Using Twitter Data to Monitor Immigration Sentiment

Francisco Rowe[1*], Michael Mahoney[1], Eduardo Graells-Garrido[2], Marzia Rango[3], Niklas Sievers[3]
[1] *Geographic Data Science Lab, University of Liverpool, Liverpool, United Kingdom*
[2] *Barcelona Supercomputing Center, Barcelona, Spain*
[3] *Global Migration Data Analysis Centre (GMDAC), International Organization for Migration, Berlin, Germany*
*Corresponding author: Francisco Rowe (F.Rowe-Gonzalez@liverpool.ac.uk)

Abstract

Immigration is a key ingredient for social cohesion and economic development. Yet, it is often portrayed as a major threat to national identity, values, economic stability and security, resulting in acts of intolerance, discrimination, racism, xenophobia and violent extremism. Understanding how misperceptions towards immigration are formed and shaped is key to address combat misrepresentations of immigrants. Typically attitudes towards immigration are studied based on qualitative and nationally representative surveys but they offer low population coverage, coarse geographical resolution and slow data collection. Social media offers dynamic and open space to better understand experiences and public opinion about immigration. While some bias exists, social media data are produced at unprecedented temporal frequency, geographical granularity and is accessible in real time. This paper aims to illustrate how attitudes towards immigration can be measured using Twitter data and natural processing language. Key findings indicate that negative attitudes emerge from a reduced number of users, and are more commonly manifested and intensify during negative immigrant news reflecting arguments of job competition and stricter immigration regulation. Positive attitudes are expressed by a more diffused number of users and are predominantly express to manifest support during specific events reflecting supportive arguments for immigrants' human and civil rights.

Keywords: immigration attitudes, sentiment analysis, United Kingdom, Twitter, xenophobia

1. Introduction

Immigration sentiment is a key ingredient to migrant integration and social cohesion. Immigration has consistently been identified as one of the most divisive social issues globally [1]. Immigration sentiment shapes migration policy formulation and political outcomes. Anti-immigration sentiment has spurred attention towards more restrictive migration policies, and has been linked to an increasing prominence of right-wing affiliation, particularly in Western European countries and the United States [2-4]. Immigration sentiment also influences the capacity of migrants to integrate into receiving communities. Acts of discrimination, intolerance and xenophobia can impair immigrants' ability to secure employment, housing and achieve a sense of belonging in local communities, contributing to more polarised societies [5-7].

Anti-immigration sentiment has gained salience during the last decade. A wave of key politically-motivated events have significantly contributed towards this trend. Examples include the Brexit referendum in the United Kingdom and Donald Trump's presidential campaign in the United States. Currently the world faces an unprecedented challenge to tackle and understand the spread and impacts of COVID-19 during which has reportedly coincided with an increase in anti-immigration sentiment [8]. Acts and displays of intolerance, discrimination, racism, xenophobia and violent extremism have emerged linking individuals of Asian descendent and appearance to COVID-19 [8].

Understanding public opinion towards immigrants is key to preventing the spread of misinformation that fuels misperception, negative attitudes and discrimination against immigrants. Anti-immigration sentiment is often rooted in misperceptions [1], and experimental evidence has revealed that providing information to address these misconceptions can shift attitudes towards a more supportive view of immigration [9]. The availability and accuracy of data on public opinion of migration are thus critical for tackling misperceptions and understanding the extent of local openness to immigration and ethnic diversity [10].

Traditionally, data on public perception on attitudes towards immigration are collected through qualitative sources, namely ethnographies, interviews and surveys. Yet, qualitative methods rely on small samples and normally suffer from sample bias [11]. Similarly, while surveys can provide a reliable national representation, they are expensive, infrequent, offer low population coverage, lack statistically validity at fine geographical scales and become available with a lag of one or two years after they have been collected [11]. Additionally, survey data do not normally provide insights into why people hold certain views on migration, and respondents may interpret the same survey question differently [12].

