

## **Online Appendix A**

### **Choosing Target Population and Quotas with Facebook Ads (February 2017)**

This appendix presents the basic options to target an audience and set quotas for Facebook Ads to study a political group.

#### **Background**

As a prerequisite to conduct surveys via Facebook Ads, researchers need a Facebook Account and register for a Facebook Ads account within Facebook.

An introduction to Facebook Ads and to audience targeting can also be found at

<https://www.facebook.com/business/learn/facebook-ads-basics>

<https://www.facebook.com/business/learn/facebook-ads-choose-audience>

The presentation will be based on two examples for the U. S. Presidential election 2016: 1.) Male Facebook users aged 50 to 59 from Texas who support the Democratic Party. 2.) Female Republicans aged 20 to 29 from New York, who like Donald Trump but not Ted Cruz.

#### **Choosing an Audience**

From Facebook Account: Click on “Your Pages” option on the right top, choose “Create Ads”.

From Facebook Ads Account: “Create Ad” button on the right top.

The process consists of three steps to define: Campaign – Ad Set – Ad.

#### *Campaign*

In the beginning, a researcher has to determine the objective of the campaign.

Under the header “Consideration”, choose “Send people to your website”.

In the following, one has to enter the preferred name of the campaign. For our first example, we call it “USA – Democratic Party 2016”.

## Ad Set

The next window shows several options to define the audience. The “Audience Definition” section on the left side estimates how many users could potentially be reached.

The screenshot displays the Facebook Ad Set configuration interface. On the left, the 'Audience' section includes a checkbox for 'Prefill with options from your last ad set' and a blue box titled 'Target Ads to People Who Know Your Business'. Below this, targeting options are set: 'Locations' to 'Everyone in this location' with 'United States' selected; 'Age' to '18 - 65+'; 'Gender' to 'All'; and 'Languages' with an input field. A 'Detailed Targeting' section is set to 'INCLUDE people who match at least ONE of the following'. On the right, the 'Audience Definition' section features a gauge showing the audience is 'fairly broad' and lists details: Location (United States), Age (18 - 65+), and Placements (Facebook Feeds, Facebook Right Column, Instagram and Audience Network). It also shows a 'Potential Reach' of 193,000,000 people and 'Estimated Daily Reach' for Facebook (2,600 - 6,800 people) and Instagram (4,800 - 13,000 people).

**Fig. A1** The Ad Set interface

As shown by Figure A1, for everyone in the United States aged 18 years or older, which is the default option by Facebook, the potential reach is 193 million. In the following, the options are adjusted to meet the requirements of the two examples:

**Location:** For research purposes, it appears to be more relevant to target “people who live in this location” than the predefined category “Everyone in this location”.

In the **Include** option, one can type or browse the country(ies), state(s), or city(ies) that should be targeted. For the first example, we will add Texas, for the second, we will include New York State.

**Age:** Age can be defined between 13 and 65 and older. For the first example, we will change it to 50 to 59 years old, for the second to 20 to 29 years old.

**Gender:** The options are to target all or women or men only. For the first and second example, we change the target to men respectively women.

**Language:** Option to limit the audience to language(s) spoken. We leave it blank for the examples.

**Detailed Targeting:** Here one can enter or browse a list of interest or likes, demographics such as education attainment, or behavior. This is our most important category as it allows us to define the list of political parties, groups, or politicians we would like to target. For the examples, we add the Democratic Party (United States) in the first example, and the Republican Party (United States) in the second as interest.

**Exclude People or Narrow Audience:** Here one can determine that target population should have at least another interest or demographic trait (Narrow Audience), or that it should be excluded if it has a particular interest or demographic trait (Exclude People). This option does not apply to the first example but to the second, for which we enter Donald Trump in “Narrow Audience” and Ted Cruz in “Exclude People”.

The screenshot displays the Facebook Ad Set configuration interface. On the left, the 'Locations' section is set to 'People who live in this location' with 'United States' and 'Texas' selected. A map shows Texas highlighted. Below the map, 'Age' is set to '50 - 59' and 'Gender' is set to 'Men'. The 'Languages' section is empty. The 'Detailed Targeting' section is set to 'INCLUDE people who match at least ONE of the following' with 'Democratic Party (United States)' listed under 'Interests > Additional interests'. The 'Exclude People or Narrow Audience' section is empty. On the right, the 'Audience Definition' section shows a gauge indicating 'Your audience selection is fairly broad'. Below this, 'Audience Details' lists: 'Location - Living in: United States: Texas', 'Age: 50 - 59', 'Gender: Male', 'People Who Match: Interests: Democratic Party (United States)', and 'Placements: Facebook Feeds, Facebook Right Column, Instagram and Audience Network'. The 'Potential Reach' is 140,000 people. The 'Estimated Daily Reach' shows '950 - 2,500 people on Facebook' (of 87,000) and '210 - 550 people on Instagram' (of 5,600). A disclaimer states: 'This is only an estimate. Numbers shown are based on the average performance of ads targeted to your selected audience.'

