Measuring the Facebook Advertising Ecosystem

Athanasios Andreou, Márcio Silva, Fabrício Benevenuto, Oana Goga,
Patrick Loiseau, Alan Mislove

Advertising in Facebook

- Facebook is the second biggest advertising platform:

Facebook made $39.9 billion in ad revenue in 2017

We're talking about ads on Facebook, because Facebook is an advertising juggernaut. Facebook made $39.9 billion in ad revenue in 2017, which is more than just about every other tech company that's not Google.

APR 10 2018, 3:21 PM ET

More than the GDP of Iceland or Bahrain!

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- Millions advertisers and billions of users:

Statistics

- 1.52 billion daily active users on Facebook on average for December 2018
- 2.32 billion monthly active users on Facebook as of December 31, 2018

Facebook ad platform issues constantly in the spotlight

Facebook ad platform issues constantly in the spotlight

MACHINE BIAS

Facebook Lets Advertisers Exclude Users by Race

Facebook's system allows advertisers to exclude black, Hispanic, and other "ethnic affinities" from seeing ads.

by Julia Angwin and Terry Parris Jr., Oct. 28, 2016, 1 p.m. EDT

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ISSIE LAPOWSKY SECURITY 04.16.18 09:00 AM

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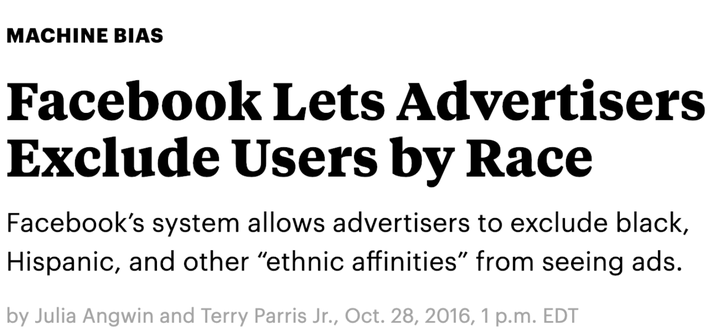

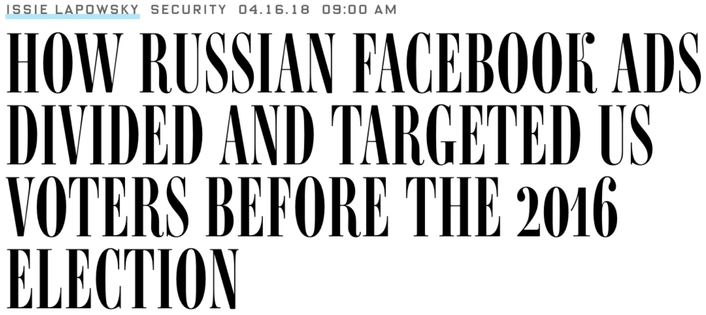

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TOM SIMONITE BUSINESS 01.07.18 07:00 AM

FACEBOOK BUG COULD HAVE LET ADVERTISERS GET YOUR PHONE NUMBER

MACHINE BIAS

Facebook (Still) Letting Housing Advertisers Exclude Users by Race

After ProPublica revealed last year that Facebook advertisers could target housing ads to whites only, the company announced it had built a system to spot and reject discriminatory ads. We retested and found major omissions.

by Julia Angwin, Ariana Tobin and Madeleine Varner, Nov. 21, 2017, 1:23 p.m. EST

This talk

- Who are the advertisers in Facebook?
- How are they targeting users?

Methodology

AdAnalyst — A tool to help you make sense of your ads

Methodology

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- **Chrome** and **Firefox** extension
- Collects **Facebook ads** and related data from **real users**

Methodology

AdAnalyst — A tool to help you make sense of your ads

- Increase **transparency for users**:

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AdAnalyst — A tool to help you make sense of your ads

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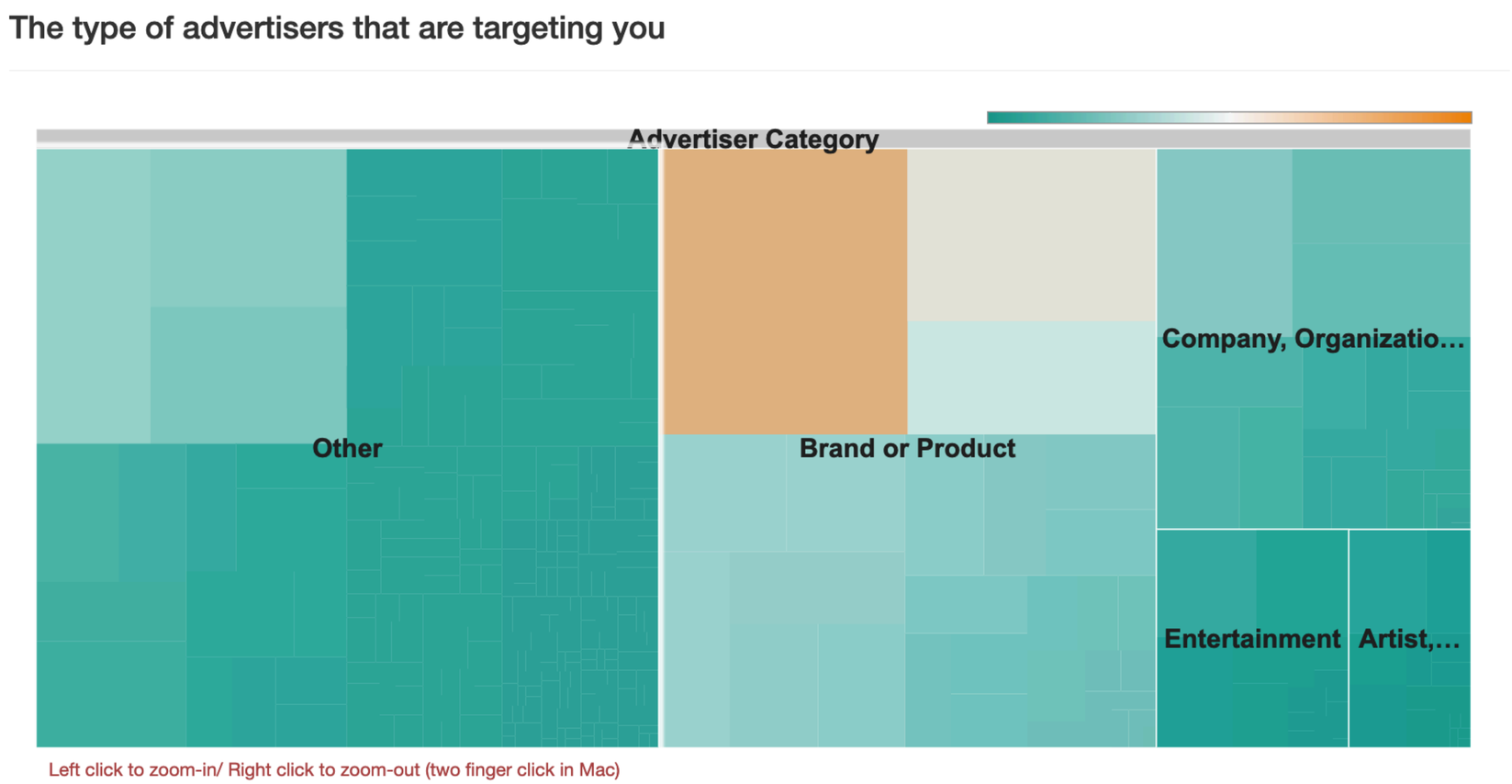

Methodology

AdAnalyst — A tool to help you make sense of your ads

- Increase **transparency for users**:

When you “woke up like this”. When you buy those skinny jeans. When you show yourself off, not hide yourself away. When you fit into the skirt you wore in college. When you feel like you can conquer the world. ... That’s Noom.

