

Tables

Table 1: Search Query Keywords

Keywords Related to Muslims		
Finnish Word	English Translation	Number of Variants
islam	Islam	23
muslimi	Muslim	27
ählämi	Insult term (offensive)	14
ähly	Insult term (offensive)	15
taatelintallaaja	Date eater	14
kamelikuski	Camel driver	14
hiekkaneekeri	Insult term (offensive)	16
kela-gold	Social welfare recipient	4
sossupummi	Social welfare recipient	14
elätti	Welfare recipient	16
pedofiiliuskonto	Pedophile religion	14
karvaranne	Hairy wrist	14
musulmaani	Muslim	12
mokkakikkeli	Racial insult term (offensive)	14
Total		221

Keywords related to LGBTQ Community		
Finnish Word	English Translation	Number of Variants
huora	Prostitute	16
homo	Homosexual	16
transvestiitti	Transvestite	15
hintti	Derogatory term (offensive)	16
homostelija	Homosexual (slur)	15
pervo	Pervert	16
pervoilu	Perversion	15
homomädätys	Homophobic behavior	15
homorummutus	Homophobic rhetoric	16
pervoparaati	Pervert parade	8
lutka	Slut	16
homppeli	Derogatory term (offensive)	19
transu	Transsexual	16
Total		199

Table 2: Validation result of text classification Models

Model	Test sample size	Test accuracy	Test precision	Test recall	Test f1
Target	658	0,941	0,922	0,911	0,915
LGBT - sentiment	152	0,783	0,787	0,748	0,758
Muslim - sentiment	375	0,755	0,722	0,693	0,703
LGBT - hate speech	152	0,829	0,837	0,649	0,678
Muslim - hate speech	375	0,715	0,724	0,690	0,692

Table 3: Parameters used in BERTopic Models

Model	min_topic_size	n-gram	top_n_words	min_cluster_size	n_components	n_neighbors
LGBT - sentiment	15	[1,1]	15	50	5	15
Muslim - sentiment	100	[1,2]	15	100	5	15
LGBT - hate speech	50	[1,2]	15	10	5	15
Muslim - hate speech	15	[1,2]	15	100	5	15

