Zeitschrift: SPELL : Swiss papers in English language and literature

Herausgeber: Swiss Association of University Teachers of English

Band: 41 (2022)

Artikel: Assessing how attitudes to migration in social media complement public attitudes found in opinion surveys

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DOI: https://doi.org/10.5169/seals-1029458

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Assessing How Attitudes to Migration in Social Media Complement Public Attitudes Found in Opinion Surveys

This article compares migration discourses in traditional opinion surveys and social media in a cross-country perspective among five English-speaking countries. Despite the extensive survey research on migration, social media discussions on migration remain understudied, and little is known about its potential complementarity to survey findings. On the basis of automated content analysis, we present insights into the salience of and sentiment about migration by comparing both data sources. We also investigate which societal factors and framing of migration influence the salience of social media discussions. We find support that, overall, there is a good correlation between salience of and sentiment toward migration, both in surveys and on social media. We also demonstrate that societal factors significantly impact the salience of migration online. The observed dynamics may nevertheless differ depending on the sample of users, thus demonstrating the different incentives that motivate users to engage with the migration topic online. Methodologically, our contribution also demonstrates the necessity to reflect on the impact of different data collection strategies on the obtained findings.

Keywords: migration; opinion survey; social media; framing; content analysis

1 Introduction

Migration has been dominating media and political discourse worldwide, especially with respect to the European refugee crisis since 2011 and Trump's 'build the wall' campaign in 2016. Previous studies have mapped migration discourses in traditional media (Vliegenthart & Boomgaarden), conventional channels of party communication (Charteris-Black), and politicians' social media accounts (Heidenreich et al.; Combei et al.).

[1] Both authors contributed equally to this paper.

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However, studies comparing different countries and different data sources on migration remain scarce (Eberl et al.).

The proposed study investigates the extent to which migration discourses on social media can provide a complementary understanding of attitudes to migration in traditional opinion surveys. It also investigates what factors explain the prevalence of migration discussions on social media, especially in relation to societal factors (for example, migration integration policies and elite polarisation on the topic), public attitudes (such as acceptance of migration and migrants), and framings of migrants (for instance, generic framing of policy issues and specific depiction of migrants). Regarding framing, we draw from the definition of Entman, who suggests that framing is inherently part of communication and implies choosing "a few elements of perceived reality and assembling a narrative that highlights connections among them to promote a particular interpretation" (164), as well as from Matthes and Kohring in our choice of a quantitative approach. We distinguish between generic frames, which offer a systematic platform for comparison across frames, and issue-specific frames, which allow for "great specificity and detail" (de Vreese, Peter, & Semetko 108). In other words, whereas issue-specific frames emphasise unique ways to contextualise a topic (for example, migrants as victims or criminals), generic frames promote a particular discourse (for instance economic or cultural) that has obvious relevance to a bigger set of topics within which the unique topic (e.g. migration) is located (Brüggemann & D'Angelo).

To date, opinion surveys remain the main way to assess public attention and attitudes towards migration and its different societal dimensions. However, social media also offer opportunities for spontaneous discussions of these topics, without the intervention of pre-defined survey interests. Although Twitter users are not representative of national populations (Ceron), they form a politically interested audience whose voices about migration are likely to interact with the current public debate. Given the important impact of social media on political views and outcomes (Zhuravskaya et al. 429), it is critical to examine whether social media serve as a reflection of or a substitute to broader public attitudes. More specifically, previous studies have demonstrated the potential influence of anti-immigration social media groups in shaping broader audiences' migration-related attitudes (Törnberg & Wahlström). However, beside these most active user groups, we still know little about what influences the general salience and sentiment found in online discussions about migration.

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Our study analyses migration discourses on the Twitter accounts of followers of major political accounts across 5 English-speaking countries (United States, Britain, Ireland, New Zealand and Australia) and compares the obtained results to attitudes found in opinion surveys. In a first step, overall comparisons are conducted, both in terms of issue salience and tonality. For instance, we display insights into the extent to which the salience of online migration discussions on social media is congruent with the perceived importance of migration measured in surveys in the selected countries. Furthermore, we correlate the online sentiment about migration with a sample of relevant attitudinal dimensions inspired from survey research. In a second step, we strive to disentangle the impacts of societal factors and public opinion on the salience of online messages about migration. To address these research interests, we complement several data sources to extract migration-related opinions, most notably social media messages and opinion survey responses.

Another contribution of the present study is to build a bridge between the fields of linguistics – using computational linguistic methods – and cultural studies. Michel et al. argue that their approach of analysing correlations between lexical frequency and time (e.g. frequency peaks), opens up an entirely new field of research, which they call *culturomics*.

> [T]his approach can provide insights about fields as diverse as lexicography, the evolution of grammar, collective memory, the adoption of technology, the pursuit of fame, censorship, and historical epidemiology. Culturomics extends the boundaries of rigorous quantitative inquiry to a wide array of new phenomena spanning the social sciences and the humanities. (1)

We use more advanced computational approaches (supervised classification, see Section 3), which allow us to focus on relevant (generic and specific) framings of migration in a cross-country perspective. Importantly, we also assess how different tweet collection strategies impact similarities between social media and survey attitudinal distributions. The proposed methodology – based on automated content analyses and the linking between social media and surveys – can be extended to other countries and to other research arenas where comparison between data sources is valuable to provide a more nuanced view of a phenomenon.

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2 Study Background

2.1 *Salience of Migration and Attitudes Towards It*

There are notable global surveys that include questions on immigration and immigrants, such as the *Gallup World Poll*, the *International Social Survey Program*, the *World Values Survey*, and the *Ipsos Global Trends Survey*. All cover a large cross-section of countries and contain multiple waves in which the same general questions are asked to respondents. Specific question items also serve to build global trend indicators, such as Gallup's *Migrant Acceptance Index*. Surveys of public attitudes toward immigration have shown that the salience of immigration as an issue has varied wildly over time (Dempster, Leach & Hargrave 25). In particular, the salience of immigration has risen in Europe over the last decade. Regardless of the salience, it is also notable that attitudes toward immigration actually improved in most European countries (Gonzalez-Barrera & Connor).

Beyond survey research, other studies found that public attitudes on immigration are increasingly expressed online, especially in the discursive construction of immigrants and refugees (Ekman 606). Yet, compared to nationally representative samples of respondents, social media users are usually unrepresentative of national populations (Ceron). Furthermore, social media platforms are likely to be polarising spaces (Krasodomski-Jones), thereby, starkly contrasting with the calibrated setting of opinion surveys. For these reasons, the online debate on immigration does not necessarily reflect public opinion but rather creates a space which amplifies the strongest views (Rutter & Carter 35). For instance, posts that are no longer socially acceptable in a face-to-face conversation and that contain prejudiced and hateful comments on immigration can reach a wide audience through social media (Rutter & Carter 165). As a result, the connection between social media messages and public opinion measures on the migration debate remains generally hard to disentangle.

On the one hand, it is complicated to evaluate the impact of social media coverage of immigration on how the broader public views immigrants and immigration. This is notably due to the fact that it is difficult to discern whether people learn their political views from social media pages (or threads), or whether they choose to consult social media pages that reflect their existing political views.

On the other hand, it is also unclear how public opinion and contextual factors affect the salience of immigration debates on social media. This

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is because it generally remains unclear whether social media serve to amplify or substitute public opinion (see similar discussion about elite communication by Castanho Silva & Proksch) and these platforms may have a similar amplification effect as news media (Gilardi et al. 42). According to the substitution logic, social media would just serve as another channel for people to express similar attitudes as during face-to-face interactions. Aggregated patterns of social media discussions should thus reflect similar trends found in surveys, despite the non-representativity of social media users. With respect to the amplifier logic, social media present tools for more personalised, and perhaps also more polarised, messages which may not be expressed in other arenas, thus circumventing the mainstream debate. Therefore, aggregated patterns of social media discussions should display quite a different distribution than opinion surveys.

