcunt, shitcunts, shitface, shitfaced, shitfuck, shithead, shitheads, shithole, shitholes, shithouse, shits, shitstain, shitstains, shitter, shitters, shittiest, shitting, shitty	10,660	5,024	0.404	0.317	205.605	<b>m</b>
3	<b>damn</b> , damnit, damnation, damned, damning, damnit, damns	6,268	3,751	0.2375	0.2367	0.024	<b>m</b>
4	<b>ass</b> , arse, arsehole, arseholes, asses, asscrown, asses, assface, assgoblins, asshat, asshats, asshole, assholes, asslick, asslover, assman, asswipe, asswipes, asskissers, asslovers	4,156	2,179	0.1575	0.1375	26.537	<b>m</b>
5	<b>bitch</b> , bitchass, bitchasses, bitched, bitcher, bitches, bitchers, bitchez, bitchin, bitching, bitches, bitchslap, bitchslapped, bitchy	1,844	2,115	0.07	0.133	410.775	<b>f</b>
6	<b>crap</b> , crapola, crapped, crapper, crappers, crapping, crappy, craps	1,539	702	0.058	0.044	37.345	<b>m</b>
7	<b>piss</b> , pissed, pissen, pisses, pisshead, pissin, pissing	1,179	584	0.045	0.037	14.581	<b>m</b>
8	<b>bastard</b> , bastards	671	568	0.025	0.036	35.406	<b>f</b>
9	<b>bullcrap</b> , bullshit, bullshits	855	317	0.032	0.02	57.001	<b>m</b>
10	<b>cock</b> , cockblock, cockblocked, cockblockers, cockblocking, cockblocks, cockfight, cockfights, cockhead, cocks, cocksucker, cocksucker, cocksuckers, cocktease	1,079	68	0.041	0.004	629.857	<b>m</b>
11	<b>nerd</b> , nerds	543	338	0.021	0.021	0.233	<b>f</b>
12	<b>pussy</b> , pussie, pussies, pussyfucker, pussylicking, pussylips	681	171	0.026	0.011	120.616	<b>m</b>
13	<b>cunt</b> , cunted, cuntface, cunts, cunty	677	81	0.026	0.005	278.714	<b>m</b>
14	<b>nigger</b> , nigg, nigga, niggah, niggas, niggaz, niggers, niggie, niggles, niggling, niggs	512	214	0.019	0.014	20.374	<b>m</b>
15	<b>motherfucker</b> , mothafucker, mothafucka, mothafuckas, mothafuckaz, mothafuckers, mothafuckin, mothafucking, motherfuck, motherfucker, motherfuckin, motherfucking	429	220	0.016	0.014	3.525	<b>m</b>
16	<b>goddamn</b> , goddamit, goddammit, goddamned, goddamnit	360	201	0.014	0.013	0.617	<b>m</b>
17	<b>boob</b> , boobies, boobs, booby	279	253	0.011	0.016	21.825	<b>f</b>
18	<b>geek</b> , geeks	327	154	0.012	0.01	6.112	<b>m</b>
19	<b>slut</b> , sluts, slutting, slutty	204	161	0.008	0.01	6.358	<b>f</b>
20	<b>wank</b> , wanker, wankers, wanking, wanks	334	23	0.013	0.001	186.481	<b>m</b>

languages and in English. From the perspective of individual word use, types associated with religion, God, and the Devil are more used by males, and are among the terms with the highest G values overall in the data: *helvíti* and derived forms in Icelandic, *fan* and *helvete* in Norwegian and Swedish, and *helvetti* and *saatana* in Finnish. When the country-level data is aggregated, the English-language type with the highest G value is *bitch* and its variants. Although most of the English-language words show male overuse, these terms, as well as *slut* and *whore*, are more likely to be used by females.

Some previous research has found that females are relatively more likely to use mild swears, profanities, or epithets (Jay 1992; McEnery 2006). In these data, females are slightly more likely to use *damn*, as well as mild ‘bad-language’ words in Nordic languages such as *pentele* (Fin. euphemism for the strong profanity *perkele* ‘devil’), *bjáni* Icel. ‘fool,’ or *dust* Norw. ‘fool/oaf.’ In Swedish, females make more use of *jäkla* and variants (a euphemism of *jävla* ‘devil’), *fasiken*, *fasingen*, and *fasen* (euphemisms of *fanden* ‘the Devil’), and *tönt* (Swed. ‘dork’). Females make more use of the Swedish number terms *sjutton* ‘seventeen’ and *tusan* (from *tusen* ‘thousand’), undeclinable emphatic particles (e.g., *vad tusan är detta?* ‘what the heck is this?’) considered to be mild profanities.<sup>20</sup> Female use of *sjutton* and *tusan* is also interesting in light of evidence suggesting that, at least for English, numerals and numbers are more likely to be used by males (Newman et al. 2008). In these data, both 17 and 1000 (i.e., as numerals) are relatively more used by males in Swedish tweets.