Time: [redacted]

Advertiser: Noom

Advertiser category: App Page

Explanation: One reason you're seeing this ad is that Noom wants to reach people who may be similar to their customers. Learn more. There may be other reasons you're seeing this ad, including that Noom wants to reach men ages 25 and older who live in France. This is information based on your Facebook profile and where you've connected to the internet.

Compact explanation: Lookalike Audience

All users have received this ad for: Lookalike Audience

The advertiser targeted you with: Lookalike Audience, PII-based targeting

The advertiser targeted other users with: Lookalike Audience, PII-based targeting, English (US) (Biographical Data), Physical exercise (Interests)

Our Dataset

AdAnalyst — A tool to help you make sense of your ads

- **DATA-Worldwide**:
  - Disseminated across friends, colleagues, conferences etc
  - 114 users / 89K ads / **22K advertisers**
  - 50 users from **France**, 16 from **Germany**, 16 from **US**
- **DATA-Brazil**:
  - Disseminated as part of a project to monitor the 2018 **Brazilian** presidential elections
  - 508 users / 146K ads / **28K advertisers**
  - 495 users from **Brazil**

Our users

- Dissemination strategy introduces some **biases**

Our users

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- **Younger educated men:**
  - 47.4% ages 22-30 vs 32.5% on Facebook
  - 71.1% with tertiary education vs 35.9%
  - 68.4% men vs 57%

Our users

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- **Younger educated men:**
  - 47.4% ages 22-30 vs 32.5% on Facebook
  - 71.1% with tertiary education vs 35.9%
  - 68.4% men vs 57%
- Our users are overall **similar** to the global Facebook population
  - More likely to travel frequently and know people that are expats

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Advertisers’ identity

- How popular are advertisers?

Advertisers' identity

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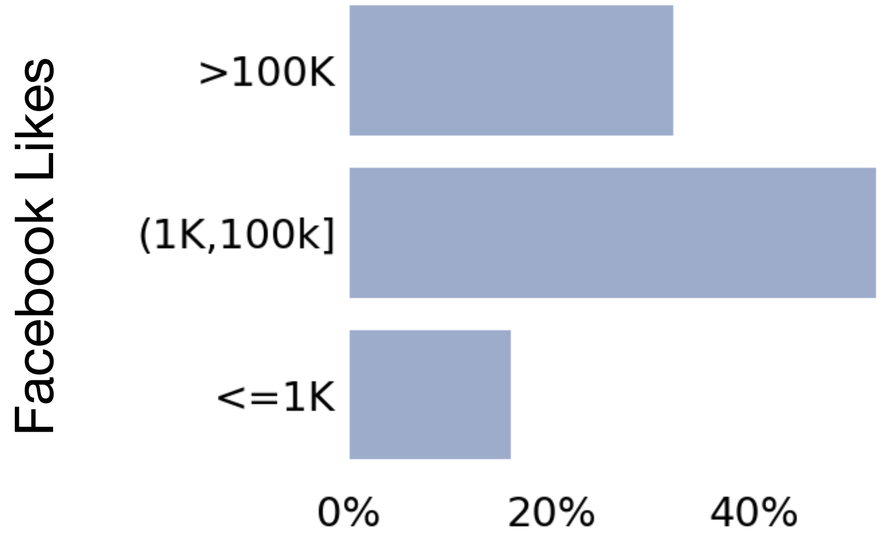

Popular: NETFLIX Google

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Niche: BachChor Saarbrücken @BachChorSB

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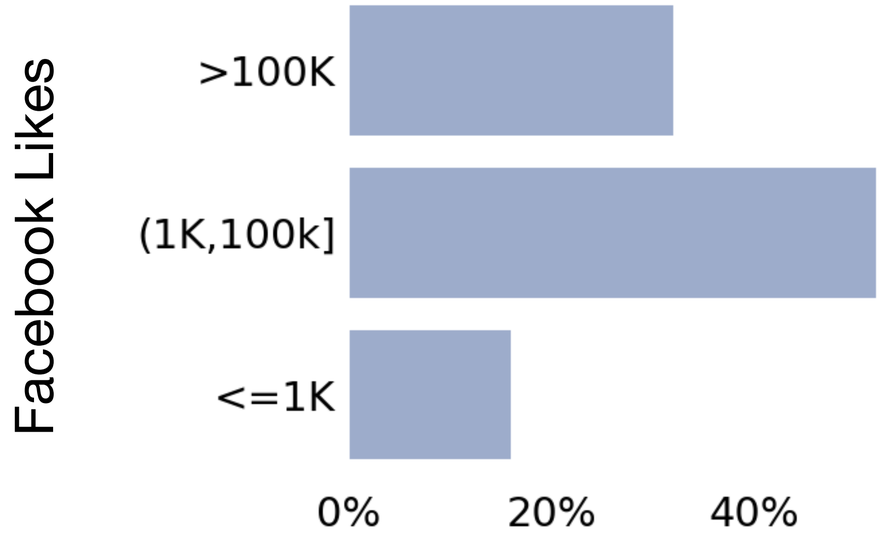

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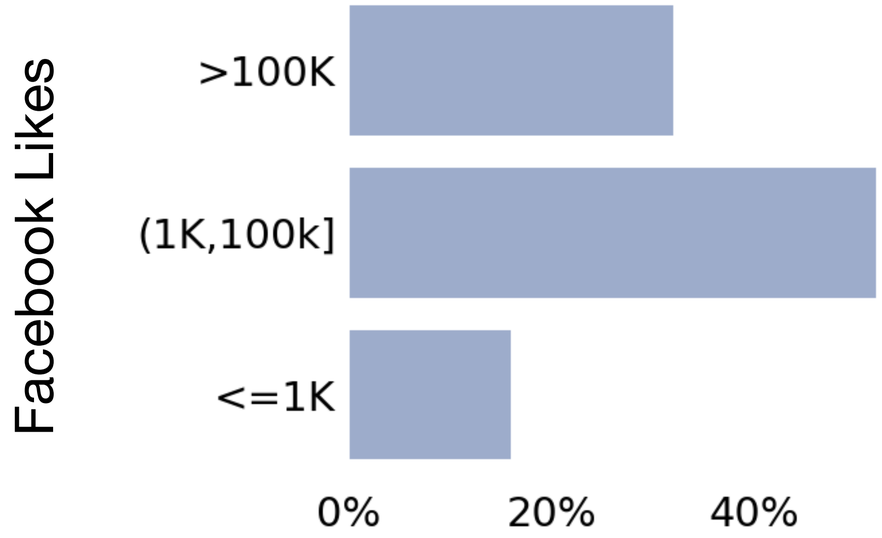

