Language metrics as a measure of global reach and local impact: the case of papers about Zika on Facebook and Twitter

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Challenges of altmetrics

- Are altmetrics able to track national relevant activity?
- Data collected on Facebook is limited, yet still the biggest social media worldwide and the most relevant in countries as in Latin America
- \(~260 \text{ million vs. } \sim83\text{million users on Twitter}\)
Zika outbreak case study

- Zika became an international emergency in February 2016
- Brazil epicentre of the outbreak, hosting the Olympic games
- Both national and internationally relevant
- Lack of information about the disease, treatment and prevention
- Need for accurate scientific information
- High and fast publication rate between Jan-Jun 2016
- High public interest (Google Trends) Jan-Jun 2016
The Zika virus outbreak

Confirmed and suspected Zika cases in Latin America 2015-2017. Source: PAHO/WHO

212,000 cases in 2016
2,205 microcephaly cases (2015-16)
The new threat

As countries in Latin America rush to contain the spread of the Zika virus, Wency Leung and Ivan Sermonti take a look at the pandemic and the virus carrier.

Zika-affected countries

Zika virus

Extremely severe' brain damage found in babies with Zika-linked defect

Research in Brazil revealed babies born with microcephaly, presumed to be caused by Zika virus, had range of abnormalities.

Evidence grows linking Zika, microcephaly and other nerve syndromes

Studies offer first hints about how the virus might damage the developing brain and nervous system.

Scientific American

Scientific American

Scientists are still scrambling to get a full scientific picture of...
Zika Virus (I). Isolations and serological specificity
G. W. A. Dick S. F. Kitchen A. J. Haddow
Transactions of The Royal Society of Tropical Medicine and Hygiene, 46 (5):509-520, 1 September 1952,
https://doi.org/10.1016/0035-9203(52)90042-4

Zika virus intrauterine infection causes fetal brain abnormality and microcephaly: tip of the iceberg?
Oliveira Melo AS, Malinger G, Ximenes R, Szejnfeld PO, Alves Sampaio S, Bispo de Filippis AM

Neutralizing antibodies against certain recently isolated viruses in the sera of human beings residing in East Africa.

Ventura, CV et al. (2016). Ophthalmological findings in infants with microcephaly and presumable intra-uterus Zika virus infection. Arq. Bras. Oftalmol. vol.79 no.1 São Paulo Jan./Feb. 2016 http://dx.doi.org/10.5935/0004-2749.20160002

Research questions

- Does language used to share zika papers differ on Facebook and Twitter? Can the language use indicate more local or international reach?
- Does the author’s country affiliation affect the languages used to post about zika-related papers?
Methodology

- Papers with zika in the title tracked by Altmetric (Jan-Jun 2016)
- 1+ Facebook or Twitter
- Excluded non-zika, non traditional research sources
- Included reports from CDCs, preprints from repositories and journals
- Extracted text from social media, excluded URLs, #, @mentions
- Run python module langdetect, Google’s language detection code
- Manually coded language of publication, posts and author’s affiliation country
Results

- 718 documents.
- 42,705 / 2,275
- DOCUMENTS published
  - Only English (90.25%)
  - English + other language (1.25%)
  - Portuguese (1.39%)

Proportion of social media posts in select languages about Zika-related papers

<table>
<thead>
<tr>
<th>Language of post</th>
<th>Facebook N=2,275</th>
<th>Twitter N=42,705</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>75.9%</td>
<td>89.8%</td>
</tr>
<tr>
<td>Portuguese</td>
<td>7.1%</td>
<td>0.9%</td>
</tr>
<tr>
<td>Spanish</td>
<td>6.5%</td>
<td>2.7%</td>
</tr>
<tr>
<td>French</td>
<td>0.8%</td>
<td>1.7%</td>
</tr>
<tr>
<td>Other</td>
<td>9.6%</td>
<td>4.2%</td>
</tr>
<tr>
<td>Unknown</td>
<td>0.0%</td>
<td>0.6%</td>
</tr>
</tbody>
</table>
AUTHORS’ country affiliation

- All from ESC 50.7%
- At least one from ESC 14.1%
- None from ESC 35.2%

Do author’s country affiliation influences the language of posts sharing zika-related papers?

Top countries whose authors had their Zika research shared on social media.

<table>
<thead>
<tr>
<th>Country</th>
<th>Papers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
</tr>
<tr>
<td>USA</td>
<td>309</td>
</tr>
<tr>
<td>Brazil</td>
<td>122</td>
</tr>
<tr>
<td>UK</td>
<td>107</td>
</tr>
<tr>
<td>France</td>
<td>38</td>
</tr>
<tr>
<td>China</td>
<td>29</td>
</tr>
<tr>
<td>Colombia</td>
<td>28</td>
</tr>
<tr>
<td>Canada</td>
<td>22</td>
</tr>
<tr>
<td>Germany</td>
<td>22</td>
</tr>
<tr>
<td>Italy</td>
<td>21</td>
</tr>
<tr>
<td>Singapore</td>
<td>18</td>
</tr>
<tr>
<td>Other</td>
<td>199</td>
</tr>
</tbody>
</table>

Note: The sum of percentages exceed 100% due to double-counting publications co-authored by more than one country.
<table>
<thead>
<tr>
<th>Author Country</th>
<th>Facebook Post Language</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>English</td>
<td>Spanish</td>
</tr>
<tr>
<td>USA</td>
<td>78.5%</td>
<td>6.2%</td>
</tr>
<tr>
<td>Brazil</td>
<td>68.3%</td>
<td>7.1%</td>
</tr>
<tr>
<td>UK</td>
<td>79.1%</td>
<td>6.1%</td>
</tr>
<tr>
<td>France</td>
<td>70.6%</td>
<td>7.8%</td>
</tr>
<tr>
<td>Other</td>
<td>73.6%</td>
<td>8.1%</td>
</tr>
</tbody>
</table>

![Graph showing the proportion of Facebook and Twitter posts in different contexts](image)

**Table 6. Proportion of Facebook posts in select languages by article author country**
Discussion and conclusion

- English dominates conversations on both social media
- English also a sign that communication is mainly between scholars
- Facebook higher percentage of non-English posts, with significant difference depending on author’s country affiliation = higher local-language effect
- Twitter more recognized as an international arena to debate zika papers
Discussion and conclusion

- Papers from Brazilian authors shared more often in Portuguese than papers from authors from the US and the UK.
- Authors write about more national relevant topics or boost communication among their professional/personal networks.
- Languages and Facebook with great chances to explore national relevance of science.
Future challenges

- More investigation should be addressed on Facebook, considering public posts shared by individuals
- Language should be explored as an indicator of national vs. international social impact of science
- Journals should consider sharing information in a multi-language strategy to wider dissemination of relevant content
Thank you! Merci! Obrigado! Gracias!

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