New forms of data provide an opportunity to overcome these deficiencies. Social media, particularly microblogging, offers a dynamic and open space which provides a unique window to better understand public opinion about immigration. Microblogging is a new form of communication in which users can short posts to express live opinions on mobile phones, computers and tablets. In July 2019, 46 percent (over 3.4 billion) of the world's population were estimated to be active social media users [13]. Social media data are produced at an unprecedented temporal frequency, geographical granularity and are accessible in real time [14]. Coupled with cheap computing and machine learning algorithms, these data enable real-time processing of information to measure and monitor anti-

immigration sentiment at frequent temporal intervals over extended timeframes and across the globe [15, 16].

This paper aims to illustrate how immigration sentiment can be measured and monitored using Twitter data and natural language processing. Drawing on Twitter data, we examine immigration sentiment in the United Kingdom during January 15th to February 15th, 2020 comprising the start of the unfolding COVID19 pandemic. The first reported case of COVID19 in the United Kingdom dates back to January 31st, 2020 [17], a day after the first reported media case of a COVID-19 related incident of racism and xenophobia against a Chinese student in January 30th, 2020 [18]. We acknowledge the potential limitations of Twitter to capture immigration sentiment. They may only enable capturing of public opinions by a selected segment of the population whose size and attributes vary by country according to access to digital technology, offering a partial representation of immigration sentiment. Yet, Twitter represents a novel, promising source of data, providing information on public opinion we did not have before, to complement traditional sources and develop our understanding of public perceptions towards immigration where appropriate data are not available.

2. Background

Globally, surveys are the primary source of public opinion on migration. A number of surveys provide historical data on attitudes towards immigration, including the Gallup World Poll, the Pew Global Attitudes Survey, the International Social Survey Programme, the World Values Survey, the Iposos Global Trends, the European Social Survey, and the Eurobarometer. They vary widely in temporal frequency, the number of countries covered, and the number of questions collecting data on migration opinion [19]. A Gallup World Poll to collect data on attitudes towards immigration was conducted between 2012 and 2014 and covered a total of 160 countries; however, it only contained six questions on migration-related public opinion, and data are not publicly accessible [19]. The World Values Survey has run annually since 1981 but typically contains only two questions on migration-related public opinion, while the European Social Survey contains 36 of such questions but were only captured in two waves in 2002 and 2014 [19].

A common question to capture attitudes towards immigration is whether or not immigration levels should be increased, decreased or stay at present levels. While wide variability across countries exist, world regional averages based on Gallup World Poll data collected in 2012-2014 revealed people's preference for either maintaining or increasing current immigration levels - with Europe being an exception [20]. In Europe, residents appear to have the least positive towards immigration globally, with 52% percent of the surveyed population indicating a need to reduce current immigration levels [20]. Yet, a sharp divergence exists between Northern and Southern Europe [20]. Southern Europeans tend to display more negative attitudes towards immigration preferring lower national immigration levels, while northern Europeans show more positive attitudes favouring maintenance or an increase in current immigration levels [4, 20]. In Northern Europe, the United Kingdom stands out as an exception with a larger percentage of the population in favour of lower immigration levels [20].

Nonetheless, anti-immigration sentiment in Europe seems to be softening. Longitudinal data on feelings towards immigrants from Eurobarometer surveys conducted in 2014-2018 reveal a

decreasing trend in anti-immigration sentiment across most European countries [4]. Though, stronger negative feelings exist towards immigrants from non-EU nations than EU member states [4]. In the United Kingdom, a paradoxical softening in anti-immigration sentiment has taken place since the Brexit Referendum [21]. According to Ipsos MORI data, the share of population agreeing that there are too many migrants has reduced from 64 percent in 2013 to 45 percent in 2017 [5]. Additionally, there is now a predominantly positive perception over the impact that immigration has had on Britain [22].

While existing survey data on public opinion about immigration provide a valuable understanding of long-term changes in attitudes towards immigration and cross-national differences, challenges remain. Survey data are typically spatially coarse, costly and infrequent. Existing data can be limited through slow data releases and statistical representation, especially at small geographical units. Real-time, frequent, exhaustive and internationally spanning information is crucial to monitor changing attitudes towards immigrants during dynamic and fast evolving events, such as pandemics. Twitter data offers a novel source to supplement and complement traditional data systems to cover their gaps and feed into real-time monitoring of immigration sentiment.