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  - advertisers can **verify** their account
    - phone number or official document
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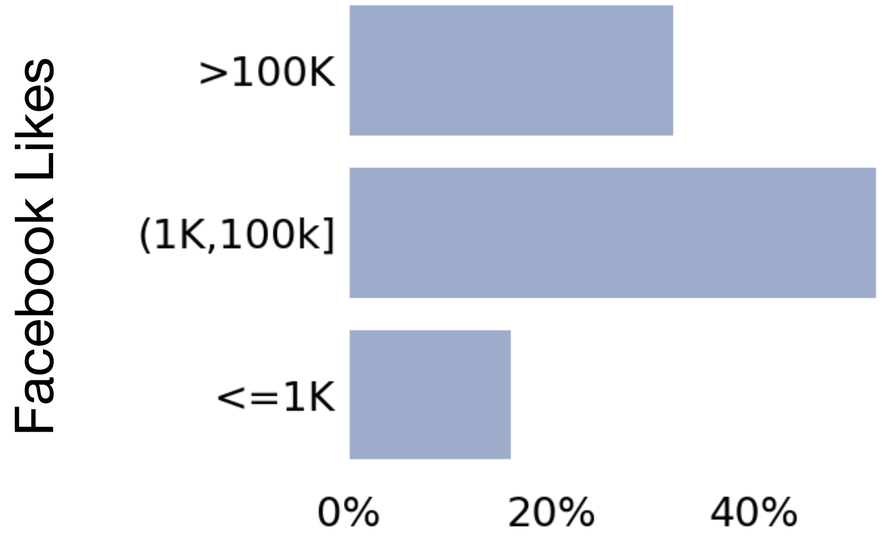

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- 64% of advertisers are not verified

Popular	66,9 %	6,1 %
Ordinary	10,3 %	12,6 %
Niche	0,2 %	6,4 %

Advertisers' categories

- Advertisers can **self-report** their categories
- **943** categories:
  - Nonprofit Organization, Shopping & Retail
  - Evangelical Church, Aquarium, Opera
- We group them to **35** broader categories (IAB)
- Sensitive Categories

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1. Food and Drink: 9.3%
2. Style & Fashion: 8.5%
3. Technology and Computing: 8.4%
4. Community Organization: 8.2%
5. Shopping: 6.7%
6. **News and Politics**: 5.5%
7. Travel: 4.6%
8. **Education**: 4.4%
9. Healthy Living: 4.2%
10. Home & Garden: 3.6%

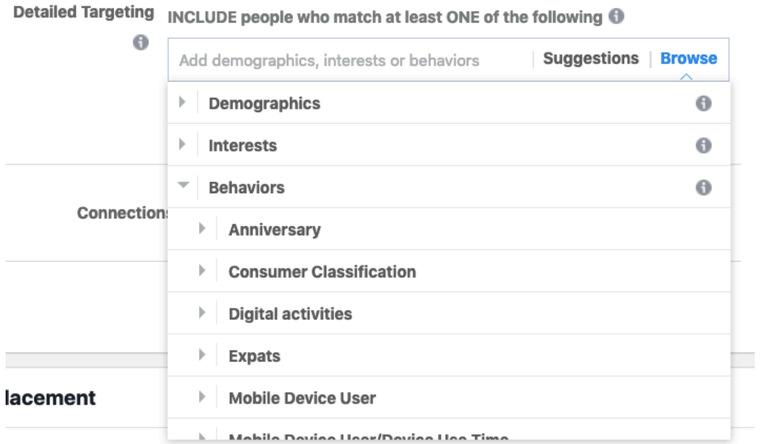
- **Business and finance**: 2%
- **Medical Health**: 1.2%
- **Legal**: 0.2%
- **Religion and Spirituality**: 0.1%

This talk

- Who are the advertisers in Facebook?
- **How are they targeting users?**

Many strategies available for targeting

- Attribute-based



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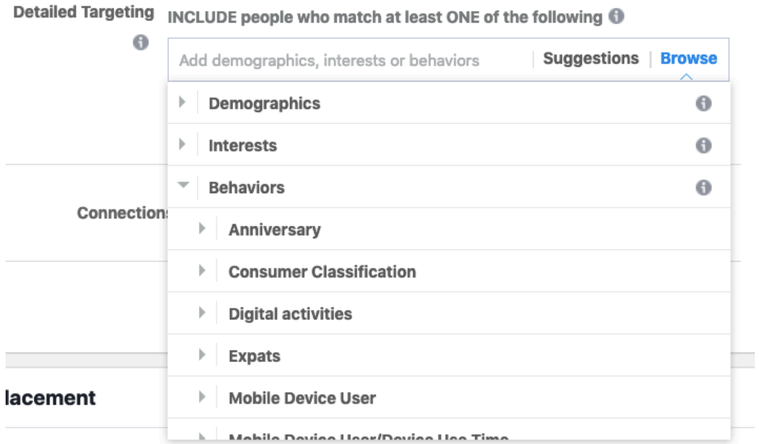
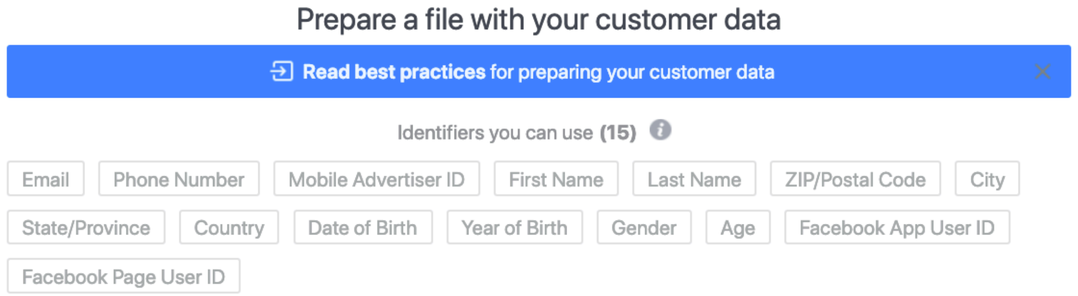