Despite their inherent unrepresentativeness, social media data can provide statistics to make informed policy and programme decisions (Japec et al. 846). The topic of migration is no exception here. Drawing from these premises, research has been undertaken to better understand whether social media data can produce distributions of attitudes and salience similar to those from survey data. Concerning attitudes, Amaya et al. take a critical view: with respect to the salience of discussions, the broad correlation between frequency and opinion is generally accepted (173). Roberts and Wanta, for instance, investigate the correlation between media coverage and private electronic conversations. Ghanem states that a strong correlation has been recognised, and that salience may be the best predictor:

> Agenda-setting studies have focused on how frequently an issue is mentioned in the media. The frequency with which a topic is mentioned probably has a more powerful influence than any particular framing mechanism (Ghanem 12)

In this article, we aim to better understand the congruence between surveys and social media messages on the sentiment and salience of immigration. We therefore raise two overarching research hypotheses. First, we hypothesise that the salience of migration online correlates with the extent to which migration is perceived as an important concern in representative opinion surveys. Second, we hypothesise that the tonality related to migration online correlates with the overall satisfaction toward migration found in representative opinion surveys. We answer these two hypotheses relying on correlations comparing salience and support towards migration

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between different groups of Twitter users and responses from survey respondents.

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2.2 *Impact of Contextual and Political Factors on the Salience of Migration-Related Tweets*

In connection to real-world events, several factors can explain variation in the salience of social media messages referring to migration. For instance, salience can be influenced by contextual factors, such as the type of institutional response to migration related issues (e.g. integration policies). It can also be linked to political factors, such as the degree of party polarisation with respect to the topic of migration.

Overall, surveys demonstrate that salience increases when immigration is perceived as problematic and decreases when it is perceived as being under control (see Blinder & Richards). As such, the institutional capacities to deal with migration related issues can decisively impact the salience of migration debates. For instance, national and local governments are responsible for integration policies which help facilitate immigrants becoming part of the host country (such as through schools, workplaces, and communities). The *Migrant Integration Policy Index*[2] is a tool dedicated to account for policies undertaken to integrate migrants in host countries.

Demonstrating the connection between political rhetoric and public attitudes to migration is a more complicated task. However, whereas the ability of politicians to directly influence attitudes through their rhetoric is unclear, the political rhetoric has a clearer influence over the salience of an issue (Hatton 19). For instance, the anti-immigration rhetoric has the potential to make "attitudes towards immigration more consequential for voting behaviour" (Rooduijn par. 7).

In this article, we aim to better understand how institutional settings (namely, the institutional responsiveness to migration) and the degree of elite polarisation impact the salience of social media messages about migration. We therefore add two further overarching research hypotheses. Our third hypothesis states that the salience of tweets related to migration is more pronounced when societal and political factors (migrant integration policy and elite polarisation) are unfavourable to migrants and immigration. Our fourth hypothesis suggests that the salience of tweets re-

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2 The *Migrant Integration Policy Index* can be found at www.mipex.eu/.

lated to migration is correlated with lower levels of public acceptance of migration. We aim to address these hypotheses relying on multivariate regression.

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2.3 *Impact of Specific and Generic Frames on the Salience of Migration-Related Tweets*

Immigration debates have been increasingly marked by a rhetoric of emergency and threat (for example, calls for stricter policing of borders and the limitation of mobility). From a survey perspective, Dempster, Leach and Hargrave have noticed important implications for the interpretation of opinion data on migration. In particular, the authors note inherent contradictions in the messages received from these surveys as people can seemingly hold two opposite views. For instance, within the same survey, people can hold the opinion that immigrants both take jobs and create jobs (14). Duffy (207) suggests this inherent contradiction may be due to the framing of the question, or to the level at which respondents prioritise the impacts of migration (namely, locally, nationally, or internationally).

Despite being 'gold-standard' for measuring public opinion, surveys can also test a limited and pre-defined set of dimensions, and are vulnerable to changes in methodologies and timing (Crawley, 2005). Compared to social media messages which explicitly refer to the perceived important (or problematic) aspect of migration, it is often difficult to know what respondents are thinking about when they answer a survey question. In surveys, the wording of a question is of utmost importance as it should be unambiguous and unequivocal.

That said, survey data are a valuable barometer of public attitudes, especially when consistent over time and between waves. Survey data are also useful for calibration purposes with other types of opinion data, such as social media messages, especially when comparing different framings of migration. For instance, surveys have particularly focused on the impacts of migrants and migration, typically assessed in terms of economic, social, and cultural burdens for the country. Yet, it is unknown how these more or less positive assessments of migrants impact the salience of social media discussions about migration.

This generic framing of migration is usually complemented by more specific narratives about migrants in public discussions. For instance, there is some evidence that people adopt elite rhetoric to a certain degree, either negatively (Doherty 57) or positively (Crawley & McMahon 13).

For instance, the anti-immigration rhetoric is at the core of far-right populism (Schwartz et al.), immigrant movements being described as invasions and narratives drawing on the concerns that people may perceive refugees and migrants as a challenge to values and culture, a source of terror and crime, and a threat to living standards, jobs, and public services (ODI & Chatham House 1), which form main frames against which the impact of migration are assessed. Social media have been shown to play a decisive role in the spread of the populist rhetoric, notably anti-immigration (Ernst et al. 18), and also in the depiction of migrants as a threat (Lorenzetti 87).

Several studies have investigated the specific depiction of migrants and asylum seekers (see Milioni & Spyridou; Van Gorp). More recently, O'Regan and Riordan relied on a combination of methods in corpus linguistics and critical discourse analysis to explore the representation of refugees, asylum seekers, immigrants and migrants. This research has been essentially applied to the study of news articles, and more rarely to social media messages (de Rosa et al.). A common finding of these studies is that migrants and asylum seekers are mainly described as 'innocent victims' or 'intruders.' Furthermore, while asylum seekers can generate empathy, this is less the case for migrants who are also perceived as 'profiteers.' The depiction of migrants in negative or positive terms has implications on countries' choices to develop exclusion or inclusion policies.

In this article, we aim to better understand what framings of migrants and migration impact the salience of social media messages. We therefore add one last overarching research hypothesis that the salience of tweets related to migration is positively associated with discussions about migrants and migration using a threat related rhetoric. To test this hypothesis we conduct multivariate regression, but we also rely on close-reading of a sample of tweets, as well as on the interpretation of important words related to the generic frames.

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3 Data and Methods

3.1 *Twitter Data Collection*

We collected two samples of Twitter users relying on a similar data collection strategy. These two samples differ in the choice of 'seed accounts' from which followers are extracted. For the selected followers, we then collected the last 3'200 tweets (which corresponds to the authorised limit by the Twitter API). We identified tweets related to migration based on the following list of search queries: *".*migration.* | migrant.* | immigrant.* | emigrant.* | foreigner.* | asyl.* | refugee.* | undocumented worker* | guest worker* | foreign worker* | freedom of movement | free movement"*. We then retrieved the followers of these seed accounts (max. 75'000 followers for each of the seed accounts authorised by the Twitter API) and applied filters to keep the most relevant Twitter accounts.[3] For each sample of Twitter followers, we decided to take random samples of 100'000 followers to keep the tweet collection stage reasonable in time and size. We also decided to include only tweets emitted after January 2019 in our final dataset of tweets about migration. The main reason for this is that we wanted to equilibrate the tweets of users with different dates of account creation and tweeting frequency as much as possible.

