

# Host-Centric Social Connectedness of Migrants in Europe on Facebook

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## Abstract

Extant literature has explored the social integration process of migrants settling in host communities. However, this literature typically takes a migrant-centric view, implicitly putting the burden of a successful integration on the migrant, and trying to identify the factors that lead to integration along various dimensions. In this paper, we flip this point of view by studying the attributes of *natives* that govern *their* propensity to form social ties with migrants. We do so by using anonymous and aggregate social network data provided by Facebook's advertising platform. More specifically, we look at factors that influence the propensity for a likely-to-be non-Muslim Facebook user to have at least one social connection to a Facebook user who celebrates Ramadan. Given that, in the European context, following Islam is predominantly tied to a migration background, this gives us a lens into cross-cultural native-migrant connectivity. Our study considers demographic attributes of the host population, such as age, gender, and education level, as well as spatial variation across 30 European cities. Our findings suggest that young, educated, and male Facebook users are relatively more likely to build cross-cultural ties, compared to older, less educated, and female Facebook users. We also observe heterogeneity across the analyzed cities.

## Social Connectedness of Migrants in Europe

Previous research pointed out that social connectedness, or the lack of social connectedness, depends on multiculturalism (Dijkstra, Geuijen, and De Ruijter 2001). One of the drivers of multiculturalism in the European context is the inflow of migrants from Muslim-majority countries. Muslim migrants often face challenges regarding social acceptance in European societies, and debates around their social integration flame up regularly (Liebert, Siddiqui, and Goerzig 2020; De Coninck and Matthijs 2020). Prior studies noted that not only *religiosity affects social contact* but also *social contact affects religiosity* (Maliepaard and Schacht 2018). Additionally, the social connectedness of Muslim migrants into European society is becoming more challenging due to the rise of Islamophobia and anti-migrant sentiment (Ciftci 2012; Khatua and Nejd 2022a,b). Muslims in Europe also face structural barriers to integration. For instance,

Muslim migrants often come from poorer and politically volatile countries. As a result, many of them might have limited access to education, employment, and other opportunities, all factors that can play a role in their social integration (De Coninck and Matthijs 2020). Highly educated migrants may have more opportunities for employment and social advancement (Stempel and Alemi 2021; Adida, Lo, and Platas 2019), and may be less likely to face discrimination and prejudice. Those with lower levels of education may face greater challenges in terms of finding employment and integrating into their respective host societies. It has also been observed that Muslim women face greater challenges in terms of social integration and acceptance compared to Muslim men (Van Laar, Derks, and Ellemers 2013). This is often because Muslim women are more likely to wear traditional Islamic clothing, such as headscarves, which can make them more susceptible to discrimination.

Overall, various socioeconomic constraints make it difficult for Muslim migrants to fully participate in European society, and subsequently, they may become more isolated and marginalized. Our study probes *host-centric social connectedness (HCSC)* between hosts and migrants in the European context. Specifically, we assess *which population groups in Europe are more socially connected to people who are likely Muslims*.

## Digital Studies of Social Connectedness

Given the interest of policymakers, academics, and the general public, in understanding and improving social integration, the literature has explored perceptions towards migrants (Khatua and Nejd 2022b) and, subsequently, the socio-cultural integration of migrants. For example, prior studies explored economic integration through economic mobility or acceptance of migrants in the labor market (Chetty et al. 2022a,b) or cultural integration through food and musical interests on social media platforms like Twitter or Facebook (Kim et al. 2022; Stewart et al. 2019; Vieira et al. 2020). Using data from Twitter, researchers have also explored spatio-temporal language-based communication between migrants and hosts (Lamanna et al. 2018).

Methodologically, this study builds on prior works that used Facebook advertising data to study migrant assimilation in terms of interests expressed online (Dubois et al. 2018; Stewart et al. 2019). Migrants may struggle to settle

down in the host countries (Khatua and Nejd 2022a). Social connectedness on social media platforms with *compatriots from their home country, people originally from their new country (locals), and also immigrants from other countries*, can help them to settle down (Herdağdelen et al. 2016). A stream of literature has probed social integration from the perspective of migrants.