3. Data & Methods

3.1. Data

We draw on a random sample of 1.76 million tweets from the United Kingdom covering the start of the COVID19 pandemic, between January 15th to February 15th, 2020. This sample comprises a sample of 22k original tweets and 1.73m retweets, reflecting the prevalence of retweets about this topic. Data were collected via an application programming interface (API) [23]. We used Twitter's Premium API to access historical data with a monthly cap of 1.25 million tweets. It enables 500 tweets per request at a rate of 60 request per minute; access to tweets, retweets, URLs, hashtags and profile geographic information; and, a total number of 2.5k requests per month.

The data were collected based on a random sampling strategy. To maximise our monthly API data allowance, a sampling strategy was developed to collect a sample of 1.5k tweets on daily basis from December 1st 2019 to June 31st 2020. We generated a dataset for a larger project to monitor immigration sentiment during the course of the COVID-19 pandemic across five countries, including the United Kingdom. We collected data at the peak hour of daily tweet activity using a geographic bounding box. We assessed the statistical representation of the resulting dataset, comparing sentiment scores based on four lexicons against scores obtained from a dataset containing all daily tweets for seven full days. The resulting sentiment scores from both datasets were consistent identifying similar daily patterns of immigration sentiment.

To collect tweets focusing on migration, we were guided by the principles of the Campbell policies and guidelines standards for the conduct of systematic reviews [24]. A key component of conducting a systematic review is planning a search strategy to capture relevant content. In consultation with migration experts at the International Organization for Migration (IOM), a set of key search terms were developed, including words, Twitter accounts and hashtags. Table 1 lists the selection of words and hashtags included in our search terms. Twitter accounts are not displayed for privacy and confidentiality purposes.

Table 1. List of search terms used for our tweet data collection. Keywords, hashtags and Twitter user accounts were used. Twitter user accounts are not reported for confidentiality and privacy purposes.

Countries	Categories		Search Terms
United Kingdom	Terms		immigrant, immigration, migrant, migration, "asylum seeker", refugee, "undocumented worker", "guest worker", "EU worker", "non-UK workers", "foreign worker", (human smuggling), (human trafficking), illegals, foreigner, "illegal alien", "illegal worker", islamophob*, sinophob*, "china flu", "kung flu", "china virus", "chinese virus", shangainese
	Accounts		37
	Hashtags	Positive	#RefugeesWelcome, #MigrantsWelcome, #LeaveNoOneBehind, #FreedomForImmigrants, #illegalmigantsUK, #LondonIsOpen, #EndHostileEnvironment, #FamiliesBelongTogether
		Neutral	#Pritiuseless, #migrationEU, #immigration, #migration, #immigrant, #migrant, #immigrate, #migrate, #refugees, #NigelFarage, #ImmigrationReform
		Negative	#illegals, #foreigner, #foreigners, #illegalalien, #illegalaliens, #illegalworker, #OurCountry, #illegalworkers, #KeepThemOut, #SendThemBack, #migrantsnotwelcome, #refugeesnotwelcome, #illegals, #ChinaVirus, #chinaflu, #kungflu, #chinesevirus, #TheyHaveToGoBack, #DeportThemAll
		Event	#Moria, #CampFire, #closethecamps

3.2 Sentiment Analysis

To capture immigration sentiment, we used sentiment analysis, or also known as opinion mining or emotion artificial intelligence. It refers to the use of natural language processing to systematically identify, measure and analyse emotional states and subjective information. It computationally enables the polarity of text to be identified; that is, whether the underpinning semantics of an opinion is positive, negative or neutral. Furthermore, it allows deriving quantitative scores to identify the attitude or position on the distribution of negative or positive terms in given a piece of text.