Concerning the first sample, we identified central media and party accounts for each country of interest (United States, United Kingdom, Ireland, Australia, and New Zealand). The distribution of this random sample of followers is given by country in Table 1. The size of the final dataset contains 310,247 tweets from 27,649 unique users. Overall, between 25% to 39% of users tweeted about migration. The overall tweeting frequency about migration in our sample has a mean of 11 and a standard deviation of 34 (with a maximum of 1 and a maximum of 2382).

[3] We apply some filters to keep only relevant users in our sample of followers. Notably, we apply the following filters: the user has to provide a minimal description in the user profile field, the user account must have been created before 2020-01-01, the number of emitted tweets must be 'reasonable' (above 5 per year and below 10'000 per year), and the main language of the account must be English.

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RANDOM SAMPLE OF TWITTER USERS				
	Selected followers	**Sample of 100'000 followers**	**Followers tweeting about migration**	**Number of tweets**
US	98363	14324	5303 (37%)	51219 (ratio: 9.7)
UK	161458	23508	9364 (39%)	106110 (ratio: 11.3)
Ireland	96406	14189	4263 (30%)	45707 (ratio: 10.8)
Australia	174618	25343	6647 (26%)	85556 (ratio: 12.9)
New Zealand	57740	8179	2072 (25%)	21655 (ratio: 10.4)
	588585	**85543**	**27649**	**310247**
INTERESTED TWITTER USERS				
	Selected followers	**Sample of 100'000 followers**	**Followers tweeting about migration**	**Number of tweets**
US	12058554	20000	7481 (37%)	88976 (ratio: 14.4)
UK	8515174	20000	7361 (37%)	94535 (ratio: 14.8)
Ireland	1002356	20000	4943 (25%)	53038 (ratio: 12.0)
Australia	1125590	20000	5614 (28%)	83312 (ratio: 16.9)
New Zealand	520743	20000	3567 (18%)	27142 (ratio: 8.4)
	23222417	**100000**	**28966**	**347003**
POLITICIANS				
	Selected politicians		**Politicians tweeting about migration**	**Number of tweets**
US	873		311 (36%)	30572 (ratio: 98.3)
UK	590		454 (77%)	7291 (ratio: 16.1)
Ireland	150		87 (58%)	825 (ratio: 9.5)
Australia	134		77 (57%)	1057 (ratio: 13.8)
New Zealand	204		37 (18%)	710 (ratio:19.2)
	1951		**966**	**40455**

Table 1. Description of the samples of Twitter followers and politicians

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Concerning the second sample, we identified central politicians' accounts for each country. To identify the relevant politicians' accounts, we relied on the Twitter Parliamentarian Database (van Vliet et al.).[4] We selected the politicians who were active in parliament from the year 2019 onward. The distribution of this politically interested sample of followers is given by country in Table 1. The size of the final dataset contains 347,003 tweets from 28,966 unique users. Overall, between 18% and 37% of users tweeted about migration. The overall tweeting frequency about migration in our sample has a mean of 14 and a standard deviation of 43 (with a minimum of 1 and a maximum of 2941).

We also give a description of the Twitter sample of the 1,951 identified politicians in Table 1. Among the entire sample of politicians, 966 (50%) tweeted about migration. This left us with a total of 40,455 emitted tweets. The overall tweeting frequency about migration in our sample has a mean of 28 and a standard deviation of 50 (with a minimum of 1 and a maximum of 457).

3.2 *Survey Data from Representative National Samples of the Population*

We test our hypotheses 1 and 2 by relying on the comparison between the collected tweets and measurements from opinion surveys. We present the comparisons between Twitter and survey data using visualisations in the form of scatter plots.

Hypothesis 1 centres on the salience of migration. On Twitter, we measure salience as the proportion of sent tweets related to migration by country. In surveys, we rely on the 'most important concern' question item, which asks respondents to mention what they perceive as the most important policy issue facing the country. We use data from the 2019 *Eurobarometer* for the United Kingdom and Ireland, from the 2021 *Survey of US adults* for the United States, and from the 2019 *Roy Morgan* survey for Australia and New Zealand. To measure salience, we rely on the proportion of respondents mentioning migration as the most important concern.

Hypothesis 2 focuses on the sentiment towards migration. On Twitter, we measure sentiment using the *sentimentr R* package (Rinker) which calculates text polarity sentiment in the English language at the sentence

[4] The data can be found here: www.figshare.com/articles/dataset/The_Twitter_Parliamentarian_Database/10120685.

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level. In surveys, we rely on the combination of question items asking respondents to assess the impacts of migration on cultural, social and economic dimensions. Data from the 2019 *European Social Survey*[5] are used for the United Kingdom and Ireland, while data from the 2019 *World Values Survey*[6] are used for Australia, New Zealand and the United States. To make the survey items most comparable and to account for the degree of positivity toward migration, we sum up the proportion of respondents rating the impact of migration positively on the three mentioned dimensions (cultural, social, and economical).

3.3 *Statistical Model Specifications*

We test our hypotheses 3 to 5 using linear regression modelling. The dependent variable is the logged number of tweets mentioning migration for each Twitter follower. According to our hypotheses, this salience of migration at the user level can be explained by several independent variables.

To test hypothesis 3, we include contextual factors, namely an integration policy index (the aforementioned *Migrant Integration Policy Index*, MIPEX) and a measure of elite polarisation. The MIPEX summarises policy indicators to create a multi-dimensional picture of migrants' opportunities to participate in society. Lower values indicate more restrictive policies whereas higher values indicate more integrative policies. The measure of political polarisation is based on the expert coding of the positiveness toward migration for the political parties within each of our selected countries. The coding is done by the experts from *Manifesto Pro-*

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5 The question items are: 'Country's cultural life undermined or enriched by immigrants' (answer scale from 0 to 10, where 0 states that the cultural life is undermined and 10 states that the cultural life is enriched), 'Immigrants make country worse or better place to live' (answer scale from 0 to 10, where 0 states 'worse place to live' and 10 states 'better place to live'), 'Immigration bad or good for country's economy' (answer scale from 0 to 10, where 0 states 'bad for the economy' and 10 states 'good for the economy').

6 The question items are: 'Immigration in your country: Strengthens cultural diversity' (answer scale from 1 to 3, where 1 states 'disagree' and 3 states 'agree'), 'Immigration in your country: Leads to social conflict' (answer scale from 1 to 3, where 1 states 'disagree' and 3 states 'agree'), 'Impact of immigrants on the development of the country' (answer scale from 1 to 5, where 1 states 'rather bad' and 5 states 'very good').

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ject.[7] For each country, we calculated the level of polarisation by taking the absolute difference between the higher and the lower party value for viewing immigration as positively impacting the national way of life.[8]

To test our hypothesis 4, we include a public opinion measure of migration acceptance, the Gallup's *Migrant Acceptance Index*. The index is based on three questions that Gallup asked in 138 countries in 2016 and in the U.S. and Canada in 2017. The index is a sum of the points across three questions: whether people think migrants living in their country, becoming their neighbours and marrying into their families are good things or bad things. It has a maximum possible score of 9.0 (all three are good things) and a minimum possible score of zero (all three are bad things).