- PII-based



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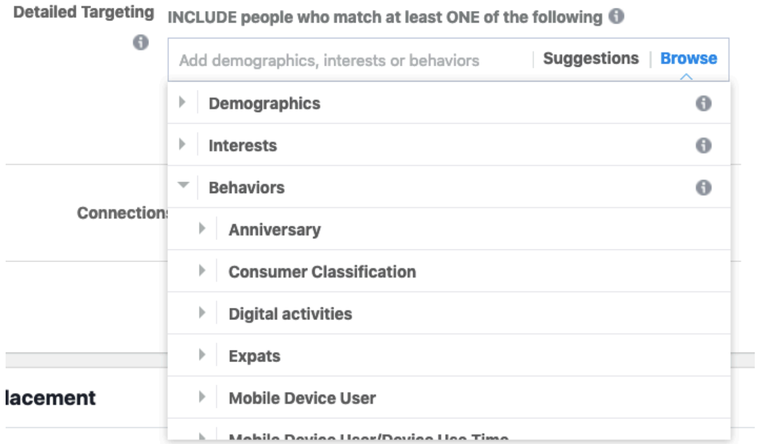

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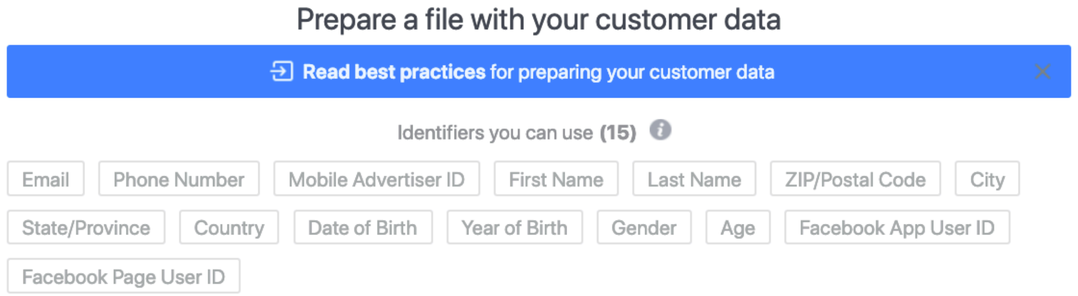
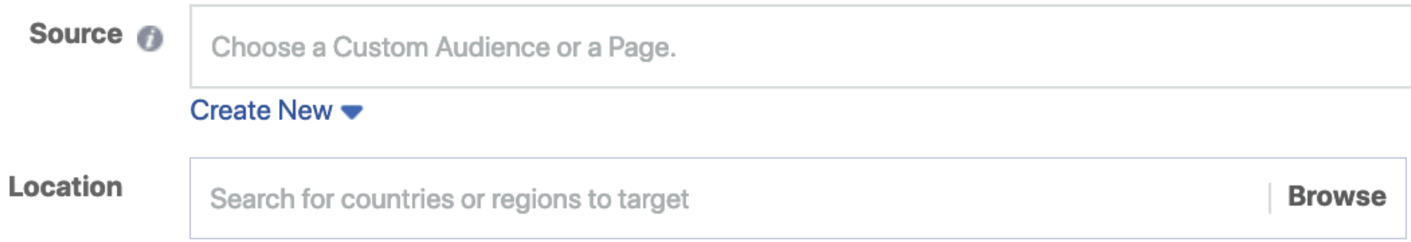


- Lookalike audiences



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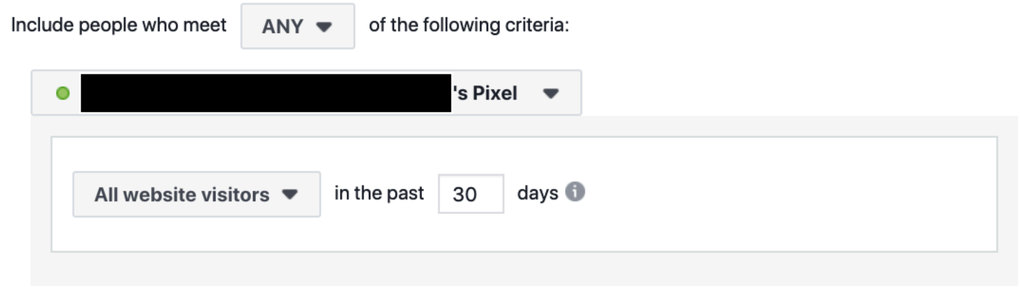
- Retargeting



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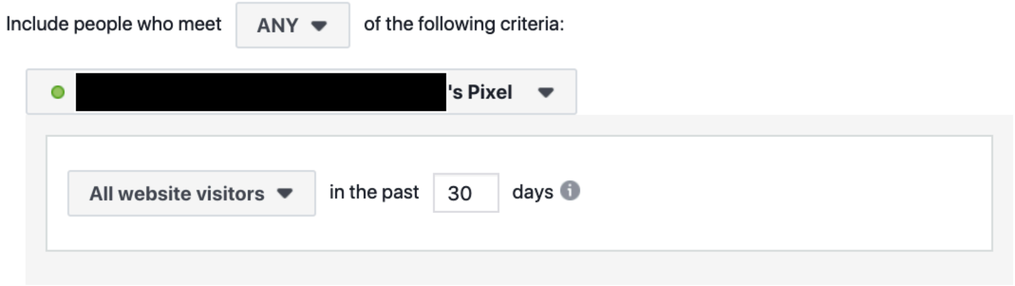
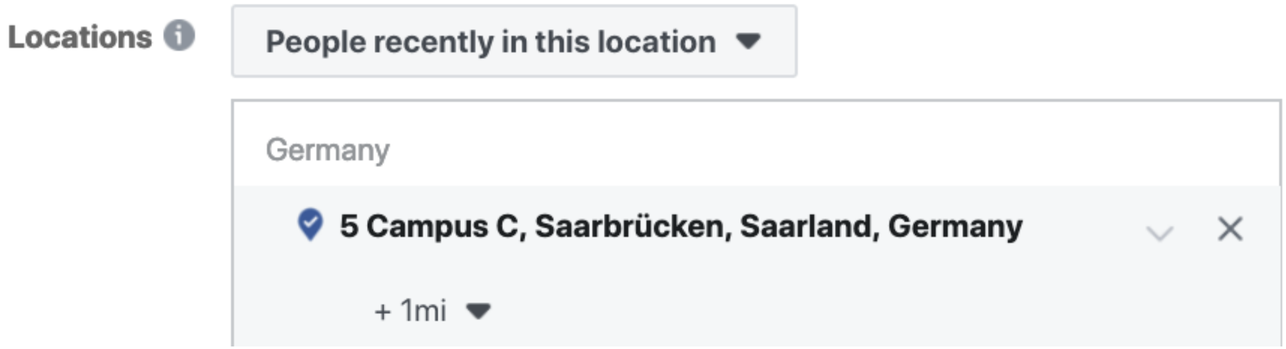