**Fig. A2** The Ad Set interface adjusted for the first Example (Male Democrats aged 50-59 from Texas)

Figure A2 shows the adjusted options for the first example. The potential reach has changed to 140,000 people who qualify as male Democrats from Texas, aged 50 to 59, in Facebook. We also see that Facebook estimates that – based on the predefined daily budget of 10 Euro – the daily reach of the advertising will be in the range of 950 to 2,500 people of the 83,000 who are expected to be on Facebook on a given day from the total target population of 140,000.

**Audience Definition**

Your audience selection is fairly broad.

**Audience Details:**

- Location - Living In:
  - United States: New York
- Age:
  - 20 - 29
- Gender:
  - Female
- Exclude:
  - Interests: Ted Cruz
- People Who Match:
  - Interests: Republican Party (United States)
- And Must Also Match:
  - Interests: Donald Trump
- Placements:
  - Facebook Feeds, Facebook Right Column, Instagram and Audience Network

Potential Reach: 32,000 people

**Estimated Daily Reach**

900 - 2,400 people on Facebook

600 - 1,600 people on Instagram

This is only an estimate. Numbers shown are based on the average performance of ads targeted to your selected audience.

**Detailed Targeting** INCLUDE people who match at least ONE of the following

- Interests > Additional Interests
  - Republican Party (United States)

Add demographics, Interests or behaviors | Suggestions | Browse

and MUST ALSO match at least ONE of the following

- Interests > Additional Interests
  - Donald Trump

Add demographics, Interests or behaviors | Suggestions | Browse

Narrow Further

EXCLUDE people who match at least ONE of the following

- Interests > Additional Interests
  - Ted Cruz

**Fig. A3** The Ad Set interface adjusted for the second Example (Female Republicans aged 20-29 from New York)

Figure A3 shows the adjusted options for the second example. The potential reach has changed to 32,000 people who qualify as female Republicans from New York, aged 20 to 29, who like Donald Trump but not Ted Cruz in Facebook. With the predefined daily budget of 10 Euro, the estimated daily reach of the advertising will be in the range of 950 to 2,400 people of the 9,400 who are expected to be on Facebook on a given day from the total target population of 32,000.

**Placements:** Here one can determine where the ads should appear. “Automatic Placements” will show it at the location where it performs the best. “Edit Placements” gives the option to show the ads on Facebook or Instagram as well as for computer or mobile phone users.

**Budget & Schedule:** Here one can determine the budget and the schedule of the Ad Set.

As discussed in the article, the allocation algorithm would target those 950 to 2,500 users a day who are believed to have the strongest interest in the advertisement in example 1. By increasing the daily budget for the example of the Democrats from 10 to 20 Euro, the estimated daily reach increases to 1,800-4,600 people, thereby also broadening the selection criteria of the allocation algorithm.

The budget is also a crucial function to impose quotas before or during the sampling process. By either increasing or decreasing the daily budget, one can immediately increase or decrease the sampling of a population of subgroup.

**Optimization for Ad Delivery:** Here it is possible to determine the type of delivery and the bid for the delivery method. The predefined options are “Link Clicks” and automatic bidding.