To test our hypothesis 5, we include general and specific framings of migration on Twitter. To classify the tweets along general policy issues, we build a classifier to assign tweets among the following categories: *civil rights*, *culture & identity*, *economy*, *foreign policy*, *law & order*, and *welfare*. These categories have been determined theoretically and inspired from survey research. To extract a sample of emblematic tweets corresponding to these categories in view of training the classification model, we annotated the tweets using the policy issue *Lexicoder* dictionary. After preprocessing (most notably, removal of stop-words, removal of punctuation, lemmatisation, and generation of bigrams), we trained an ensemble model based on Random Forest and Gradient Boosting Machine using the *R* package *h2o* (LeDell et al., 2018). The accuracy of the classifier is shown in Table 2.

We also consider specific frames of migrants in terms of 'victims' and 'criminals' using lists of search queries. The list for 'victim' which we use is "*.*victim.** | *.*scapegoat.**". The list for 'criminal' reads as "*.*criminal.** | *.*rapist.** | *.*rape.** | *.*murder.** | *.*illegal.** | *.*intruder.** | *.*alien.**".

Finally, we also include a number of control variables in our regressions. For instance, we control for users' tweeting frequency because this can be a strong predictor of the number of migration related tweets, since it accounts for users' general level of online activity. We also include user's mean sentiment on immigration.

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7 More information can be found at www.manifesto-project.wzb.eu.

8 For more information see the codebook: www.manifesto-project.wzb.eu/down/data/2021a/codebooks/codebook_MPDataset_MPDS2021a.pdf.

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		Twitter sample of politically interested users				Twitter sample of random users			
Generic frames	**Original Lexicoder categories**	**precision**	**recall**	**F1**	**accuracy**	**precision**	**recall**	**F1**	**accuracy**
civil rights	civil rights	0.78	0.79	0.79	0.87	0.78	0.67	0.72	0.82
culture & identity	culture, education, religion	0.72	0.67	0.69	0.81	0.66	0.64	0.65	0.80
economics	labour, macroeconomics	0.72	0.70	0.71	0.83	0.72	0.66	0.69	0.81
foreign policy	international affairs, defence	0.76	0.75	0.75	0.86	0.68	0.72	0.70	0.83
law order	crime	0.80	0.84	0.82	0.88	0.77	0.83	0.80	0.87
welfare	healthcare, housing, social welfare	0.79	0.78	0.78	0.86	0.67	0.70	0.68	0.81

Table 2.
Accuracy of the classifier for the generic frames in both samples of Twitter users

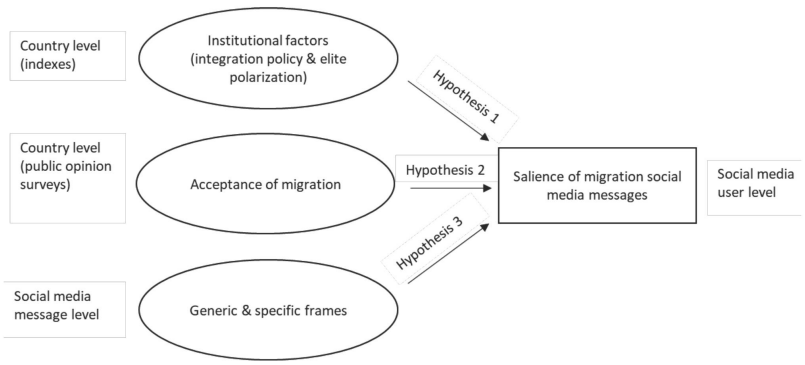

Figure 1.
Conceptual framework summarising the explanatory factors of the salience of migration on Twitter

4 Results

4.1 *Comparing the Salience of and Tonality toward Migration Online and Offline*

The salience of migration as a topic of social media discussion relates to its visibility and can be compared to survey respondents' perceived importance of the topic. Furthermore, the sentiment (or tonality) of social media discussions about migration is important to understand the evaluations of online users as compared to representative samples of the population.

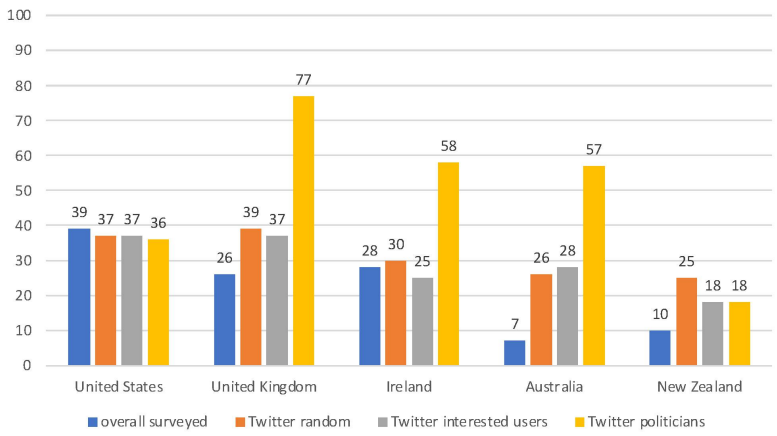

Figure 2. Salience of migration on Twitter for our different samples of users and in public opinion surveys by country

Figure 2 displays the salience of migration related discussion on social media for our different samples of Twitter users (random users, interested users, and politicians) and compares it to the survey distribution related to respondents' perceived importance of migration as a policy concern. The salience is given as a percentage of the number of tweets mentioning migration of the total of the collected tweets of users from each sample. We observe that in a majority of countries (Australia, New Zealand and the United Kingdom) politicians pay more attention to migration than Twitter users and survey respondents, which is probably related to Brexit in the case of the UK and possibly Ireland, the contested detention policy in Australia. Furthermore, when taking different samples of Twitter users (random and interested users), we end up with similar distributions in

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most countries. Pearson correlation between the salience of migration in surveys compared to the different Twitter samples indicate that the correlation is the highest with the random sample of Twitter users (0.81), followed by the sample of interested users (0.67), and politicians (0.16).

Figure 3 displays the correlation between sentiment toward migration on Twitter (for both samples of Twitter users and for politicians) and the percentage of public support for migration in public opinion surveys. The Pearson correlation between the sentiment of migration in surveys compared to the different Twitter samples indicate that the correlation is the highest with the interested sample of Twitter users (0.94), followed by the sample of random users (0.80), and politicians (0.38). The ascent on Figure 3 is much steeper for interested Twitter users than for random Twitter users, thus indicating polarisation and the fact that this is a more indicative user group. The fact that the correlation is much lower from the plot including politicians is particularly due to the outlier behaviour of the politicians from the United Kingdom on Twitter. This can be explained by the fact that the political discourse is much more polarised than in other countries due to discussions surrounding Brexit.