In contrast, this study flips this view and focuses on the *hosts*. What are *their* characteristics that facilitate a cross-cultural connectedness? In particular, which demographic attributes are tied to a higher propensity of host-migrant ties? Thus, our work complements the literature that studied demographic characteristics and political alignment of host societies with respect to phenomena like Islamophobia (Ogan et al. 2014). Our study also complements work that looks at cross-lingual connections on Twitter (Kim et al. 2014) - as our work focuses on demographic attributes and on cross-cultural connections. The work that is conceptually most similar to ours is Bailey et al. (2022), as the authors use Facebook data to study social integration for the specific case of Syrians in Germany, and to assess the effect of integration courses on social integration. Our analysis has a broader scope, considering Europe as a whole, and is not limited to Syrians.

Both our study and Bailey et al. (2022) use online connectedness to, ultimately, reason about real-world social ties. While online ties might not necessarily accurately reflect offline ties, recent work shows that ties, as observed on Facebook, are causally linked to improved economic mobility (Chetty et al. 2022a,b). In a similar vein, causal studies on LinkedIn find a benefit of social network usage on job outcomes (Wheeler et al. 2022). As such, even if our findings only apply to online connectedness, they nevertheless speak to real-world consequences.

### Data: Facebook’s Marketing API

The key enabler of our study is an innovative use of social media advertising data from Facebook. This data comes in the form of so-called audience estimates of how many Facebook users match certain targeting criteria available to advertisers. These anonymous and aggregate estimates are available free of charge via an API, are accessible to everyone with a Facebook account, and have been used for a number of socio-demographic studies before (Fatehkia et al. 2020a; Palotti et al. 2020; Zagheni, Weber, and Gummadi 2017).

The key differentiating factor in our work is the use of a targeting attribute that relates to cross-cultural social connectedness, namely: *Friends of people who have engaged with Ramadan*. The advertising interface describes this targeting option as “Friends of anyone that has high or medium engagement with Ramadan month content. Excludes people that engaged with Ramadan content.” In other words, using the advertising platform, we could obtain audience estimates of how many likely-to-be non-Muslims have at least one Facebook friend who is likely-to-be Muslim. We use such data as evidence for the presence (or absence) of host-migrant online ties, and we disaggregate our analysis along different host attributes. The following host attributes chosen

for disaggregation are based on existing integration research but are limited by what Facebook provides, and by what can be obtained within the rate limits.

1. **Age:** 18 to 24; 25 to 34; 35 to 55; 56 and above [4 categories]

2. **Gender:** Male and Female [2 categories]<sup>1</sup>

3. **Education:** Basic (such as High School, Some High School, Undergrad, Associate Degree, etc.); Advanced (such as Professional Degree, Master’s Degree, Doctorate Degree, etc.); Unknown/unspecified [3 categories]

4. **Operating system:** iOS users vs. non-iOS users [2 categories]<sup>2</sup>

5. **Local language:** Not for disaggregation, but to identify the hosts: we limited the audience selection to speakers of the respective local language (German for cities in Germany, Italian for cities in Italy, and so on).<sup>3</sup>

6. **Friends with upcoming birthdays:** The likelihood to have a Muslim friend on Facebook also depends on the size of the person’s online social network. While we cannot observe the absolute size directly, we can observe whether a user has a friend on Facebook with a birthday coming up in the next week. The probability of this happening is tied to the network size and can be used to indirectly observe variation thereof (Gil-Clavel, Zagheni, and Bordone 2022). Thus, we use it for normalizing our dependent variable and controlling the size of the host’s online social network.

7. **Exposure to AR/TR:** The propensity to be friends with Muslims also depends on whether hosts have exposure to Muslim migrants in their city: someone in a city with only a small Muslim population would naturally be less likely to befriend a Muslim. Unfortunately, we could not obtain city-level Muslim population estimates for all 30 cities in our study. Thus, as a proxy for this (missing) exposure variable, we obtained city-level Facebook audience estimates for the Arabic (AR) and Turkish (TR)-speaking users as a percentage of total Facebook users for that specific city. Importantly, this Facebook-derived variable is the only one that is not for the individual hosts but for their city.