We specifically employed VADER (Valence Aware Dictionary and sEntiment Reasoner) [25]. VADER is a lexicon and rule-based sentiment analysis tool which is tailored to the analysis of sentiments expressed in social media. VADER has been shown to perform better than eleven typical state-of-practice sentiment algorithms at identifying the polarity expressed in tweets [25]. It overcomes limitations of existing approaches by more appropriately handling informal text, including the use of negations, contractions, slang, emoticons, emojis, initialisms, acronyms, punctuation and word-shape (e.g. capitalization) as a signal of sentiment polarity and intensity. Most commonly, lexicon-based approaches only capture differences in sentiment polarity (i.e. positive or negative) but do not identify differences in sentiment intensity (strongly positive *versus* moderately positive) or contradictions (e.g. "Immigration is *good* but the current visa system is *horrible"*). They have also been designed to capture sentiment in well-structured sentences, meaning generally their lexicons do not include slang, emoticons, emojis, acronyms and capitalised word differentiation. We note that accurate identification and scoring of sarcastic statements remain a key challenge in natural language processing, but these statements tend to represent a small fraction of daily tweets.

VADER provides a normalised, weighted composite score which captures the polarity and intensity of individual tweets. The score ranges from -1 to +1, representing the most extreme negative to most extreme positive sentiment respectively. Intuitively, to derive the score, VADER assigns a score to each word in a tweet, ranging from -4 (extremely negative) through 0 (neutral) to +4 (extremely positive) based on positive and negative text features identified in the text. These scores are then aggregated and normalised to range between -1 and +1. We used the daily average of the composite score to track the daily evolution of immigration sentiment in twitter. We then identified positive sentiment tweets (i.e. composite score > 0.05) and negative sentiment tweets (i.e. composite score < -0.05).

4. Results

Fig. 1 displays the overall distribution of tweet sentiment scores between January 15th to February 15th, 2020. As expected, it shows a high frequency of neutral polarity tweets but also reveals a high prevalence of negative and positive polarity scores around -0.5/-1 or 0.5/1 indicating the existence of a very polarised discussion on issues relating to immigration. Adding together all negative sentiment scores results in a total of 880k which exceeds the number of positive sentiment tweets (723k), while neutral sentiment tweets account for a small fraction (155k). These results reflect the fact that Britain has become an increasingly divided society on controversial issues, and immigration has featured as a key divisive topic [5], particularly prominent during the lead-up to the Brexit referendum [25]. These divisions have become increasingly aligned with partisan identities in recent years [21] and attributed to echo chambers – patterns of information sharing that reinforce pre-existing beliefs by restricting exposure to opposing political views [2]. Social media is often believed to comprise a main channel leading to selective exposure to information and political polarisation [27, 28].

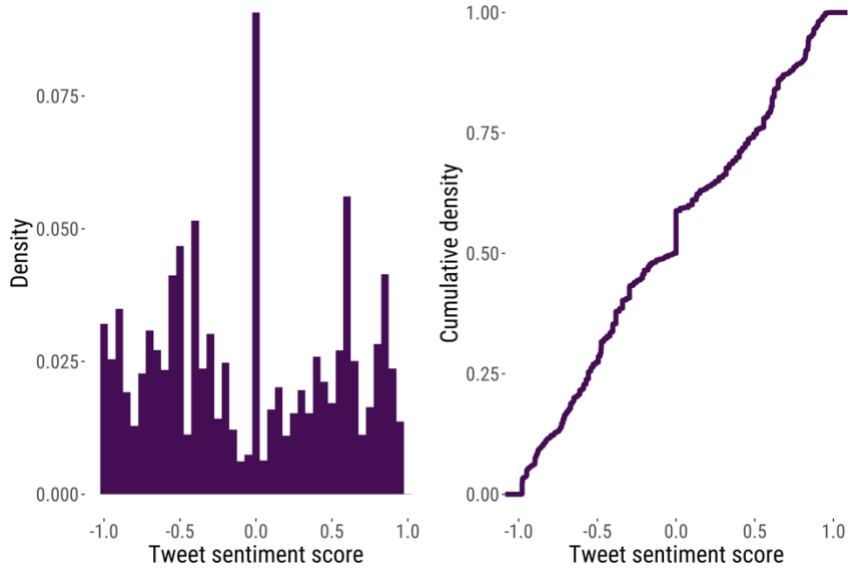

Fig.1. Density (left) and cumulative (right) distribution of sentiment scores.