The English scatological profanities *shit*, *crap*, and *bullshit* as well as *cock* and *wank* are overused by males. Words with related denotations in Nordic languages tend to show more mixed patterns of use. Despite relatively higher male usage of most Nordic profanity types, in the Nordic languages females show higher rates of use of words that denote a female person and/or stigmatize female sexual behavior: This is true for Icelandic *tussa* and *hóra* (approx. ‘cunt’ and ‘whore’), as well as *lessa* ‘lesbo.’ In Norwegian, the words with the highest G values are more used by males, but females slightly overuse *hore* ‘whore.’ In Sweden, females overuse *hora* (‘whore’) and *fitta* (‘cunt’/‘pussy’) compared to males. The trend is also apparent for word types that are not among the most frequent 20 types in Tables 3–8: While the Danish data show a more balanced use of Nordic profanities by males and females, females overuse the potentially objectionable words *kælling* ‘bitch,’ *luder* ‘hooker,’ and *kusse* (‘cunt’/‘pussy’). Similarly, in Finland, while males make more use of most Finnish profanities, females lead in the use of *muija* ‘chick,’ as well as in the use of the less-common items *akka* ‘hag/bitch,’ *ämmä*

<sup>20</sup>Stroh-Wallin (2008) finds extensive use of *tusan* as a profanity with no recognizable numerical attribution beginning at the end of the 16th century (55). Whereas 34% of survey respondents considered *tusan* to be a profanity (*svordom*) in 1977, only 16% did in 2009 (Stroh-Wallin 2010, 13).

'hag, bitch,' *horo* 'ho, whore,' and *narttu* 'bitch,' although the difference in use is not significant for the latter terms.

Female overrepresentation in the use of these words, and in English of *bitch* (as well as *slut* and *whore*), parallels findings by Wang et al. (2014) in a large corpus of English-language tweets and overuse of *bitch* by females in English-language tweets geolocated to the UK, according to Gauthier and Guille (2017, 143). This may be due to the gender-specific offensiveness of such terms: For English, older survey-based research found gender differences in the perception of the relative offensiveness of insults directed toward males and females, with the most offensive insults directed toward males typically denoting homosexuality and those directed toward females sexual promiscuity. A study conducted on American undergraduate students in the mid-1980s found the insults perceived to be most offensive when said by females to other females were *bitch* and *slut*; the male-male insult with the highest offensiveness was *faggot*, a word that shows higher male use in this data (Preston and Stanley 1987). *Cunt*, a word overused by males in these data, is considered to be strongly offensive by females according to older survey results (Preston and Stanley 1987), although the item can also be used to insult a person of either gender.<sup>21</sup> In these data, *cunt* has the third-highest G value among the English words, indicating it is used far more by males than by females. Racial and ethnic-based profanities are not frequent in the data, but most attested types are more used by males, including *nigger* and variants, as well as lexemes not among the 20 most frequent types shown in Tables 3–8, such as *chink*, *paki*, *svenne* (a Swedish derogatory term used to refer to ethnic Swedes), *ryssä* (a derogatory Finnish term for a Russian), and *manne* ('gypsy,' a derogatory Finnish term for a person from the Kale ethnic group). Likewise, most terms in the lists denoting homosexuality (e.g., *faggot*, *homo*, *bög*, *fjolla*, *hinttari/hintti*) are also overused by males.

Previous research has found that profanities are more likely to occur in same-gender interaction (Jay 1992; Jay 2000; Beers Fägersten 2012). According to Jay, the frequency of the word *bitch* in contexts with a female speaker and female listener was almost twice that found in interactions with a female speaker and male listener (Jay 1992, 133). Evidence for within-gender interaction is available by examining directed tweets: those addressed to a specific user via the inclusion of a user's screen name, prepended with <@>, in the tweet text, from users whose gender has been identified. Wang et al. (2014) found higher rates of swear word use in English-language tweets directed to

<sup>21</sup>In American English, the word is more likely to be directed towards females (Jay 2000), while in the U. K., some evidence suggests that it is becoming a term of abuse applied to males by both genders (McEnery 2006, 33; Gauthier and Guille 2017, 148).

persons of the same gender.<sup>22</sup> For this corpus, approximately 7% of the tweets were directed to other Nordic users whose tweets were represented in the corpus. Analysis of the frequency of profanity in these directed tweets shows higher use of Nordic-language profanities for same-gender tweets, but higher use of English-language profanities only for female-authored tweets. Male tweets to males contain 17.7% more Nordic-language profanities than male tweets to females, but 11.5% fewer English-language profanities. Female tweets to females show 11.8% more Nordic-language and 12.4% more English-language profanity than female tweets to males.