For our study, we collected data for 30 cities from seven European Countries (see Figure 1 for details), picking the most populous cities in each country, ranging from six cities for Germany to three for the Netherlands. This selection still included some comparably small cities such as Bilbao (Spain) or Goteborg (Sweden). For the smaller cities and certain combinations of attributes, we had sparsity challenges as Facebook’s advertising API does not return audience estimates of monthly active users (MAU) smaller than 1,000. For our analysis, we decided to keep only the non-sparse (> 1,000) estimates, meaning that the number of de-

<sup>1</sup>Facebook’s advertising platform currently does not support the ad targeting of non-binary users.

<sup>2</sup>Previous work has found that, across numerous geographic contexts, using an iOS, i.e. Apple device to access Facebook is generally a proxy for higher wealth (Fatehkia et al. 2020b, 2022).

<sup>3</sup>While relying on language is simplistic, the targeting attribute used explicitly “[e]xcludes people that engaged with Ramadan content”. We believe that the combination of these two provides a good enough proxy for the native host population.

	M1	M2	M3	M4	M5	M6	M7	M8
Intercept	0.75*** (0.01)	0.74*** (0.01)	0.73*** (0.01)	0.74*** (0.01)	0.68*** (0.01)	0.80*** (0.01)	0.70*** (0.02)	0.87*** (0.01)
Age: 25 to 34	0.02 (0.01)	0.02 (0.01)	0.01 (0.01)	0.01 (0.01)	0.00 (0.01)	0.01* (0.01)	0.01 (0.01)	0.02* (0.01)
Age: 35 to 55	-0.08*** (0.01)	-0.07*** (0.01)	-0.08*** (0.01)	-0.08*** (0.01)	-0.09*** (0.01)	-0.07*** (0.01)	-0.07*** (0.01)	-0.07*** (0.01)
Age: 56 and above	-0.20*** (0.01)	-0.20*** (0.01)	-0.20*** (0.01)	-0.21*** (0.01)	-0.20*** (0.01)	-0.19*** (0.01)	-0.20*** (0.01)	-0.20*** (0.01)
Gender: Male		0.02*** (0.01)	0.02*** (0.01)	0.02*** (0.01)	0.02*** (0.01)	0.02*** (0.00)	0.02*** (0.00)	0.02*** (0.00)
Education: Advanced			0.03*** (0.01)	0.03*** (0.01)	0.03*** (0.01)	0.03*** (0.01)	0.03*** (0.01)	0.03*** (0.00)
Education: Unknown			0.00 (0.01)	0.00 (0.01)	-0.00 (0.01)	0.00 (0.01)	-0.00 (0.01)	-0.00 (0.00)
OS: iOS users				-0.01 (0.01)	-0.01 (0.01)	-0.02*** (0.00)	-0.02*** (0.00)	-0.01*** (0.00)
Exposure to AR/TR					0.01*** (0.00)		0.01*** (0.00)	
Country-dummies						Included	Included	
City-dummies								Included
R <sup>2</sup>	0.35	0.36	0.37	0.37	0.46	0.68	0.69	0.78
Adj. R <sup>2</sup>	0.35	0.36	0.37	0.37	0.46	0.67	0.69	0.77
Num. obs.	1075	1075	1075	1075	1075	1075	1075	1075

\*\*\* $p < 0.001$ ; \*\* $p < 0.01$ ; \* $p < 0.05$

Table 1: Effects of Demographic and Spatial Characteristics on *Host-Centric Social Connectedness (HCSC)*. Coefficients are relative to the baseline (age 18-24, female, basic education, non-iOS) with positive coefficients indicating higher connectedness.