Table 4: Description of hate speech topics targeting LGBTQ+

Topic index	Tweet count	CustomName	Top representative	Top representative translated
-1	4216	Other	-	-
L-00	3009	Resistance to LGBTQ+ Visibility and Identity: Pride, Media, and Public Life	hintti, homo, homot, transu	faggot, gay, gays, transvestite
L-01	280	Naming and Shaming in Political Contexts: Figures, Organizations, and Controversies	presidentti, cia, lääkäri, poliisi	president, cia, doctor, police
L-02	71	Nationalistic Discourses Opposing LGBTQ+ Existence	suomen, suomalainen, suomalaisia, homppeli	Finland's, Finnish, Finns, gay (colloquial term)
L-03	69	Critique and Opposition Targeting Politician Pekka Haavisto	haavisto, haaviston, homo haavisto, hintti haavisto	Haavisto (last name of the Finnish politician), gay Haavisto
L-04	63	Perceptions of LGBTQ+ Suitability in Military and NATO Service Roles	sivari, puolustamaan, vitun, natoon	civil servant/conscientious objector (colloquial), to defend, fucking, to NATO
L-05	51	Brand-Specific Homophobic Stereotyping in Alcohol Consumption	juo, homot juo, viinaa, juoppo	drink, gays drink, booze, drunkard
L-06	45	Mainstreaming of Homophobic Discourse and Attitudes	hintti, hintit, hintti hintti, hintti hintit	faggot
L-07	43	Moral Judgments on Homosexuality within Christian Religious Contexts	jumalan, jumala, kristityt, jumalaa	of God, God, Christians
L-08	37	Homophobic Stereotyping in Anti-Swedish Sentiments	ruotsiin, läpsyttelemään, hiekka, hevonpaskaa	to Sweden, to slap, sand, horse shit
L-09	33	Interplay of Food Preferences, Homophobia, and Gender Stereotypes	syö, paskaa, syömään, ruokaa	eat, shit, to eat, food
L-10	31	Critique of Perussuomalaiset's LGBTQ+ Stance: Homophobia and Political Discontent	persut, persujen, persu, perussuomalaiset	True Finns
L-11	26	Homophobia and Pathologizing Homosexuality: Stigmatization as Illness	hoitoon, vajukki, lääkäriin, mee	to treat, retard, to the doctor, go to
L-12	26	Misogyny, Homophobia, and Disparagement of Prime Minister Sanna Marin	sanna, marin, sannan, olavi	Sanna, Marin, Sanna, Olavi
L-13	25	Homophobic and Transphobic Reactions to YLE's LGBTQ+ Representation	yle, lesboja transuja, lesboja, tv	general, lesbians, shemales, lesbians, tv
L-14	23	Transphobia and the Pathologization of Transgender Identity	transut, hoitoon, transujen, sairaita	trans, to treat, sick
L-15	23	Conflating Homophobia with Leftism: LGBTQ+ Rights and Anti-Communist Sentiment	kommunisti, kommunisteja, kommunistit, hintit hullut	communist, communists, gays (derogatory), crazy
L-16	22	Intersection of being Vegetarian, Vegan Lifestyles, and LGBTQ+	soija, soijapoika, tiedätkö, vitsi	soy, soy boy, you know, joke
L-17	21	Homophobic and Transphobic Backlash Against LGBTQ+ Inclusion and Education	sukupuolen, lapsille, helvetin, seta	for sex, for children, hell, uncle

L-18	21	Accusations Against LGBTQ+ Impact on Youth, Society and Traditional Values	keijo, jokinen, keijo jokinen, päällikkö	Keijo, Jokinen, Keijo Jokinen (ref. to Twitter personalities), chief
L-19	22	Transphobia and Associative Fallacies Linking LGBTQ+ Individuals with Criminal Behavior	suomalainen, pedofiliaan, puuttua, pitkään	Finnish, pedophilia, intervene, for a long time
L-20	20	Incitement of Violence Against LGBTQ+ Inmates in Prison Settings	vankilaan, vankilassa, toivottavasti, toisten	to prison, in prison, hopefully, of others
L-21	20	Homophobic Stereotyping of Daily Activities	homojen hommaa, hommaa, nukkumaan, hyvää	gay business, business, sleep, good
L-22	19	Homophobic Rhetoric in Work Discourse: Stereotyping LGBTQ+ Employment Status	töihin, mene, mee, sinäki	to work, go, go to, you too
L-23	18	Use of a Derogatory Homophobic Label in Personal Attacks	pekka, homo pekka, homppeli pekka, jospa	Pekka (first name of Finnish politician), gay Pekka, just in case
L-24	18	Homophobic Discourse Regarding Political Leadership, Presidency and Presidential Election	pressan, ruumis, presidenttiä, roikkuu	presidents, body, president, hanging
L-25	17	Homophobic Opposition to LGBTQ+ Inclusion in Religious Institutions, such as Marriage and other Practices	naimisiin, kirkko, kirkosta, haluavat	marry, church, from church, want
L-26	16	Ageist and Homophobic Stereotyping and Insults	vanha, vanha hintti, homo huora, huora	old, old faggot, gay whore, whore
L-27	16	Homophobic and Racially Insensitive Remarks Involving Turkey	turkissa, homo sivari, sivari, tila	in Turkey, gay civil servant, civil servant, space
L-28	16	Conflating LGBTQ+ Identities with Perversion and Cultural Decline	perverssiä, perversiot, muut, eli homo	perverts, perversions, others, i.e. gay
L-29	14	Anti-LGBTQ rhetoric and their Marginalization	feministit, cis, naiset, muilla	feminists, cis, women, others
L-30	14	Homophobic and Transphobic Commentary on Reality TV and Media Content	bbsuomi, yllellä, hankkikaa, samanlaisia	Big Brother Finland (tv show), Yle (state funded broadcasting company), get, similar
L-31	13	Homophobic and Transphobic Associations with Child Abuse and Perversion	ehkä, usein, pervojen, nythän	maybe, often, freaks, now
L-32	13	Homophobic Insults Targeting Intelligence and Competence	vanha homo, taas, vanha, vinkuu	old gay, again, old, whining
L-33	13	Homophobic Attitudes in Political Voting and Representation of LGBTQ+	äänestää, pekkaa, idiootti, kiertää	vote, cheat, idiot, evade
L-34	13	Homophobic Stereotyping and Intolerance	ajaa, kaapista, pääse, edes	drive, closet, access, even
L-35	11	Negative Stereotyping of LGBTQ+ Community and Financial Burden Accusations	yhteiskunnan, homoja lesboja, maksaa, loppua	society, gay lesbians, pay, end
L-36	11	Homophobic Criticism of Kokoomus Party's Support for LGBTQ+ Rights	kokoomus, pervoille, puolue, pride	National Coalition Party, to the pervers, political party, pride
L-37	11	Transgender Inclusion in Competitions and Awards	voittaa, joltain, ens, antanut	win, from someone, next, given