- Location-based



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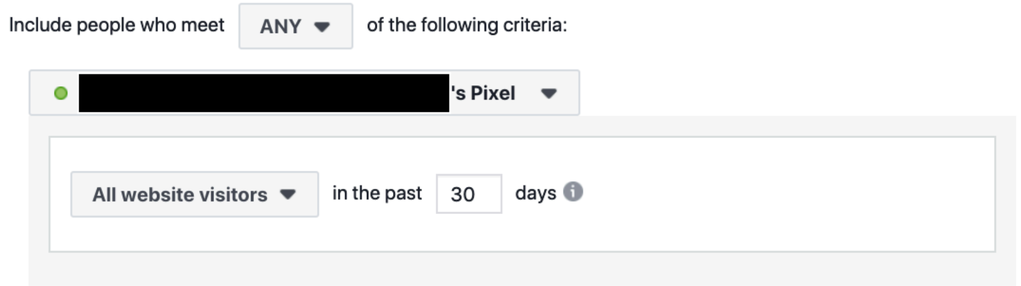

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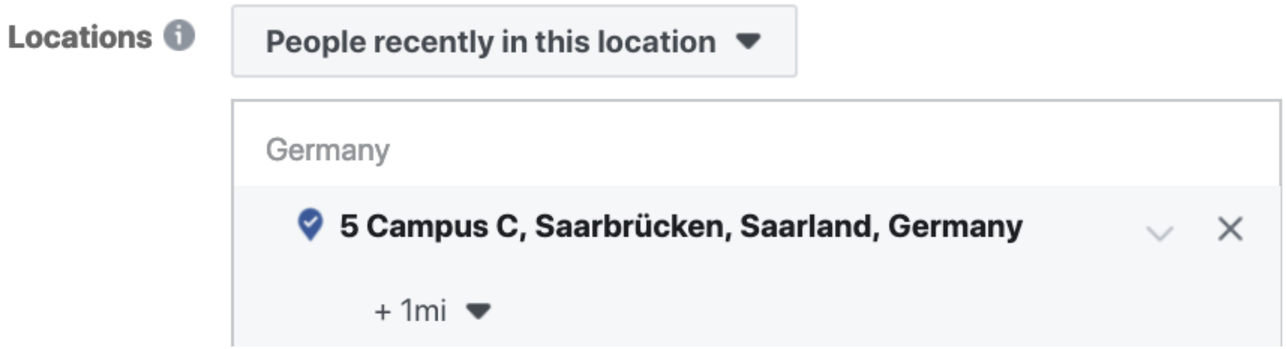
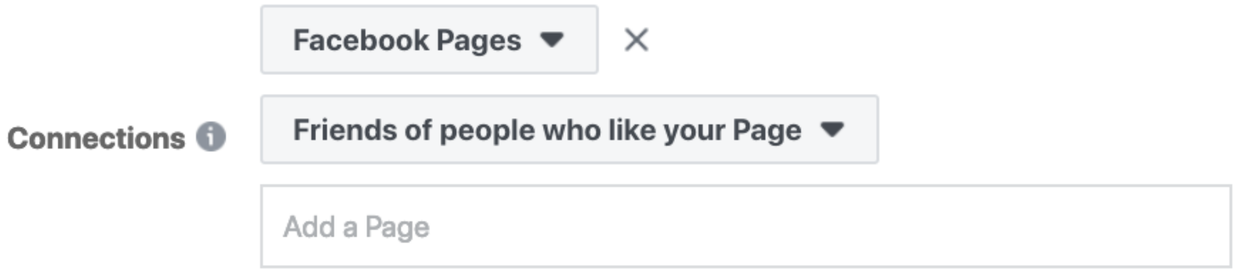
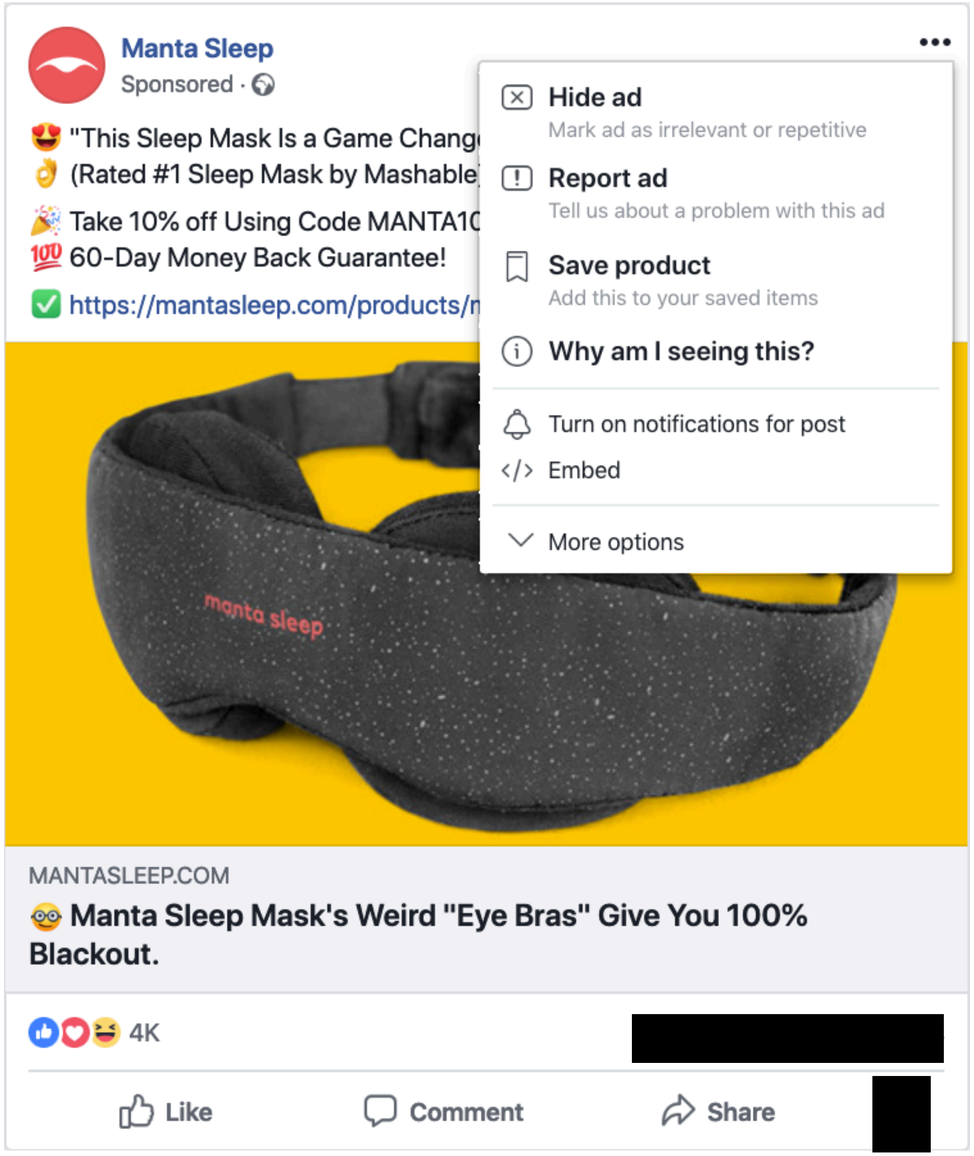


- Social Neighborhood



How do we know how advertisers target users?