Fig.2a shows the daily average tweet sentiment score displaying a cyclical pattern of positive and negative sentiment, and Fig.2b reveals the sentiment intensity composition of tweets. A first key observation from these results is that negative feelings towards immigration does not seem to have intensified during the start of the COVID19 pandemic in the United Kingdom. This is contrary to expectations of increased intensification of negative sentiments towards immigration, particularly against people of Asian descent and appearance. Links between COVID19 and China are believed to have sparked acts and displays of xenophobia and racism against Asian people around the world [8]. Asian international students were reportedly subjected to racist attacks in early stages of the outbreak [8].

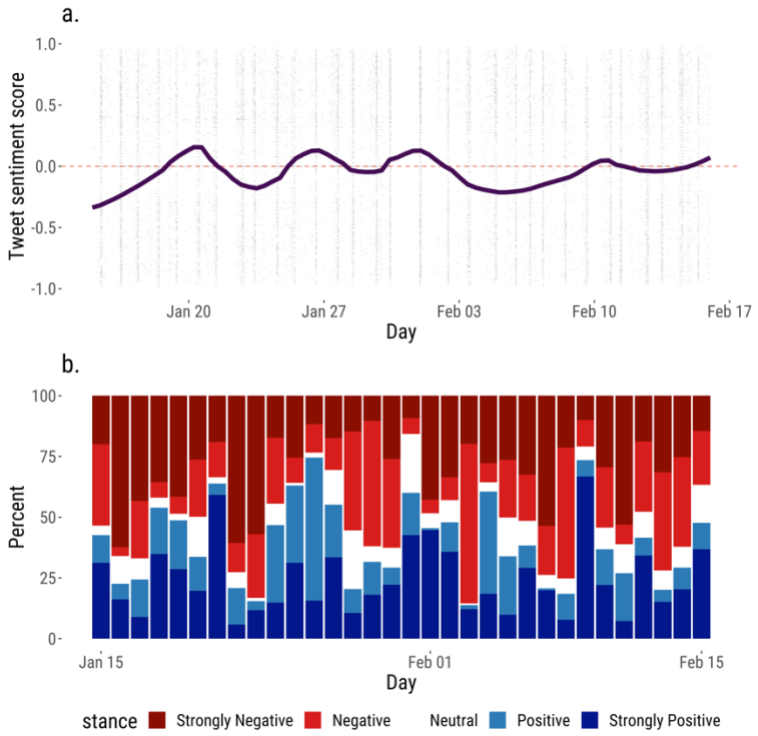

Fig2. Daily evolution of tweet sentiment: (a) Average overall sentiment score. Smoothed conditional means obtained are reported obtained via locally weighted scatterplot smoothing (loess) using a span of 0.3. Gray background dots represent daily individual tweet sentiment scores. (b) Percentage of sentiment scores classified into strongly negative (< -0.5), negative (-0.5 - -0.05), neutral (-0.05 - 0,05), positive (0.05 - 0.5) and strongly positive (>0.5)

Fig.2a suggests that key Brexit events have driven periods of intensification in negative sentiment. Notable periods of negative sentiment include January 15-16th 2020 (initial days in our analysis), January 22nd-23rd, and February 3rd-8th 2020. January 15-16th coincide with concerns raised by the European parliament about EU citizens risking discrimination after Brexit in seeking housing and employment made on January 15th [29]. January 22nd-23rd concur with the government's unveiling of its post-Brexit immigration plans [30]. February 3rd-8th comprise the first working week after the United Kingdom exited the European Union on Friday, January 31st, Trump's impeachment acquittal in February 5th and the indictment of multiple murder charges against an immigrant in the United States in February 7th [31-32]. Fig2.b reveals that overall negative sentiment during these three sets of dates were driven by a rise in the percentage of tweets with strongly negative sentiment, with relatively less tweets expressing strongly positive sentiment. This situation contrasts with days during which relatively high percentages of negative sentiment tweets do not seem to result in an overall day negative sentiment score, as these tweets are counteracted by an equally large share of strongly positive sentiment tweets, such as February 13th.