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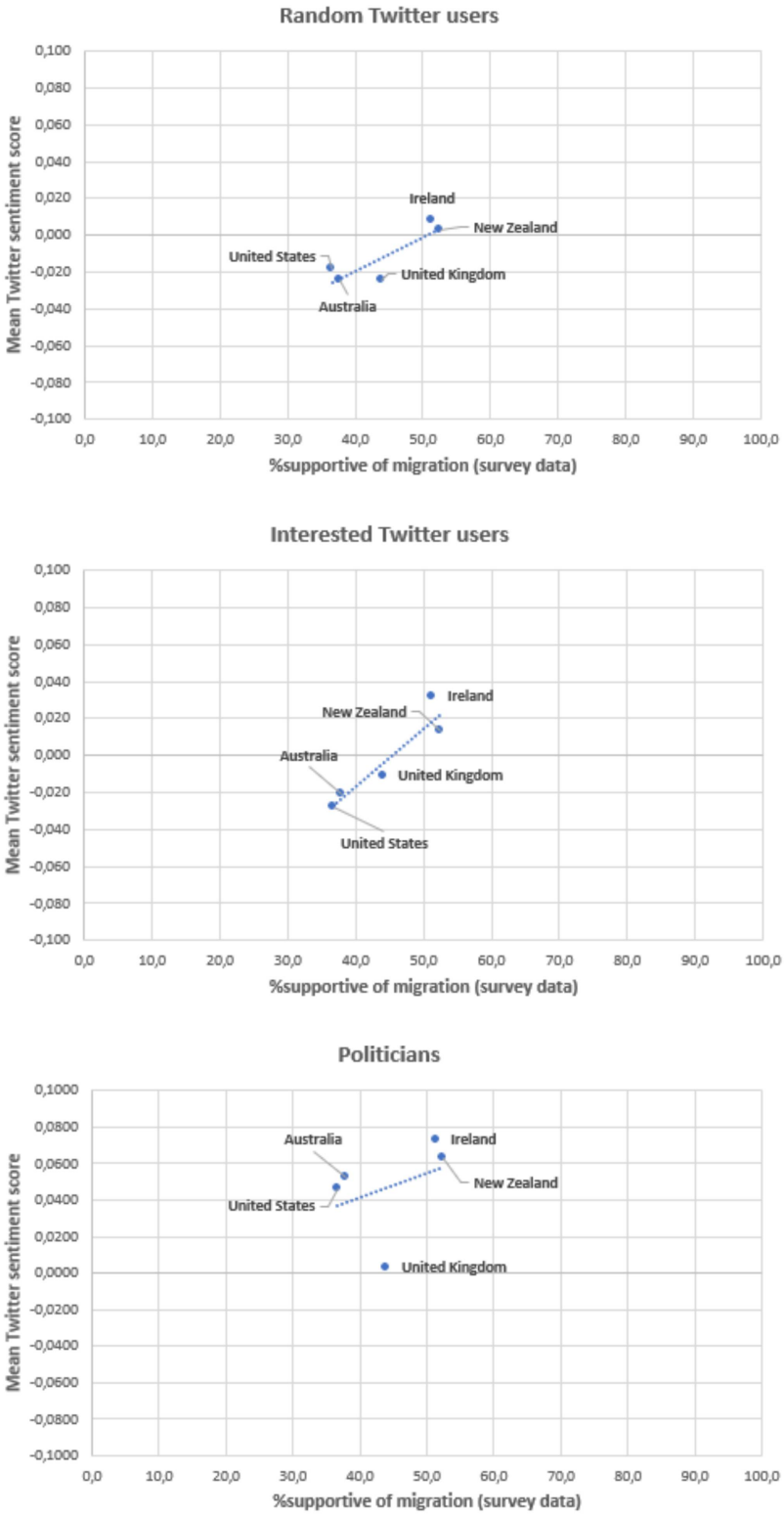

Figure 3. Correlation between sentiment toward migration on Twitter (for both samples of Twitter users and for politicians) and the percentage of public support to migration in public opinion surveys, split by country

The differences in sentiment distribution for the samples of Twitter users are displayed in Figure 4. Overall, we can see that the sentiment score is much lower for politicians than in the other Twitter samples. Random users have a mean of 0.37, compared to the mean sentiment of interested users of 0.53. The difference is highly significant at $p<0.001$ (t-test). Random users compared to politicians, who have a mean sentiment of 0.05 $p<0.001$ (t-test), also deliver a highly significant difference at $p<0.001$ (t-test). Finally, interested users versus politicians is also significant at $p<0.01$ (t-test).

Furthermore, the sample of politicians shows a more polarised distribution of sentiment than the sample of users. The standard deviation of both random users and interested users is 0.05, while the standard deviation of politicians is 0.13. We also observe that some of the most negative tweets come from the politicians, possibly aiming to incite their followers. The most negative tweets in the sample of politicians forcefully reject right-wing immigration policies, but there are also negative statements about immigrants. The most positive tweets are related to the advantages of highly skilled immigrants for the receiving country. We first thought that the positivity of interested users may sometimes be due to them applauding the politicians they follow rather than the topic of migration, but the data shows very few such instances.

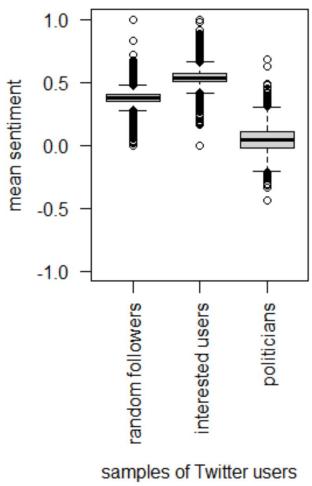

Figure 4.
Distribution of sentiment in tweets for both samples of Twitter users and for politicians

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4.2 *Explaining the Salience of Tweets about Migration*

In this section, we discuss the visibility of migration on social media and focus on the impact of the salience on migration in online discussions at the user level. We especially focus on how several factors impact the salience of online discussions about migration at the user level. To do so, we link social media messages, survey data, and societal indicators by applying linear regression models as explained in Section 3. We predict the salience of random twitter users in Model 1, and the salience of interested twitter users in Model 2. As predicting factors, we on the one hand use societal variables like Gallup's Migration Acceptance Index, elite polarisation, the Migration indexation Index (MIPEX; Section 2). On the other hand, we add linguistic factors, namely sentiment and specific content features which are indicative of generic frames, specific frames. The result is given in Table 3.

With respect to societal factors, we note several interesting effects. First, the level of elite polarisation slightly, but significantly, impacts the salience of migration discussions. This impact is negative, which means that higher levels of elite polarisation tend to be associated with a decreased salience of migration discussions online, thereby suggesting migration is discussed less prominently. Second, the effect of the index about migration integration policies is also negatively associated with the salience of migration on social media. This suggests that the salience of migration discussions on social media is higher when there are fewer institutional responses dedicated to the integration of migrants.

With respect to the connection between social media and public opinion, Table 3 shows that migration acceptance significantly impacts the level of salience of migration for both of our Twitter samples, random and interested users. However, while the effect is negative for the former, it is positive for the latter. This suggests that the more polarised sample of Twitter users is more likely to tweet about migration when the level of public acceptance is high at the country level, which indicates that this sample of users may be more likely to gather dissenting voices on migration.

Regarding the generic policy issue frames of migration, there are notable differences between both samples of Twitter users. In a nutshell, *economy*, *foreign policy*, and *law & order* framings have the effect of opposing direction between our samples of Twitter users. A possible explanation is that both groups of users pay attention to different narratives feeding into similar generic and specific framings. For the example of *eco-*

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nomy, the development of the economy is of more direct concern to the general population (see James Carville's famous quote from Clinton's campaign in 1992, "it's the economy, stupid") than to interested users, who may be willing to sacrifice economic success to the benefit of political or ideological views. Examples of tweets from random users supporting this interpretation are:

(1) @JoshVanVeen @philipsophy But why don't they go down the economic populist route? That's where the open lane is. I think they'll fail with rw populism: anti-immigration & culture wars. First one is irrelevant with borders closed & who's concerned with culture war issues with an economic crisis coming?