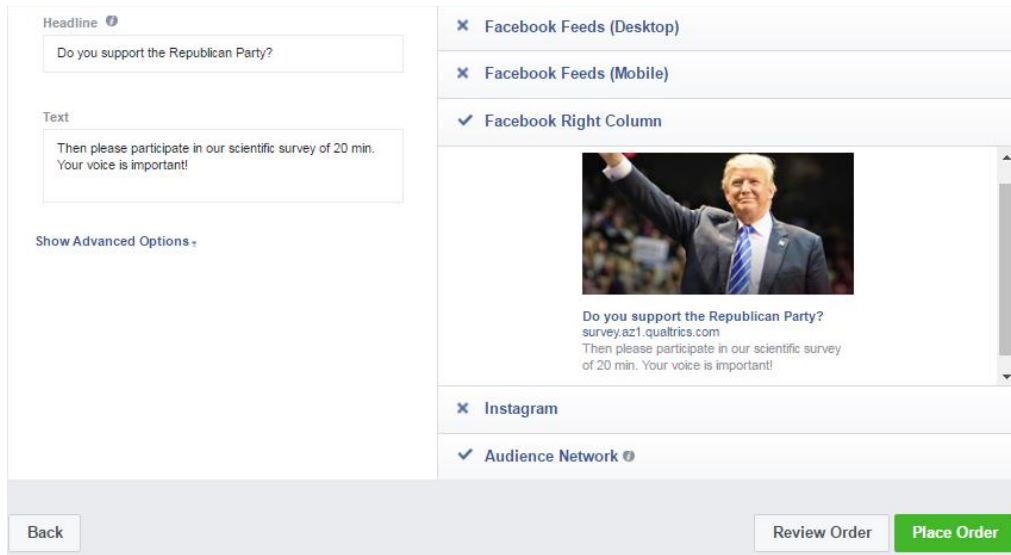
Subsequently, one has to name the Ad Set which will appear under the “USA – Democratic Party 2016” respectively “USA – Republican Party 2016” campaigns. We enter the following names “Dems - Texas - M - 50-59” and “Reps - New York - F - 20-29”. Additional Ad Sets can be created within a campaign.

### *Ad*

On the third page, one can choose the Ad picture format under the **Format** option, and upload the desired pictures for the Ad box under the **Images** option.

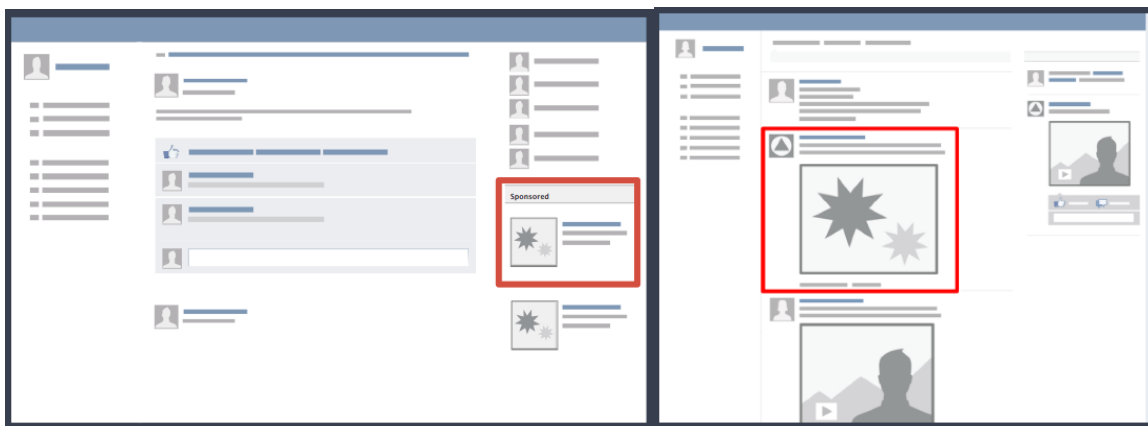
**Page & Links:** Here one has to enter the webpage of the questionnaire, and enter the headline and text of the Ad as shown by Figure A4 for the Republican Party example. There is also the option to connect the Ad to a Facebook fan page and to determine the places on the Facebook user interface where the Ad should appear.

The “Place Order” button finishes the ad. Facebook will whether the Ad meets the Facebook Advertising Guidelines.



**Fig. A4** Choosing the Headline and Text for the Republican advertisement

After approval, Facebook Ads runs small advertising boxes on the right side, in the news-feed, or on the front page of the Facebook user interface for the target population as shown by Figure A5.



**Fig. A5** Advertising box placement on the Facebook user interface.

Source: Facebook.com

### Adjusting for potential biases

It is possible to learn more about the characteristics of a target population in terms of demographics and interests that are likely to influence the allocation procedure of the Facebook Ads algorithm. The feature is called **Audience insights** and can be reached in the menu of the Facebook Ads account.

In “Audience insights,” one can set the target population similar as in the Ad Set above. The feature provides more information about the target population in the categories “Demographics”, “Page Likes”, “Location”, “Activity”, “Household”, and “Purchase”. Figure A6 shows the top page likes of Facebook users who have an interest in the Democratic Party. We can see that the Facebook fan page of Barack Obama is the most relevant page for Democrats. While Obama has about 39.1 million Facebook fans in total, 11.1 million of them are also interested in the Democratic Party. This suggests that fans of the Democrats are 2.6 times more likely to like the page of Barack Obama compared to the average Facebook user. The list can be extended to show the 100 most relevant fan pages.