To better understand periods of rise in negative sentiment, we analyse the frequency of words during the three sets of dates identified above. We distinguished between words associated with expressions of negative and positive feelings captured in tweets, to identify general themes of discussion. A main advantage of Twitter data is its temporal frequency, which enables understanding of changes in public opinion on a daily basis and the ways they are shaped by key events. Fig.3 displays word clouds containing the most frequently used words in tweets associated with negative (red) and

positive (blue) sentiment during January 15-16th, 22nd-23rd, and February 3rd-8th, 2020. Words relating COVID19 are not apparent. Crime, the consequences of Brexit, and immigration policy on EU migration, refugee settlement and human trafficking emerge as key themes emerging from the analysis of these word clouds.

a. January 15-16th, 2020

b. January -22nd-23rd, 2020

c. February 3rd-8th, 2020

Fig3. Frequent words to express negative (red) or positive (blue) sentiment. (a) January 15-16th, 2020. (b) January 22nd-23rd, 2020. (c) February 3rd-8th, 2020. The size of the word indicates the number of tweet appearances. Only

words with a frequency greater than 200 are displayed. Sentiment scores < -0.05 are classified as negative. Sentiment scores > 0.05 are classified as positive.

Words, such as “alien”, “deport”, “kill” and “arrest” related to a criminal event represent the prevailing negative sentiment in January 15-16th. They relate to a viral tweet shared by more than 13.9k user involving a notorious case of assault and murder by an apparently illegal immigrant in the City of New York in the United States. The consequences of Brexit for EU citizens and Britons are a prevalent topic across the three set of dates. Negative feelings are addressed to the hard realisation of the challenges imposed by Brexit. Tweets express the anger and frustration of EU citizens and Britons as they are expected to apply for residency to remain in their respective host countries where they pay taxes and own a house. Tweets relating to Brexit also embody positive sentiment as captured in the word clouds, celebrating the exit of the United Kingdom from the EU and how this enables the controlling of immigration. Stringent immigration policy on human trafficking and refugee migration are also prevalent themes, and seem to be key triggers of both positive and negative sentiment. In January 22nd-23rd, tweets revolve around the rejection of amendments to child refugee policy by the United Kingdom’s government. In February 3rd-8th, they relate to temperamental comments from people coming to the realisation of false claims made by the Leave campaign about £350M a week becoming available for the NHS post-Brexit; Trump’s impeachment acquittal and murder indictment of an immigrant in the United States.

5. Conclusion

Understanding public attitudes towards immigration is essential in the delivery of the Global Compact for Safe, Orderly and Regular Migration. In early stages of the COVID19 outbreak, concerns about a rising number of racist and xenophobic incidents against individuals of Asian descendent and appearance were reported. Lack of appropriate data have however prevented detailed analysis of immigration sentiment since the start of the pandemic. This paper illustrates how Twitter data can be employed to analyse immigration sentiment during the start of the COVID19 pandemic. We analysed a sample of 1.76 million tweets from the United Kingdom between January 15th to February 15th, 2020.

The analysis revealed a trend of high fluctuation in daily tweet-measured immigration sentiment. Negative sentiment was greatly influenced by Brexit, immigration policy changes and key situational events. There is no evidence of a significant rise in negative sentiment associated with COVID-19-related racist and xenophobic attitudes towards immigrants in the United Kingdom during the early stages of the pandemic. A 21 percent increase in hate incidents against Asian communities between January and March 2020, relative to the same period in 2019, was reported in May [33]. The majority of these events seem to have occurred in February and March as COVID spread throughout the United Kingdom. Expanding the analysis to cover a longer time period would enable capturing changes in sentiment relating to these events as the United Kingdom transitions away from the EU and associated anti-immigration sentiment softens as reported in a recent study [21].

A second key finding is the polarisation of the discussion around immigration on Twitter. Our analysis revealed high volume of tweets at both ends of the sentiment distribution, expressing heavily charged negative or positive sentiment relating to immigration. Such polarisation is likely to reflect a

wider trend of political polarisation in the United Kingdom around Brexit, but is also observed in other countries such as the United States. It may also mirror patterns of misinformation and information sharing on social media, such as echo chambers, which contribute to reinforce pre-existing beliefs by restricting exposure to opposing views.