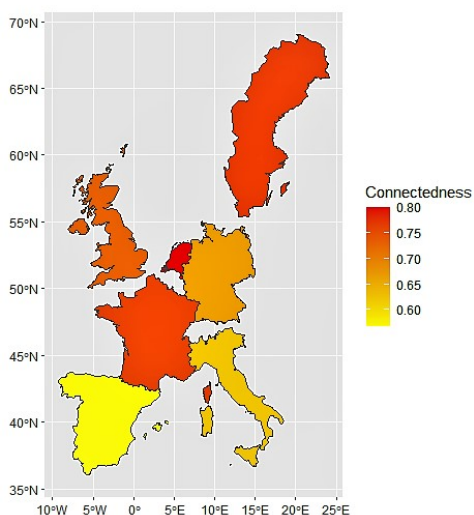


Figure 1: Country-wise HCSC Scores

demographic combinations used per city varies and is typically smaller for cities with a smaller population.

The monthly active user audience estimates were collected in two rounds, January and March of 2022, from Facebook’s advertising API<sup>4</sup>. We averaged the audience es-

<sup>4</sup><https://developers.facebook.com/docs/marketing-apis>

timates from the two rounds of data collection to improve robustness and limit temporal fluctuation. For a demographic sub-group of interest, such as “18-24 years old German-speaking women with higher education, using iOS devices, and living in Berlin”, this variable captures the propensity to have at least one likely-to-be Muslim friend on Facebook. This propensity is normalized by the propensity to have at least one friend with an upcoming birthday in the next week. Thus, **HCSC**, our dependent variable, is *# of people with a Ramadan-celebrating friend / # of people with a friend with an upcoming birthday in the next week*.

Figure 1 reports the country-level HCSC score, i.e., the average of city-level scores for that specific country. We find variation across the seven considered countries. For instance, the score of the Netherlands is 0.80 (highest), whereas it is 0.56 for Spain (lowest). In the following section, we probe deeper using linear regression to understand the relationship between HCSC Score and demographic attributes, as well as city-level variation.

## Findings

**Age Effects:** In all of our models (see Table 1), age-related effects of the 35-55 and 56+ years groups, relative to the 18-24 baseline group, are negative and statistically significant ( $p < 0.001$ ). Furthermore, these effect sizes ( $\approx -.08$  and  $\approx -.20$  for 35-55 and 56+, respectively) are the biggest ones for demographic variables, comparable to some between-city variation (see Figure 2). Variation in age alone also ex-

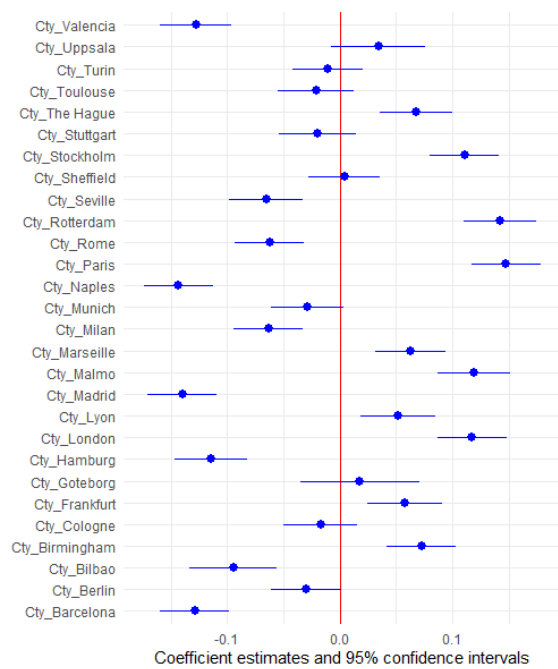


Figure 2: City-level fixed effects coefficients of Model M8, with Liverpool (0.68) as a baseline.

plains about one-third of the total variation. Hence, it can be concluded that *the older generations (35-55; 56 and above) are less likely to be friends with Muslims on Facebook, compared to the younger generations (18-24; 25-34).*

**Gender and Education Effects:** Gender was also a statistically significant ( $p < 0.001$ ) variable (M2-M8). Being male consistently led to an estimated increase in the HCSC Score of .02. Similarly, having advanced education was statistically significant ( $p < 0.001$ ) and consistently positively associated (.03) with a higher HCSC Score. In short, it can be concluded that *younger, male, and highly educated Facebook users are more likely to be friends with Muslims online.* Notably, this pattern remains consistent for all the models.