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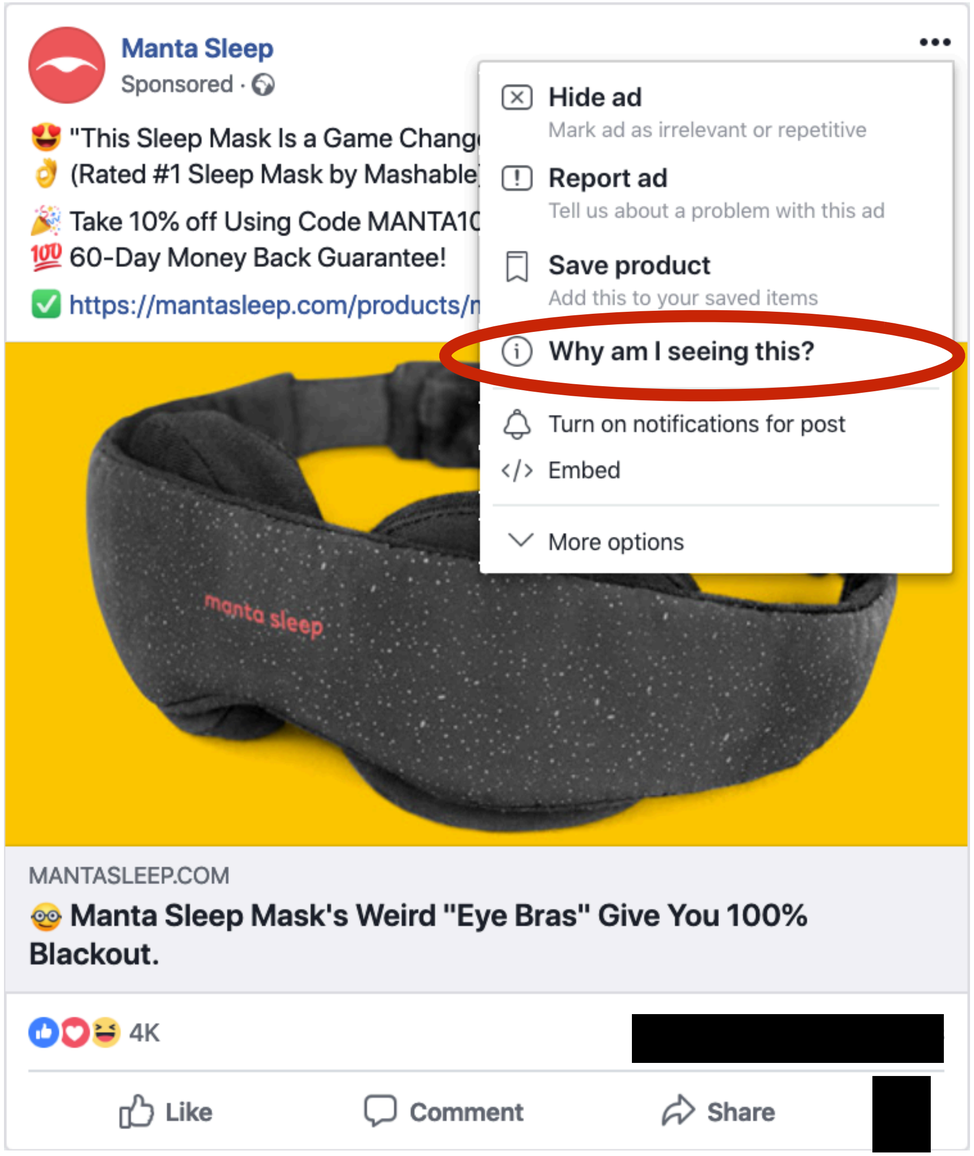

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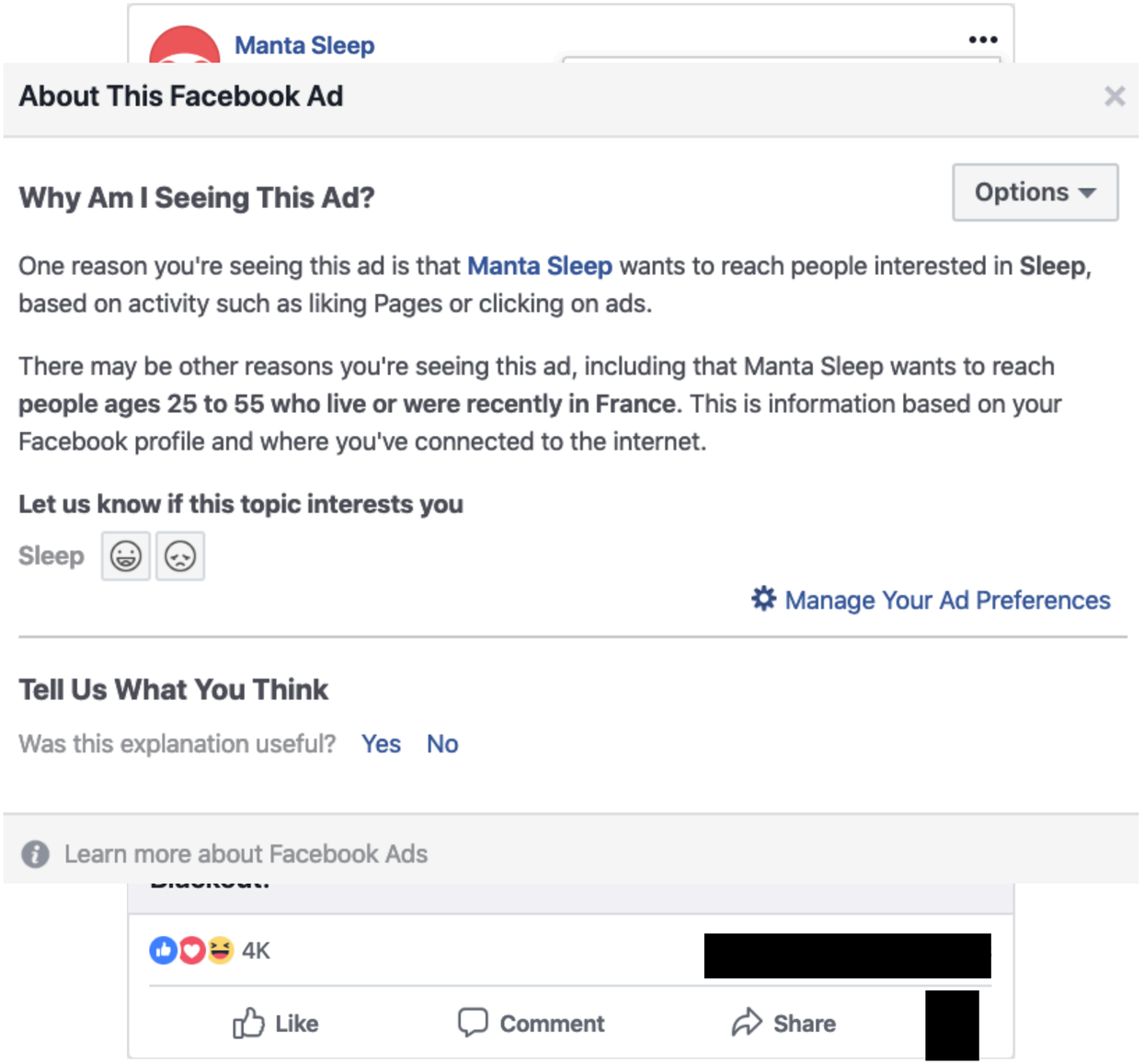