L-38	11	Homophobic and Derogatory Remarks on Education and Intelligence of LGBTQ+	painu vittuun, painu, vailla koulutusta, homo lespo	fuck you, uneducated, gay lesbian
L-39	10	Homophobic Slurs in Response to LGBTQ+ Accomplishments and Success	kannattanut, pääasia, tuotannon, saatu	supported, main, production, received
L-40	10	Homophobic Language and Dismissal of Homosexual Men	pitkän, tykkään, kerro, tahtoo	long, I like, tell, want

Table 5: Description of hate speech topics targeting Muslim

Topic	Tweet count	CustomName	Top representative	Top representative translated
-1	30639	Other	-	-
M-00	7470	Islam and Societal Integration in Finland	muslimien, vihreät, eli, islamia	Muslims, greens, that is, Islam
M-01	2200	Discrimination and Xenophobia against Somalis	ählämit, ählämi, ählyt, ählämeitä	Different anti-Arab/Muslim slurs
M-02	1949	Gender Equality and Religious Practices	naisten, islamia, uskonto, naisia	women's, Islam, religion, women
M-03	1842	Immigration Politics and Cultural Assimilation in Sweden and Finland	Ruotsi, Ruotsissa, Ruotsin kieli, Ruotsiin	Sweden, in Sweden, Swedish, to Sweden
M-04	1120	Comparison of Muslim Refugees with Ukrainian Refugees	Venäjä, Venäjän, ukrainalaiset, venäläiset	Russian, Russias Ukrainians, Russians
M-05	1138	Religious Tensions and Anti-Semitism in the Context of Immigration	juutalaiset, juutalaisia, juutalaisten, israel	Jews, Israel
M-06	1057	Challenges and Perceptions of Muslim Immigration in Europe	eurooppaan, euroopan, eurooppa, euroopassa	Europe
M-07	860	Discrimination and Violence Against Sexual Minorities in Religious Contexts	homot, homoja, homojen, tappaa	gays, kill
M-08	739	Religious Tolerance and Conflict: Islam and Christianity in Europe	kristinusko, kirkko, kristinuskon, kirkon	Christianity, church
M-09	487	Taqiyya: Deception or Misunderstanding in Islamic Doctrine	valehdella, vääräuskoisille, taqiyya, valehtelee	to lie, to infidels, taqiyya, lies
M-10	487	Interpretations of Violence and Scriptural Justifications in Islam	koraani, uskottomien, turun, hakatkaa	Quran, infidels, of Turku, fight
M-11	447	Challenges of Integration in Western Societies	yhteiskuntaan, integroitua, integroidu, länsimaiseen	to society, integrate, Western
M-12	380	Religious Extremism and Its Impact on French Society	ranska, ranskassa, ranskan, macron	France, in France, French, Macron
M-13	358	Cultural Significance and Controversies Surrounding the Hijab	hijab, naisten, naisen, hijabia	hijab, women's, woman's
M-14	344	Perussuomalaiset and Immigration: Discussion on Nationalism, Islam, and Women's Rights	persut, persujen, persuja, perussuomalaiset	True Finns
M-15	296	Communism and Islam: Comparative Discussion in Context of Violence and Ideological Critique	kommunismi, kommunismin, miljoonaa, kommunistit	communism, communisms, million, communists
M-16	254	Oulu and the Discussion on Sexual Assault Cases Involving Muslims	oulussa, oulun, oulu, raiskaus	in Oulu, Oulu's Oulu, rape
M-17	259	Turkey, EU, and Islam: Perspectives on Erdogan's Policies and European Relations	turkki, turkin, erdogan, eu	Turkey, Turkish, Erdogan, EU