<b>Page Likes</b> Facebook Pages that are likely to be relevant to your audience based on Facebook Page likes.				
Page	Relevance <sup>i</sup> ▼	Audience	Facebook	Affinity <sup>i</sup>
Barack Obama	1	11.1m	39.1m	2.6x 
Michelle Obama	2	4.5m	12.7m	3.2x 
CHANEL	3	2.7m	13.4m	1.9x 
Oprah Winfrey	4	2m	8.6m	2.2x 
Hillary Clinton	5	1.4m	5.2m	2.5x 
Michael Kors	6	2.8m	15.2m	1.7x 
My Black is Beautiful	7	841.7K	2.3m	3.4x 
Victoria's Secret	8	3.7m	22.2m	1.5x 
Alicia Keys	9	4m	24.7m	1.5x 
Morris Chestnut	10	1.1m	3.8m	2.7x 
Jennifer Hudson	11	1.5m	6.2m	2.3x 
MAC Cosmetics	12	2.5m	13.4m	1.8x 
Occupy Democrats	13	1m	3.5m	2.8x 

**Fig. A6** The favorite fan pages by Facebook users who have an interest in the Democratic Party

The optimization strategy by the Facebook advertisement algorithm implies that it is more likely that it targets those Democrats who also like or are active on the fan pages of Barack Obama, Michelle Obama, CHANEL, Oprah Winfrey, Hillary Clinton, etc.

Interestingly, Bernie Sanders does not appear to be on the top 100 list for the defined target population. This has implications for the allocation algorithm of Facebook Ads, as it appears that it is for example more likely that the allocation algorithm would invite fans of the page of Hillary

Clinton, which is ranked as number 5, than fans of the page of Bernie Sanders. Thus, a researcher that would target fans of the page of the Democratic Party with the goal to measure whether the support for Clinton or Sanders is higher among politically active Democrats could receive biased results in favor of Clinton.

Whether such a bias is problematic depends on the particular research question. “Audience insights” gives researchers the opportunity to study potential biases in the algorithm before the sampling takes place. The options “Exclude People”, “Narrow Audience”, or increasing or decreasing the budget allow researchers to adjust for potential biases or different participation rates before or during the sampling process.

During the sampling process, researchers can click on the campaigns in the “Ads Manager” or “Power Editor” in the main menu of the Facebook Ads account to supervise their ads, and to discover whether differences in the participation rate between groups and within groups occur.

Figure A7 shows fictitious data for our examples. We can see that the Democrat sample has a higher participation rate as indicated by the higher click-through rate (CTR %) and the absolute link clicks. If a research question requires equal participation, one can reduce the budget for the Democrats or increase the funding for the Republicans.

Ad Sets		Performance							
<input type="checkbox"/>	Ad Set Name	Results	Cost	Reach	Impress...	Clicks	Avg. CPM	Avg. CPC	CTR %
<input type="checkbox"/>	Dems - Texas - M - 50-59	48 Link Clicks	€0.08 Per Link Click	1,729	1,875	73	€2.09	€0.05	3.893%
<input type="checkbox"/>	Reps - New York - F - 20-29	38 Link Clicks	€0.10 Per Link Click	1,922	2,133	60	€1.81	€0.06	2.813%

**Fig. A7** Performance comparison between the two Ad Set examples

Similarly, different participation rates could exist within a group. In Figure A8 we see that there are 102 link clicks for an Ad Set. We see that 47 come from women, while 54 come from men. However, when we look at the different reach values, we can infer that women have a higher participation rate (female click-through rate of  $47/659 = 0.071$  percent vs.  $54/1134 = 0.047$  percent for men). If the research question requires that gender participation approximates gender group distribution, the researcher could generate additional ads that explicitly target men.



Ad Name	Delivery ?	Results ?	Reach ?	Cost ?	Amount Spent ?
	● Not Delivering Campaign is Off	102 Link Clicks	1,799	€0.02 Per Link C...	€2.40
Female		47	659	€0.02	€0.87
Male		54	1,134	€0.03	€1.53
Unknown		1	6	—	€0.00
► Results from 1 Ad		102 Link Clicks	1,799 People	€0.02 Per Link C...	€2.40 Total Spent

**Fig. A8** Performance comparison between female and male participants for a given Ad

The proportion of the reach column for key demographics is also another indicator about the potential bias of the allocation algorithm. The gender reach suggests that there are about 36.6 percent women in the target population. However, if the actual figure in the target population is for example 25 percent (which researchers can check when creating the Ad Set or using the “Audience insights” function), the allocation algorithm is sending relatively more survey invitations to women than to men. This, in turn, might justify using additional quotas or changing the funding of gender specific ads.