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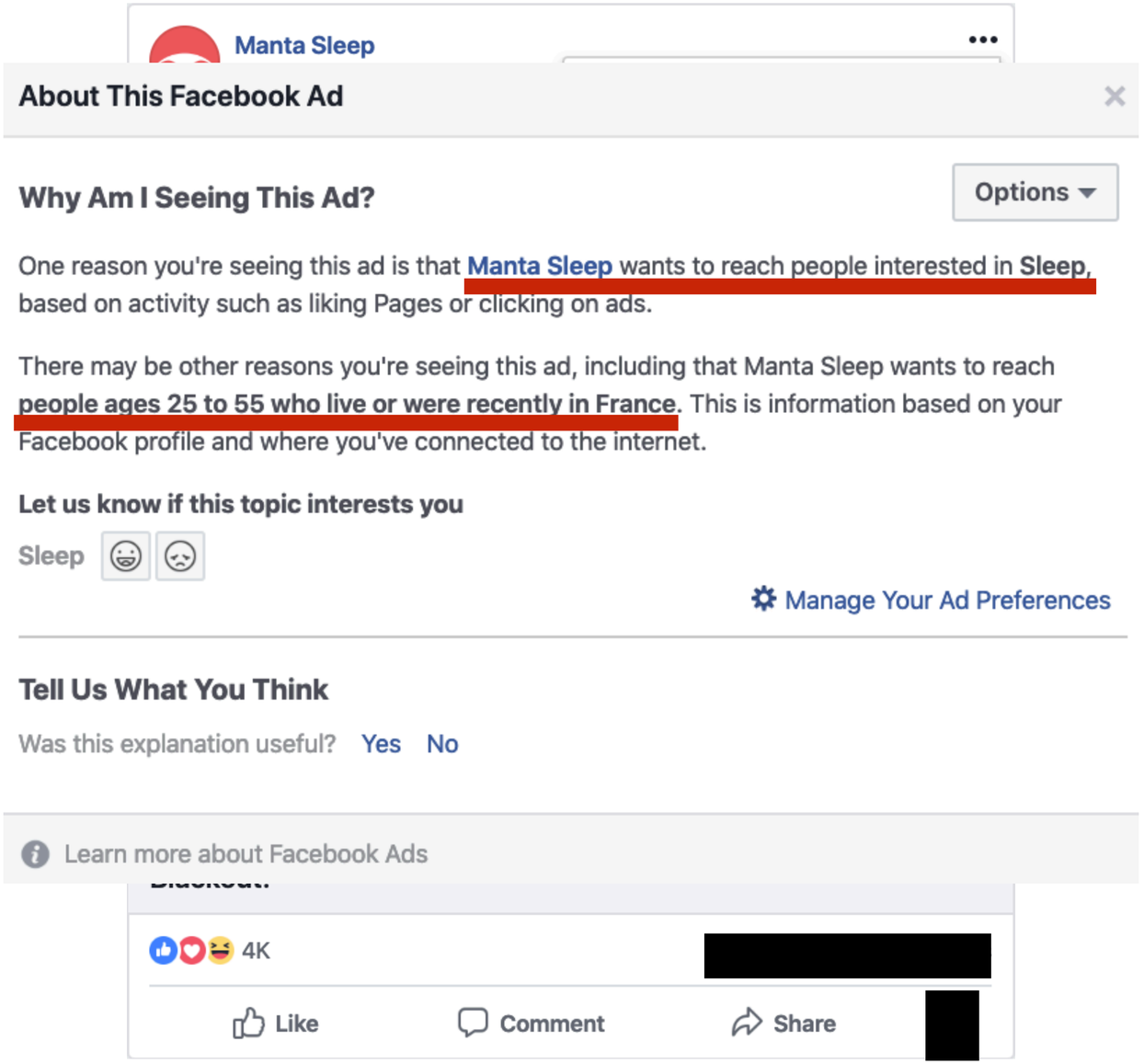

Limitations of Facebook Explanations

- Facebook ad explanations reveal information about the targeting

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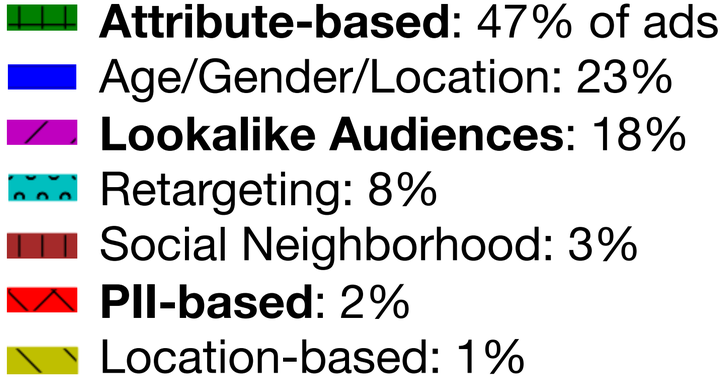
- Facebook ad explanations reveal information about the targeting
- They have limitations:
  - They show one attribute
  - Demographics > Interests > PII-based > Behaviors
  - Show the most prevalent attribute

What targeting strategies do advertisers use?



What targeting strategies do advertisers use?