**iOS Usage (Wealth Effects):** In models M4-M8, we incorporate a dummy variable for iOS usage as a proxy for wealth (Fatehkia et al. 2020a,b). The effect of this variable was statistically significant ( $p < 0.001$ ) after controlling for spatial effects (M6-M8), with a negative effect ( $-.01$  to  $-.02$ ). This suggests that, after accounting for spatial variation in wealth and other factors, *the propensity to be friends of Muslim migrants on Facebook is lower for wealthier hosts compared to not-so-economically well-off users.* This could be due to the difficulty that Muslim migrants may have, on average, in accessing the upper strata of society.

**Exposure Effects of AR/TR:** The coefficient of the exposure variable is positive and statistically significant ( $p < 0.001$ ) in M5 and M7, though its magnitude is surprisingly small (.01). Thus, *the propensity to be friends with Muslims on Facebook will be higher if hosts have higher exposure to AR/TR.* Notably, the  $R^2$  and Adj.  $R^2$  improved significantly from 0.37 (in M4) to 0.46 (in M5).

**Spatial Effects:** Finally, M6 to M8 control the spatial effects through dummy variables. Interestingly, the Adj.  $R^2$  went up significantly from 0.46 (in M5) to 0.67 (in M6) after controlling for country effects. However, the improvement is marginal between M6 (with country dummies) and M7 (with exposure effects + country dummies).

Finally, we have incorporated the city-level dummy variables in M8 and reported the city-level effects graphically in Figure 2, showing strong variation across the analyzed cities. Correspondingly, the Adj.  $R^2$  went up significantly from 0.69 (in M7) to 0.77 (in M8), indicating existing city-level effects beyond exposure. Note that we cannot simultaneously include both *City-Level Exposure Effects* and *City Dummies* in our models due to multicollinearity. Interestingly, only city dummies report an Adj.  $R^2$  of 0.41.

## Ethical Considerations

Anonymous and aggregate data were obtained through Facebook’s Marketing API. Given the minimum group size of 1000, any individual re-identification risk is minimal. However, there is a risk of group-level harm by mapping vulnerable populations, such as those of a particular faith. To mitigate this risk, Facebook removed targeting attributes related to religion and other sensitive attributes, including the one used in this study<sup>5</sup>. Note, however, that our study does not target Muslim migrants themselves but ‘natives’ *non-Muslim* in the respective countries, limiting the potential group harm. Still, the removal of the targeting attribute of “friends of people who have engaged with Ramadan” limits the reproducibility. Given the sensitivity of the topic, we commit to sharing our data with other researchers upon request.

## Limitations and Conclusion

Our study addresses the issue of integration in an innovative way. However, threats to the validity of this type of analysis include (i) ecological fallacy, due to using group-level data, and (ii) invalid constructs, due to reliance on proxy measures. As a plausibility check for our results, we note that certain observed results are in line with existing findings, such as a higher level of social integration in the Netherlands than in Italy or Spain (Bell, Valenta, and Strabac 2021). Furthermore, we also collected data for Turkey, a Muslim-majority country, where we found a country-level HCSC score of almost 1, higher than the highest value for all European countries. This indicates that our target measure satisfies at least basic plausibility checks.

We are aware that celebrating Ramadan relates to religious or cultural behavior and not necessarily a migration background. However, in the context of Western Europe, most Muslims have a migration background (Bailey et al. 2022), leading us to emphasize the host-migrant connection angle, in addition to the cross-cultural angle.

In conclusion, by studying online connectedness and taking a host-centric approach, this paper contributes to a more nuanced debate around integration processes in Europe.

<sup>5</sup><https://www.facebook.com/business/news/removing-certain-ad-targeting-options-and-expanding-our-ad-controls>

## Acknowledgments

This research was partially funded by the Federal Ministry of Education and Research (BMBF), Germany under the project LeibnizKILabor with grant No. 01DD20003.

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