As far as individual word types are concerned, the traditional Nordic-language profanities, many of which are diabolical invocations or are associated with religious belief, are linked to males in these data. Ljung notes a gradual shift in the profanity lexicon away from swearing associated with blasphemy and religion and toward items associated with scatological or sexual themes in a number of European languages, including Nordic languages (2011), and a similar historical development has been proposed for American English beginning at the end of the 19<sup>th</sup> century and continuing to the late 20<sup>th</sup> century (Jay 1992, 74–76). In the Nordic languages, males exhibit a more conservative pattern of profanity use, in that they make much more use of traditional blasphemous, diabolical, and religion-based items. This contrasts with the profanity behavior of females, who, particularly in the English-language data, are more open to the use of ‘bad-language’ terms from other semantic fields.

Gender differences in the use of English profanities may also reflect the proposed sociolinguistic paradigm in which females more rapidly embrace extra-local language features that are imbued with prestige (e.g., Trudgill 1974, 1998), and tendentially avoid stigmatized language variables (Labov 2001, 266). For the data in this study, females may be somewhat quicker to embrace the use of English ‘bad language,’ which may be associated with the sophistication of global culture and not especially stigmatized, than are males, partially offsetting the greater female inhibition to use potentially offensive language.

Increased male-to-male use of Nordic-language profanity items is consistent with a sociolinguistic interpretation in which males are more likely to use language that is affiliated with local identities, compared to females, who may be more likely to orient toward prestigious extra-local linguistic patterns (Labov 1990). Males’ overuse of traditional Nordic profanities may represent the construction and establishment of a shared identity in discursive space, based on, among other things, the

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<sup>22</sup>Wang et al. (2014) conduct  $\chi^2$  tests from contingency tables that compare number of swear words and number of tweets, rather than number of swearing lexical items and total number of tokens. Because male-authored tweets tend to be slightly longer than female-authored tweets, this method may somewhat overestimate female use of these words.

use of profanity. As for English directed tweets, it may be the case that there are contextual differences between male-male English tweets and female-female English tweets, with the former more likely to have informative communicative functions, such as sharing results of sporting events or links to websites, rather than interactive functions such as the performance of social evaluation, negotiation of interpersonal stance relations, or communication of affective content – a possibility consistent with the findings of some earlier studies (Newman et al. 2008; Bamman, Eisenstein, and Schnoebelen 2014; Coats 2017), and which could explain lower rates of English profanity use in male-male tweets. However, due to the small size of the reply-tweet subcorpus in this study, these interpretations are speculative, and further research is needed to investigate these possibilities.

## 6. Conclusions and future outlook

In general, the findings of this study are in accord with the results of previous research showing that although gender-based differences are small, males are more likely to use ‘bad language,’ both on a per-user basis and in aggregate by individual word type, for most of the types considered in the study.

Effect size measures show that the male-female difference in profanity usage tends to be greater for Nordic languages, compared to English. Because Nordic languages are presumably L1 languages for many of the users in the study, and in light of survey-based or experimental findings in which profanities are judged to be less offensive by L2 or LX users (Dewaele 2004, 2010), as well as greater female sensitivity to offensive language in general, it may be the case that some English-language profanity words are undergoing a process of ‘deprofanization,’ when used in global contexts, toward use as nontaboo affect markers.

Words that are potentially more offensive to males or to females, that is, those that denote homosexuality and those that stigmatize femaleness or female promiscuity, are used more by males and by females, respectively, both in the presumable L1 Nordic languages as well as in English. Analysis of the directedness of tweets suggests that this is not simply an artifact of tweeting to people of the same gender, although the phenomenon needs further investigation.

Twitter posts are relatively rich in metadata which could be harvested to investigate the interaction of user and addressee identity in terms of additional demographic parameters. Collocation analysis (cf. Lutzky and Kehoe 2016; Gauthier and Guille 2017) could yield insights into differences in discourse according to gender (or some other demographic parameter). Vector-based approaches using word embeddings could shed light on the



semantic specialization that borrowed English-language profanities may be undergoing when used in a Nordic-language matrix.

Although differences between males and females in the use of ‘bad language’ are evident for this data set, they are small in extent, and are not categorical. Continued investigation into the ways in which profanity is used multilingually according to demographic parameters such as gender identity may allow us not only to observe differences between groups, but to address more general questions of language change and evolution in the context of widespread bilingualism with English.

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No financial interest or benefit has arisen from the research.

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## Data availability statement

The data set used for this study cannot be freely distributed due to Twitter’s terms and conditions. However, the individual tweets used in the analysis can be downloaded from Twitter’s APIs by providing the Tweet IDs and using tools such as *Tweepy* or *Twarc*. The profanity items and a list of the Tweet IDs for the data in this study is available at <https://github.com/stcoats/NordicGenderProfanity>.

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