M-18	256	Afghanistan and Immigration: Perspectives on Aid, Integration, and Cultural Conflicts	afgaanit, afganistanin, afganistaniin, afgaaneja	Afghans, of Afghanistan, to Afghanistan
M-19	231	Iran and Women's Rights: Struggle Against Islamic Laws and Patriarchal Control	iranin, iranissa, iran, iranilaiset	Iranian, in Iran, Iran, Iranians
M-20	201	Debate on Banning Islam: Calls for Prohibition Due to Perceived Threats and Incompatibility with Modern Values	kieltää, kiellettävä, pitäisi, pitää kieltää	to prohibit, to be prohibited, should, must be prohibited
M-21	189	Central and Eastern European Countries and EU: Debates on Immigration, Multiculturalism, and Islam	puola, itävalta, unkari, eu	Poland, Austria, Hungary, EU
M-22	195	Islam and Slavery: Discussions on Historical and Contemporary Perspectives	markkinoilla, sotasaaliiksi, paratiisiin, armelaisuutta	in the market, spoils of war, to paradise, mercy
M-23	178	Yle and Islam: Accusations of Bias and Propaganda in Reporting	yle, ylen, hävetä, muslimien	Yle (state funded broadcasting company), Yle's, shame, Muslims
M-24	168	Islam, the Left, and the Far-Right: Polarizing Views on Ideological Alliances and Threat Perceptions	äärioikeisto, vasemmisto, äärioikeiston, vasemmiston	extreme right, left, extreme right, left
M-25	150	Denmark's Immigration Policy: Discussions on its Approach and Implications	tanskan, tanska, tanskassa, tanskan malli	Danish, Denmark, in Denmark, Danish model
M-26	144	National Coalition Party (Kokoomus) and Immigration: Public Perceptions and Criticisms	kokoomus, kokoomuksen, isänmaa, koti uskonto	National coalition Party, of the National Coalition Party, fatherland, home religion
M-27	128	Jutta Urpilainen and Islam: Criticisms and Accusations of Misrepresentation	jutta, urpilainen, jutta urpilainen, urpilaisen	Jutta, Urpilainen, Jutta Urpilainen, Urpilainen's
M-28	117	Islamist Terrorism and Norway: Public Reactions and Concerns	norjan, norjassa, norja, oslon	Norway, in Norway, Oslo
M-29	112	Koran Burning and Church Arson: Debates on Religious Tensions in Europe	polttaa, koraanin, koraani, kirkkoja	burn, Koran, churches
M-30	108	Jari Taponen and Jihadism: Public Perspectives on Law Enforcement Approach	taponen, jari, jihadismia, poliisin	Taponen, Jari, jihadism, the police
M-31	103	Pekka Haavisto and Islam: Public Opinions and Criticism	haavisto, pekka, haaviston, homo	Haavisto, Pekka, Haavisto, gay