(2) Immigration Bill before parliament today. A Bill that would block entry to all care workers, cleaners, shop workers, delivery drivers & other low paid key workers who we clap for every week. Our @JCWI UK polling shows people do not want this. #r4today https://t.co/MJVxdVjp5K

The following is an example of a tweet from an interested user explicitly giving low precedence to economic issues:

(3) @SenatorLeahy @DHSOIG What a Joke, support your country, we're being overrun by illegal migrants. Do your damn job fraudulent hacking hypocrite

Similar arguments can be adduced in the discussion of the *welfare* frame. Namely, migrants are more likely to be constructed as being given unfair access to benefits and threatening the welfare State. For instance, an interested user writes,

(4) Eighty. Six. Million. Dollars.For hotel rooms. To house illegal immigrants. "Scoop: ICE securing hotel rooms to hold growing number of migrant families" https://t.co/xZyoFmh7IU

The correlation to welfare is high among interested users because many of them ask for support to migrants, particularly in difficult situations which coincide with immigration waves. (5) is from an interested user, (6) from a random user:

(5) I've been moved by the plight of refugees risking their lives in unimaginable ways to get to a safe place. I'm not much of a runner but I'm pledging to run 22 miles in September. Please sponsor me! <U+0001F64F> Thank you. <U+0001F496> @everydayherouk #everythingcounts https://t.co/KXRE5hEhZ1

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(6) @lilibellmia @BlueSea1964 "The true measure of a man is how he treats someone who can do him absolutely no good." – Samuel Johnson. After the Golden Age Illegal Immigrants & the WALL = MOOT. Nobody should have to LIVE in FEAR. Put yourselves in their SHOES. https://t.co/81zdWVspxE

Regarding the issue-specific framing of migrants, both the samples of interested and random users put emphasis on frames depicting migrants as 'criminals.' An example from random users is given in (7).

(7) Who voted for mass open door immigration and who wanted to see the sort of aggressive scenes on the streets of Britain we are witnessing in Batley? Multi culturalism has never in history ever worked. It can't. The left have caused this. I was called a racist.

Compared to the sample of interested users, where the 'victim' frame is frequent, such as in (8), it is under-represented in tweets from random users but can also be found, for instance (9).

(8) @DavidFrankal She is trying to copy the Australian asylum system by sticking them in unspeakable camps like in Nauru and PNG. You only have to watch @4corners docus to see how bad they are.

(9) Trump shared a video that begins "the only good Democrat is a dead Democrat." Remember: when he referred to immigrants & asylum seekers as an "invasion", an "infestation", as "animals" they – and anyone perceived to be an immigrant – became targets. 23 people murdered in El Paso.

In view of investigating the variations in the narrative about migration, we do not only measure the direct impact of generic frames, but also to their effect in conjunction with tonality. To do so, we include interaction terms between generic frames and sentiment in tweets. Figures 5 and 6 display the results for the mean (and +/- 1 standard deviation) of sentiment. For the interested Twitter users, *economy* and *sentiment* are particularly strongly correlated (pane C): a more positive sentiment leads to more tweets on economy. But also *law & order* is strongly correlated to sentiment (pane E) with interested users: here, a more negative sentiment leads to more tweets. Indeed, more negative opinions about *economy* and *law & order* appear more often within the sample of interested users compared to the random user sample. Examples with strong negative sen-

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timent from interested users are given in (10), which is from *law & order*, and (11), from *economy*.

(10) This is evil. Days after immigrants were gunned down in El Paso, Trump is continuing the attacks on immigrant families. Our job is to reject Trump's racist agenda, end the terror inflicted on immigrant communities and bring families together, not tear them apart. https://t.co/NAjZes02Aw

(11) And by the way, this India immigration bill (HR.1044 & S.386) is a disaster. It's a big-tech subsidy. India would dominate all employment green cards for the next decade. Is this what they call diversity? Shame on @MikeLeeforUtah. https://t.co/hKBgpWB599

The most strongly correlated factors for the random users are *foreign policy* and *sentiment*. Examples in this class are given in (12) and (13).

(12) @Nigel Farage @BorisJohnson No. Boris is wet, weak & woke and will happily accept mass immigration on an even larger scale than Blair.

(13) Our PM is shocked at alleged war crimes by our #SAS in Afghanistan while being part of a political party that for past 20 years has been demonising & dehumanising Muslim refugees from the Middle East. What message do you think this sent and what culture did this foster? #auspol

The strong correlation indicates that foreign policy kindles the strongest feelings, and that sentiment among the general public is typically higher. Non-experts tend to associate migration first and foremost with foreign policy.

Concerning the control variables, there is a small, but significant and negative effect of the users' sentiment, suggesting that online discussions about migration are generally unfavourable towards migration. Furthermore, the tweeting frequency has a significant and positive effect, suggesting that users who rely more heavily on Twitter are also more likely to address the topic of migration. Here it would be tempting to compare the effect size of the tweeting frequency between the two groups, which is higher for interested users. But this is statistically not permissible, as the sample sizes, which affect absolute frequency weights, are different.

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	Model 1 Random users		Model 2 Interested users	
(Intercept)	-0.03 (0.01)	***	0.06 (0.01)	***
Gallup's Migration Acceptance Index	-0.03 (0.01)	***	0.06 (0.01)	***
Elite polarisation	-0.03 (0.00)	***	-0.04 (0.00)	***
Migration integration index (MIPEX)	-0.10 (0.01)	***	-0.07 (0.00)	***
Generic frames				
civil rights	7.37 (1.07)	***	17.21 (2.13)	***
culture & identity	33.52 (1.19)	***	12.56 (0.98)	***
economy	12.12 (0.71)	***	-52.50 (2.69)	***
foreign policy	-20.36 (1.60)	***	0.55 (0.37)	
law & order	-2.89 (0.93)	**	23.52 (1.27)	***
welfare	19.68 (0.84)	***	6.04 (0.94)	***
Generic frames x sentiment				
civil rights x sentiment	-16.41 (2.59)	***	-27.94 (3.72)	***
culture & identity x sentiment	-74.07 (2.79)	***	-18.77 (1.63)	***
economy x sentiment	-27.56 (1.86)	***	96.99 (4.89)	***
foreign policy x sentiment	52.43 (4.24)	***	1.27 (0.68)	
law & order x sentiment	10.08 (2.51)	***	-42.06 (2.34)	***
welfare x sentiment	-45.63 (2.13)	***	-9.69 (1.66)	***
Specific frames				
criminal	0.21 (0.02)	***	0.77 (0.07)	***
victim	-1.97 (0.10)	***	0.04 (0.04)	
Sentiment on Twitter	-0.03 (0.00)	***	-0.04 (0.00)	***
Tweeting frequency	0.26 (0.00)	***	0.34 (0.01)	***
R^2	0.46		0.46	
Num. obs.	29498		25172	

Table 3. Linear regression model explaining salience of tweets (log transformed)