We expect our analysis to lay some ground for future research on attitudes towards immigration. Our analysis suggests that viral tweets act as vehicles through which negative sentiment is disseminated via retweets. Sharing a viral tweet, without adding additional commentary, tends to represent a sign of endorsement of a time-specific opinion in a given situation. It can communicate a pre-existing, longstanding attitude towards immigration. Examining the network structure of retweets is important to identify and understanding active spreaders of misinformation. Our findings also revealed that not all tweets associated with negative (positive) sentiment scores convey negative (positive) sentiment towards immigration. Sentiment may also relate to other textual features in a tweet, such as processes of slavery and human trafficking, rather than immigration or immigrants. Similarly, not all tweets refer to immigration events within a country's national boundaries. Our findings showed the relevance that immigration-related events occurring in the United States has on the United Kingdom. This suggests that attitudes towards immigration are not only shaped by local factors but are also greatly influenced by international events. Understanding the influence of international events in the formation of perceptions towards immigration is probably a key under-researched area in the migration literature and deserves greater attention.

Understanding attitudes towards immigration is essential to develop appropriate policy instruments. Negative sentiment towards immigration is usually based on misconceptions, and a recent study has demonstrated that knowing key pieces of information underpinning these misbeliefs is key to fostering a more favourable view towards immigration [9]. Identifying and understanding misconceptions about immigration policy changes and impacts may help formulate interventions to reduce anti-immigration attitudes. If rigorously handled, we believe Twitter data to represent a key tool to expand our existing knowledge of the misconceptions and contact network underpinning the formation of attitudes towards immigration, especially if they are used to complement existing data source. Facilitating access to, and handling of, Twitter data are key challenges that need to be addressed to deliver this promise.

References

[1] European Political Strategy Centre. 2019, 10 trends shaping migration. European Commission. https://op.europa.eu/s/oq7V (last accessed: 7 Nov 2020)

[2] Bail, C.A., Argyle, L.P., Brown, T.W., Bumpus, J.P., Chen, H., Hunzaker, M.F., Lee, J., Mann, M., Merhout, F. and Volfovsky, A., 2018. Exposure to opposing views on social media can increase political polarization. Proceedings of the National Academy of Sciences, 115(37), pp.9216-9221.

[3] Greven, T., 2016. The rise of right-wing populism in Europe and the United States. A Comparative Perspective. Friedrich Ebert Foundation, Washington DC Office, pp.1-8.

[4] Dennison, J. and Geddes, A., 2019. A rising tide? The salience of immigration and the rise of anti-immigration political parties in Western Europe. The political quarterly, 90(1), pp.107-116.

[5] Blinder, S. and Richards, L, 2020. UK Public Opinion toward Immigration: Overall Attitudes and Level of Concern. Migration Observatory briefing, COMPAS, University of Oxford, UK; January 2020

[6] Cheong, P.H., Edwards, R., Goulbourne, H. and Solomos, J., 2007. Immigration, social cohesion and social capital: A critical review. Critical social policy, 27(1), pp.24-49.