Table 6: Difficult Tweet Samples

Original tweets	Translation	Main difficulties	Final hate speech annotation
@USER_926108886070906881 @USER_1041410925436325891 Pittää semmonen muslimi pirkkojen käyttämä huivi hommata ajoon. Ko silmät vain näkyy niin voi huoletta kiistää	@USER_1041410925436325891 One should get a headscarf like the ones Muslim women use for driving. When only the eyes are visible, you can confidently deny.	Sarcastic/mocking towards the dress code of some groups: e.g., head scarf	Yes
@USER_69 @USER_200923051 Vegan my friend. Ymmärrän, että tapahtunut kuohduttaa mieliä. Mutta kaksilla rattailla ei voi juosta. Kukaan edes persuista ei ole syyttänyt muslimeita kokonaisuudessaan edes Suomessa tapahtuneista asioista. Saati maailmalla tapahtuneista. Ko murhat tuskin tehtiin jeesukselle?	@USER_69 @USER_200923051 Vegan, my friend. I understand that what happened is unsettling. But you can't ride two horses. No one, not even the Finns Party, has accused Muslims as a whole of what happened in Finland, let alone globally. Were those murders likely committed for Jesus?	Multiple themes and hard to understand	Yes
@USER_732845359781847040 Muslimit heittää homoja katolta alas. Juha Kaartinen: konservatiiveilla menee taas kovaa. 🤔	@USER_732845359781847040 Muslims throw gays off the roof. Juha Kaartinen: conservatives are going strong again. 🤔	Context dependent	Not sure
@USER_23502747 Juodaan viinaa, imetään siittimiä, sotketaan sukupuolielimiä keskenään ja työnnetään ruumiinaukkoihin puudildoja. Mitäs Yleiradion mielestä? Voimaannutaan ja ollaan vapaita SETA - jengiläisiä? Oletteko te menettäneet järkenne, kun perverisonne lähti käsistä, ja uhri-lutka itkee?	@USER_23502747 We drink booze, suck sperm, mix genitalia with each other and insert wooden dildos into body holes. What does Yleiradio think? Let's get stronger and be free SETA gang members? Have you lost your mind when your perversion got out of hand and the victim-slut is crying?	Lack contextual knowledge (e.g., SETA)	Yes
@USER_677 @USER_1719447770 Tapahtuu, mutta tuo määrien vaihtelu tarkoittaa, että homostelun tarve ja halu ei johdu jostain synnynnäisestä ominaisuudesta henkilössä. Homostelijalla voi olla heterosuhteita.	@USER_677 @USER_1719447770 It happens, but the variation in numbers means that the need and desire for homosexual behavior are not due to some innate characteristic in the person. A person engaging in homosexual behavior may also have heterosexual relationships.	Misunderstanding keywords (e.g. homostelun)	Yes
USERNAME_TWITTER_1608 USERNAME_TWITTER_146_rkp Sitähän he ajavat, osa tietoisesti, osa vahingossa. Islamilaisista maista tulevan maahanmuuton haalistaminen kiihdyttää islamisaatiokehitystä. Yllättäen. Verojen nosto ei ole hyvinvointivaltion parantamista.	USERNAME_TWITTER_1608 USERNAME_TWITTER_146_rkp That's what they drive, some consciously, some accidentally. Organizing immigration from Islamic countries accelerates the development of Islamization. Surprisingly. Raising taxes is not improving the welfare state.	Implicit hate: Clear Target + negative Sentiment. For hate speech, no concrete action / reason OR against policy that allows muslims/lgbt	Yes
@USER_1174372126649913347 Varmaan Euroopan keskuspankki voi painaa lisää rahaa ja saada muslimille rahaa - eurooppalaiset ovat velkaa muslimille	@USER_1174372126649913347 Surely the European Central Bank can print more money and give Muslims money - Europeans owe Muslims	Political agenda: EU financial policy	Not sure