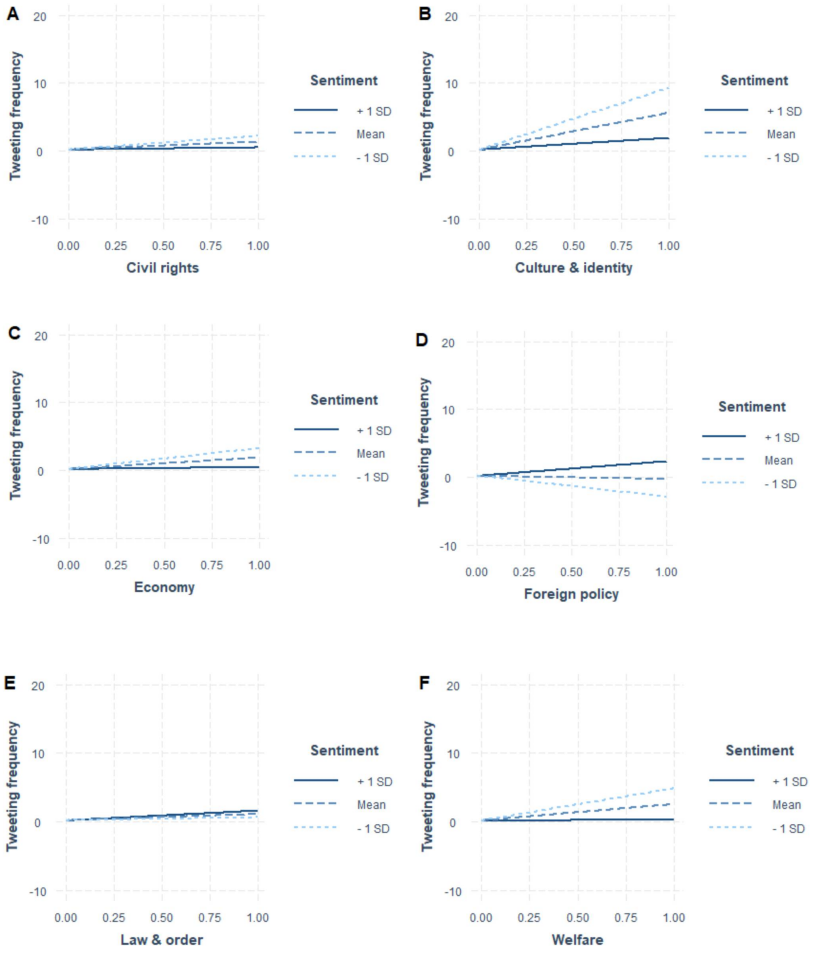

Figure 5.
Interactions between generic frames and sentiment in tweets for the sample of random Twitter users

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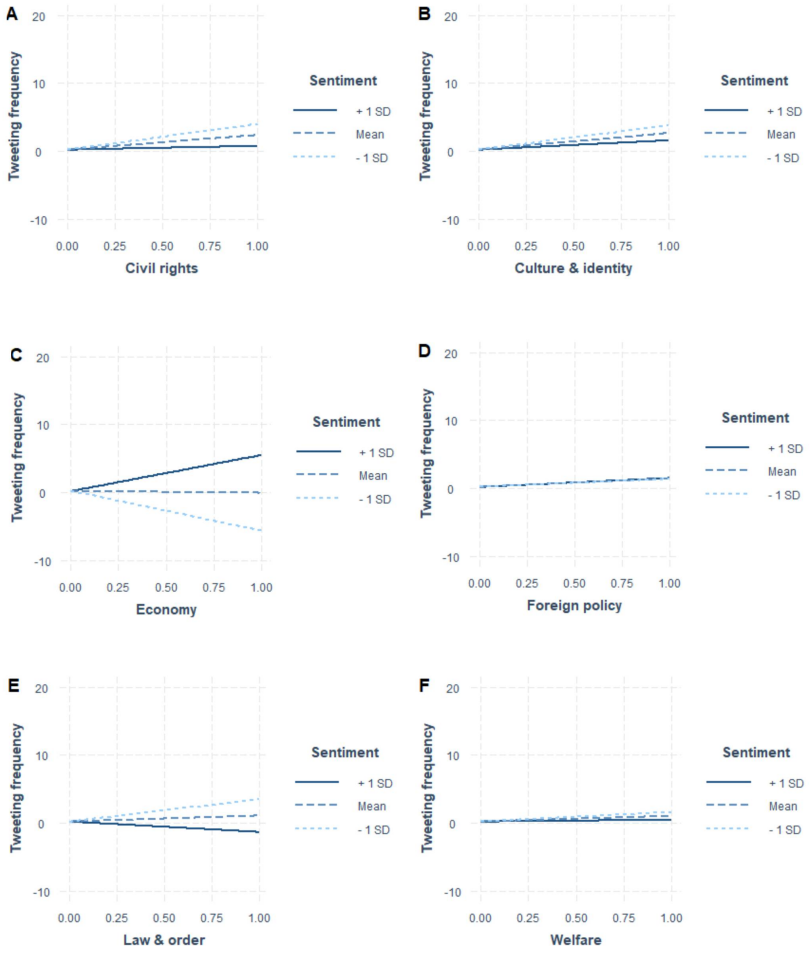

Figure 6.
Interactions between generic frames and sentiment in tweets for the sample of interested Twitter users

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Interested users are much more specific and engaged. This is shown in Figure 7 which extracts the most discriminatory words for each generic frame using the *tf-idf* measure. This is a classic measure to detect keywords, that is, to reflect how important a word is to a document in a collection or corpus.

Major differences can be observed in *foreign policy* where the two Twitter samples tend to adopt different behaviours. For instance, the random samples rather engage in a broadcasting style of communication by citing 'hot' events (e.g. Brexit, flee), typical entities (e.g. Macron, Erdogan), and agreements (e.g. pact) of the public debate. The interested users tend to be more engaged in the migration debate by using more specific terms that link migration to direct political events (e.g. election, council) and concrete policy making (e.g. fairness, dialogue).

A similar logic applies to the economy, where the random users cite numbers and figures (e.g. billions, yearly), whereas the interested users are more engaged with concrete policy measures (e.g. wage for all, stimulus) and refer to ways of life (e.g. dreams, growth).

With respect to civil rights, the random users are, again, rather non-specific and call to overarching principles (e.g. constitution, equity), whereas interested users refer to specific social movements and events (e.g. migrants' lives matter, migrants stuck offshore).

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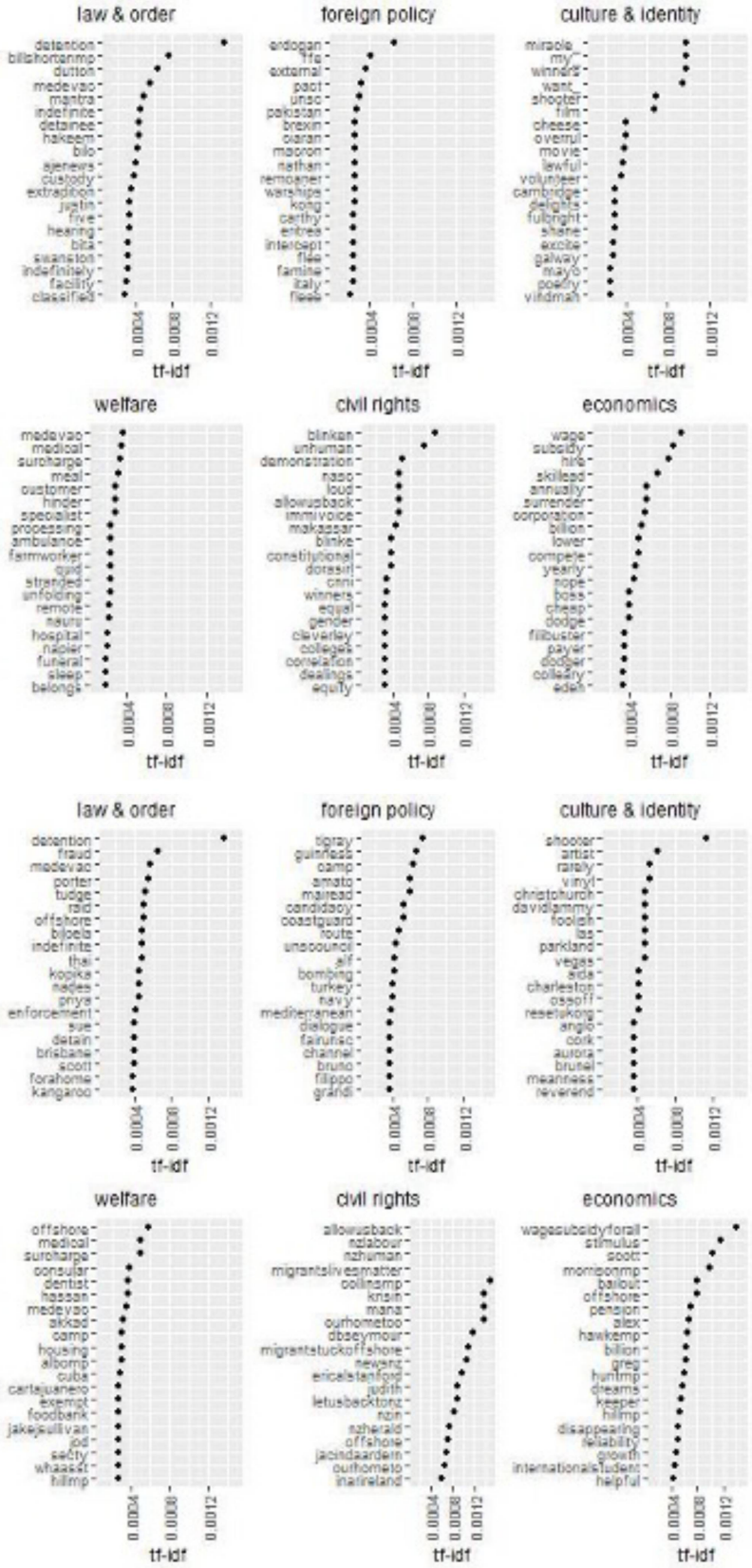