- **Attribute-based**: 47% of ads
- Age/Gender/Location: 23%
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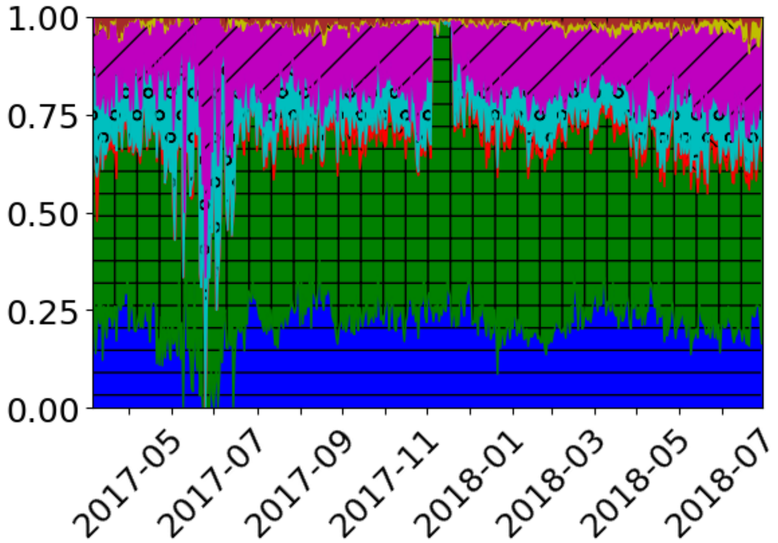

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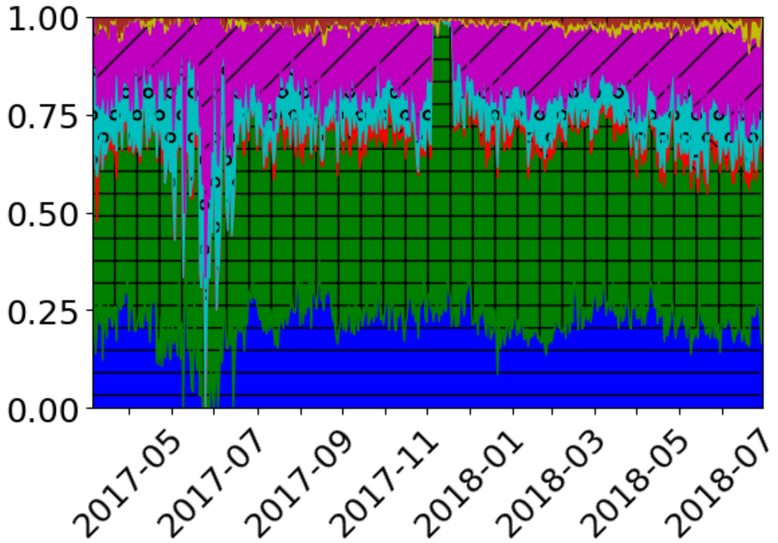

- 74% of **users** PII-based, 92% Lookalike audiences

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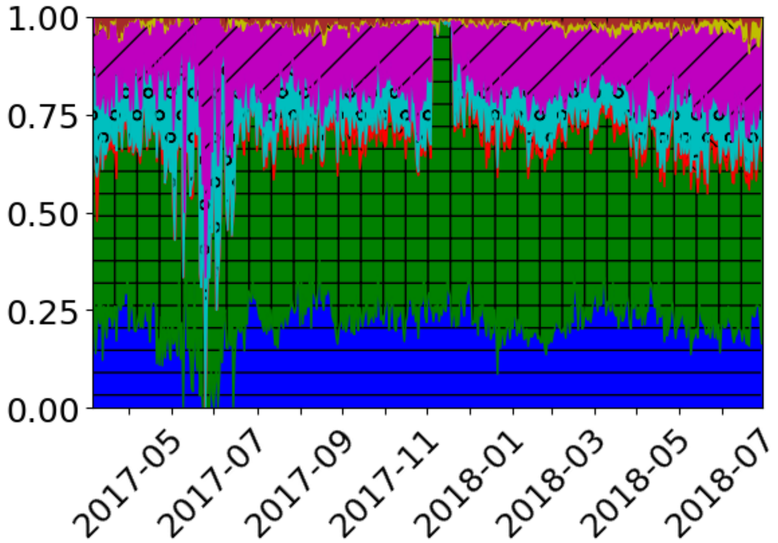

- 74% of **users** PII-based, 92% Lookalike audiences
- Differences between **North America** and **Europe:**
  - PII-based **6%** vs **2%**
  - Lookalike audiences **30%** vs **17%**

What attributes do advertisers use?

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- *591 attributes used by **News and politics** advertisers:*
  - *Anti-fascism, LGBT community*

Do advertisers change ads over attributes?

- 2.5K advertisers that have used more than one attributes
- 65% of them never used the same text with two different attributes
- VICE news:
  - *PC Magazine*: “A self-driving, flying taxi could soon be a reality”
  - *Democratic Party*: “Mr. Trump and Mr. Cohen have a lot of explaining to do”
  - *US Politics (Very Liberal)*: “One of the reasons it’s hard for Trump to navigate the guns issue after Parkland is that the gun rights community itself is still trying to figure out what change is acceptable”

Conclusion

- **Popular** and **verified** advertisers mixed with **niche** and **unverified**
- Advertisers that can be sensitive
- They use strategies that can be considered **invasive** or **opaque**
- The use a **plethora** of attributes that are difficult to monitor
- They change the content of the ads w.r.t. attributes they use

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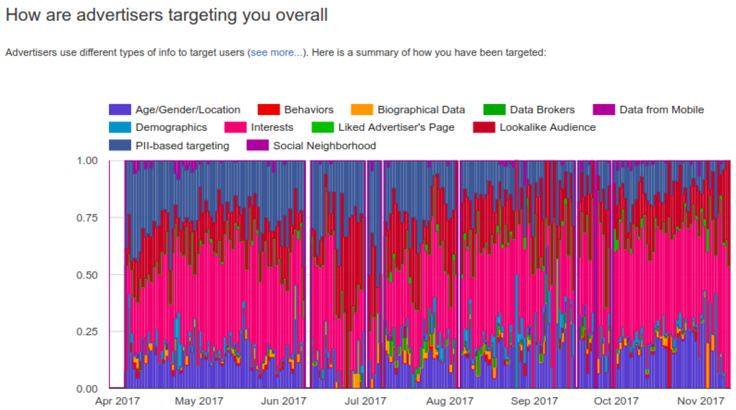
Need for better mechanisms to **audit** ads and advertisers

Need for **global** approach towards **transparency**

AdAnalyst

- A tool to help you make sense of your Facebook ads
- https://adanalyst.mpi-sws.org



Disable adblockers for Facebook and anti-tracking

Set your Facebook in English or French

- **QUESTIONS**

Capturing Facebook Ads

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```
▼<span class="v_1i5pqo2ei6 r_1i5pqo2ehp" id="u_ps_0_0_e">
  ▼<s class="c_1i5pqo2ei5 q_1i5pqo2ehm u_1i5pqo2ehs">
    <s class="c_1i5pqo2ei5 l_1i5pqo2ei2">S</s>
    ▼<s class="c_1i5pqo2ei5 q_1i5pqo2ehm u_1i5pqo2ehs">
      <s class="c_1i5pqo2ei5 k_1i5pqo2ei1">P</s>
    </s>
    ▼<s class="c_1i5pqo2ei5 q_1i5pqo2ehm u_1i5pqo2ehs"> == $0
      <s class="c_1i5pqo2ei5 k_1i5pqo2ei1">P</s>
    </s>
    ▶<s class="c_1i5pqo2ei5 q_1i5pqo2ehm u_1i5pqo2ehs">…</s>
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Capturing Facebook Ads

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