Figures

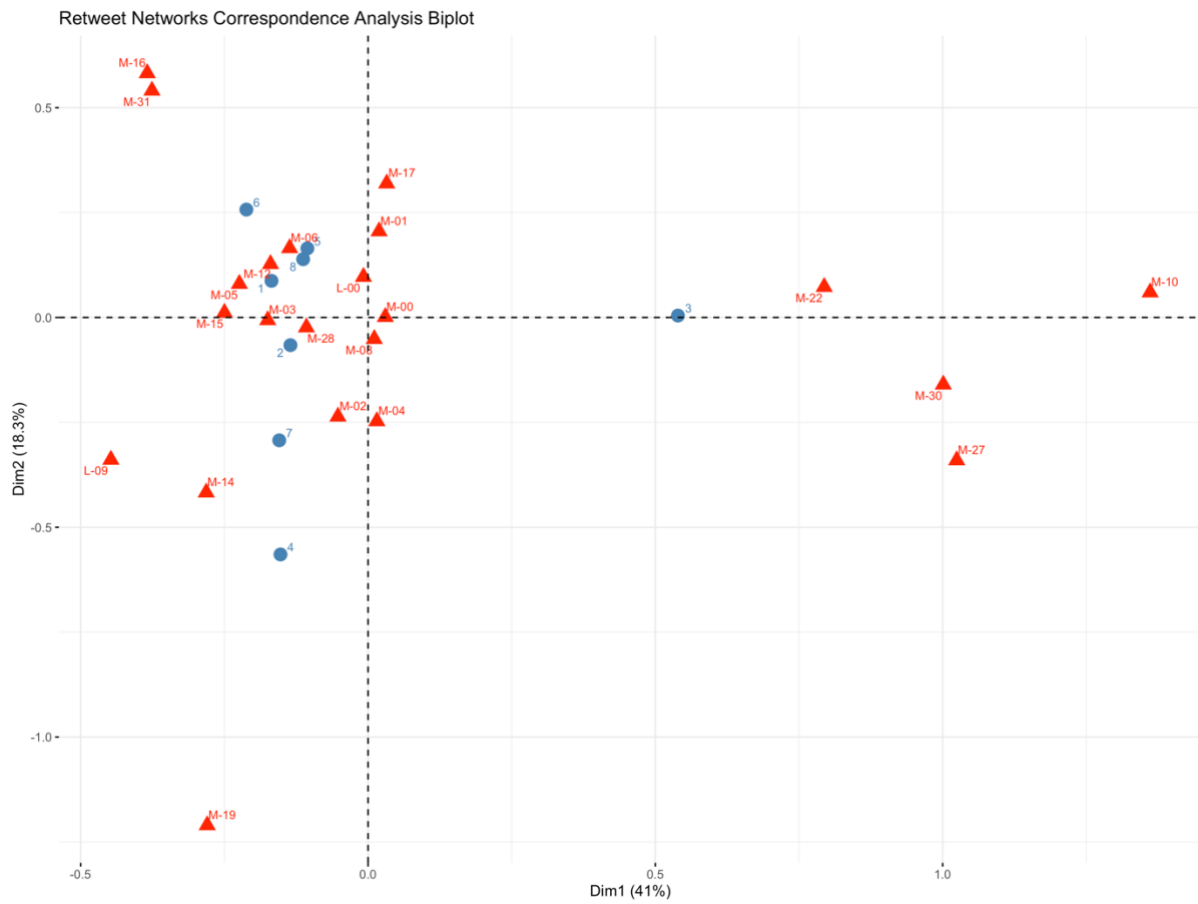


Figure 1: Correspondence Analysis of Communities in Retweet Networks

Note: When the topic contribution threshold is set to 0.70, the number of topics increases from 18 to 22.