Figure 7. Top words by generic frame for the sample of random users (left pane) and interested users (right pane)

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5 Discussion of the Main Findings and Concluding Remarks

In our study, we proposed to compare migration discourses in traditional opinion surveys and social media in a cross-country perspective among five English-speaking countries. Let us discuss our main findings with reference to our initial hypotheses.

5.1 *Main Findings*

Hypothesis 1: the salience of migration online correlates with the extent to which migration is perceived as an important concern in representative opinion surveys

We can answer this hypothesis positively. Pearson correlation between the salience of migration in surveys and on Twitter shows a high correlation of 0.81 with the random sample of Twitter users. This indicates that salience can be used as a good approximation to surveys. Correlation to interested users and politicians is lower, which is also expected as polls aim to capture the stance of the general population.

Hypothesis 2: the tonality related to migration online correlates with the overall satisfaction toward migration found in representative opinion surveys

We can answer this hypothesis positively. We observe a very high Pearson correlation of 0.94 between the sentiment on migration in surveys compared to the interested Twitter users, and a high correlation of 0.80 to the random users. While we find a good match between social media and surveys, we do not claim that Twitter users are representative of the national populations. Rather, it merely suggests that there is a shared public mood at the national level when looking at aggregated measures between survey respondents and social media users. The merit of relying on two different samples of users enabled us to show how it might influence sentiment distributions, particularly with respect to interested Twitter users, which overrepresent engaged, politically active or strongly opinionated users. Our study thus nuances earlier findings that sceptically concluded that social media users are not representative of the population by showing that users produce significantly different averages in sentiment compared to survey respondents, especially by being less supportive of migra-

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tion (see Amaya et al.'s study on Reddit). Our aim was not to construct equivalent distributions of sentiment toward migration as found in opinion surveys, but to use both data sources in tandem to better understand how public attitudes toward migration interplay.

The fact that the correlation of sentiment is higher than the one of salience indicates, on the one hand, that it is worth adding a linguistic analysis, albeit simple and not adapted to the domain. On the other hand, it may also suggest a revision to Ghanem's statement that "[t]he frequency with which a topic is mentioned probably has a more powerful influence than any particular framing mechanism" (12). It is also worth observing that politicians only correlate with 0.38.

Hypothesis 3: the salience of tweets related to migration is more pronounced when societal and political factors (migrant integration policy and elite polarisation) are unfavourable to migrants and immigration

We found no support for this hypothesis. Indeed, higher levels of elite polarisation tend to be associated with a decreased salience of migration discussions online, which contradicts the direction of our hypothesis. It could be that if the elite is devised on a topic, then it may mostly affect citizens' positions on an issue but not necessarily their perceived importance of the issues. Furthermore, the MIPEX is also in the opposite direction from what we hypothesised. This could be explained by the fact that social media discussions on migration are most likely to take place in countries where integration mechanisms are scarce.

Hypothesis 4: the salience of tweets related to migration is correlated with lower levels of public acceptance of migration

Gallup's *Migrant Acceptance Index* is a significant factor in the regression analysis. However, its effect is negative, as expected, only for the random sample, while it is positive for the sample of interested users. We suggest that this could be linked to the fact that, in contexts where there is a high public acceptance of migration, interested users are likely to voice their positions, perhaps in a dissenting direction and as a counter-reaction movement to the general acceptance of migrants. On the reverse, the random sample of users tend to be less involved in migration discussions on social media when the acceptance of migration is high and, thereby, presumably perceived as under control.

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Hypothesis 5: the salience of tweets related to migration is positively associated with discussions about migrants and migration using a threat related rhetoric

We could confirm this hypothesis in several respects. For instance, we showed that the *law & order* frame is especially prevalent for interested users, especially from a standpoint on migration. We also noticed that there are different affordances according to our samples of users to pay attention to generic frames. For instance, the development of the economy is of more direct concern to the random sample than to interested users, who balance economic concerns with the benefit of political or ideological views. When looking at the specific depictions of migrants, we noticed that they are more prominently characterised with the *criminal* rather than the *victim* frame.

Migrants and migration are thus generally associated as being a threat to the country of arrival. However, a closer look at the top words used in each generic frame also allows us to derive more positive attitudes towards migrants, namely through concerns related to the threat to life for immigrants on their journey.

5.2 *Study Limitations*

Our sample provided a cross-country analysis including only English-speaking countries. However, future studies would benefit from including other regions of the world and additional countries. For instance, it would be interesting to compare multiple receiving European countries. However, this poses additional challenges due to the language variety. Furthermore, the countries included in our sample are essentially receiving countries. Other studies could also envisage conducting temporal analyses, such as the study of Yantseva comparing multiple media sources.

Moreover, although we implemented different tweet collection strategies, it may well be that limiting our analysis to the followers of political accounts excludes groups of users with different ideas about migration. However, we are confident that we could sample users with enough variation in the countries and ideological orientations. We recommend that similar and other collection strategies be made for the sake of comparability between countries and years of analysis, but also for different social media platforms (e.g. Facebook, Instagram, TikTok).

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Another limitation lies in the use of a dictionary-based approach for sentiment analysis. In the future, it may be possible to use more machine-learning algorithms with domain specific validation. Furthermore, we should note that sentiment contained in tweets does not necessarily equate the stance of a speaker toward migration. Future improvements could also be made in this direction to render social media data more comparable to surveyed attitudes.

Additionally, Twitter represents an important source of social media discussions. However, we encourage future research to additionally use other platforms, such as Reddit or Youtube (see Lee & Nerghes), but also to use other types of content, such as pictures or videos, to study attitudes towards migration.

Finally, the perceived importance and specific framings of migration may alter citizens' perceptions of and attitudes toward migration or migrants (Vliegenthart & Boomgaarden 309). To analyse such relationships, most studies have relied on public opinion data from (panel-)surveys that link to aggregate analyses of relevant media coverage (Eberl et al. 210). However, future research needs to test the influence of migration discourse on public opinion by integrating broader media samples, including and social media.

The salience of migration and the tonality with which it is publicly discussed are important as they may influence broader public opinions on migration and migrants. Albeit this relationship has been tested by combining (panel) surveys with media analysis (see review by Eberl et al.), it is so far understudied with respect to social media discourses. A notable exception is the study of Heidenreich et al., who focused on party communication on social media. Our study contributes to this line of inquiry and provides an approach that can be usefully extended to other countries and frames of migration.

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