[7] Penninx, R., Spencer, D. and Van Hear, N., 2008. Migration and integration in Europe: The state of research. Swindon, UK: Economic and Social Research Council.
[8] Nature, 2020. Stop the coronavirus stigma now. Nature, 580(7802), p.165.
[9] Grigorieff, A., Roth, C. and Ubfal, D., 2020. Does Information Change Attitudes Toward Immigrants?. Demography, 57(3), pp.1117-1143.
[10] Dennison, J. and Dražanová, L., 2018. Public attitudes on migration: Rethinking how people perceive migration. An analysis of existing opinion polls in the EuroMediterranean region. European Union: Observatory of Public Attitudes to Migration.
[11] Atieno, O.P., 2009. An analysis of the strengths and limitation of qualitative and quantitative research paradigms. Problems of Education in the 21st Century, 13(1), pp.13-38.
[12] Goyder, J., 1986. Surveys on surveys: Limitations and potentialities. Public Opinion Quarterly, 50(1), pp.27-41.
[13] Hootsuite & We Are Social (2019) Digital 2019 Global Digital Overview. Available at: https://datareportal.com/reports/digital-2019-global-digital-overview.
[14] McCormick, T.H., Lee, H., Cesare, N., Shojaie, A. and Spiro, E.S., 2017. Using Twitter for demographic and social science research: Tools for data collection and processing. Sociological methods & research, 46(3), pp.390-421.
[15] Bartlett, J. and Norrie, R., 2015. Immigration on Twitter: Understanding public attitudes online. Demos. https://apo.org.au/sites/default/files/resource-files/2015-04/apo-nid54788.pdf (last accessed: 12 Nov 2020)
[16] Freire, Y. and Graells-Garrido, E., 2019. Characterization of Local Attitudes Toward Immigration Using Social Media. arXiv preprint arXiv:1903.05072.
[17] Wikipedia, 2020, COVID-19 pandemic cases. https://en.wikipedia.org/wiki/COVID-19_pandemic_cases (last accessed: 12 Nov 2020)
[18] Wikipedia, 2020, List of incidents of xenophobia and racism related to the COVID-19 pandemic. https://en.wikipedia.org/wiki/List_of_incidents_of_xenophobia_and_racism_related_to_the_COVID-19_pandemic (last accessed: 12 Nov 2020)
[19] International Organization for Migration, 2020, Surveys measuring public opinion on migration, Global Migration Data Analysis Centre (GMDAC). https://migrationdataportal.org/infographic/surveys-measuring-public-opinion-migration (last accessed: 12 Nov 2020)
[20] International Organization for Migration, 2015, How the World Views Migratio, Geneva. https://publications.iom.int/system/files/how_the_world_gallup.pdf (accessed 12 Nov 2020)
[21] Schwartz, C., Simon, M., Hudson, D. and van-Heerde-Hudson, J., 2020. A Populist Paradox? How Brexit Softened Anti-Immigrant Attitudes. British Journal of Political Science, pp.1-21.
[22] Ipsos, 2019, Attitudes towards immigration. Survey conducted on behalf of IMiX. https://www.ipsos.com/sites/default/files/ct/news/documents/2019-03/public-attitudes-towards-immigration-survey-for-imix.pdf (last accessed: 12 Nov 2020)
[23] Campan, A., Atnafu, T., Truta, T.M. and Nolan, J., 2018, December. Is data collection through twitter streaming api useful for academic research?. In 2018 IEEE International Conference on Big Data (Big Data) (pp. 3638-3643). IEEE.
[24] Campbell Collaboration. 2020. The Campbell Collaboration. http://www.campbellcollaboration.org/ (last accessed: 12 Nov 2020)
[25] Gilbert, C.H.E. and Hutto, E., 2014, June. Vader: A parsimonious rule-based model for sentiment analysis of social media text. In Eighth International Conference on Weblogs and Social Media (ICWSM-14). Vol. 81, pp. 82.
[26] Ipsos, M.O.R.I., 2017. Shifting ground: 8 key findings from a longitudinal study on attitudes towards immigration and Brexit. London: Ipsos MORI.
[27] Conover, M.D., Ratkiewicz, J., Francisco, M.R., Gonçalves, B., Menczer, F. and Flammini, A., 2011. Political polarization on twitter. Icwsm, 133(26), pp.89-96.
[28] Hong, S. and Kim, S.H., 2016. Political polarization on twitter: Implications for the use of social media in digital governments. Government Information Quarterly, 33(4), pp.777-782.
[29] Rankin, J., 2020, Britain's EU citizens 'at risk of discrimination' after Brexit, say MEPs. The Guardian. https://bit.ly/2H5LZjQ (last accessed: 12 Nov 2020)
[30] The Guardian, The Observer view on the government's immigration plans, Observer editorial. https://bit.ly/3f3Ywkx (last accessed: 12 Nov 2020)

[31] Smith, D, 2020, Trump impeachment. Trump's acquittal offers glimpse of America's imploding empire. The Guardian. https://bit.ly/3nG81cy (last accessed: 19 Nov 2020)
[32] Li, D,. 2020, Texas man charged with killing 12 women, police look at 750 other deaths for possible links. NBCNews. https://nbcnews.to/2IQwNHW (last accessed: 19 Nov 2020)
[33] House of Commons, 2020, Home Affairs Committee Oral evidence: Home Office preparedness for Covid-19 (Coronavirus), HC 232. 13 May 2020.